Biodiversity Impact Assessment for Environmental Authority (EA0001399) Amendment

Surat Gas Project (SGP) North Girrawheen Development Stage 1

Prepared for:
Arrow Pty Ltd

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1.0 Introduction

Attexo Pty Ltd (Attexo) has been engaged by Arrow Pty Ltd (Arrow) to undertake an assessment of biodiversity impacts associated with the development of the Surat Gas Project (SGP) North to inform an application to amend the approved Environmental Authority (EA0001399) under the *Environmental Protection Act 1994* (EP Act). Specifically, amendments are being sought to authorise impacts associated with the Girrawheen Development Stage 1 (the Project) of the SGP North gas field which involves the construction of 214 wells and associated supporting activities and additional infrastructure on the following tenements:

- PL305;
- PL491; and
- PL492.

The SGP North EA also covers PL304, PL494 and PL1044 however, no works are proposed on these tenements at this time. Attexo has been engaged to undertake the following to inform an amendment application under the EP Act:

- assess the ecological values of the Study area;
- calculate anticipated impacts on these values associated with the updated Project design;
- confirm the extent to which these impacts are already approved or trigger an amendment to the current EA; and
- where the impacts are not already approved under the current EA, assess and report on the likely significance of those impacts.

This report has been prepared specifically to support the amendment application documentation for the SGP North EA.

1.1 Project description

The SGP North Project will deliver natural gas to the QGC Bellevue Delivery Point and comprises a number of petroleum leases located to the north-east of the township of Miles, Queensland. The proposed EA amendment seeks to authorise impacts associated with the following infrastructure:

- 214 wells, comprising primarily vertical wells with deviated wells being implemented where required to manage surface constraints;
- 11 water monitoring bores;
- Right of Ways (RoWs) for the construction of gathering lines, access tracks and a water transfer export pipeline (water trunkline);
- the Girrawheen field compression station (FCS) and gas engines to power the facility;
- a hybrid gas/solar power station;
- a temporary accommodation camp;
- a water transfer station;
- communication towers;

- minor road and intersection upgrades;
- access tracks;
- a warehouse, offices and laydown yards;
- gravel pits; and
- stygofauna investigation monitoring bores.

The area in which this infrastructure is proposed is referred to as the Study area throughout this report. For the purposes of this assessment, values and impacts have been reported using a Study area around the development footprint (refer **Figure 1.1**) which is based on a 500 m buffer of proposed infrastructure.

1.2 Scope of this report

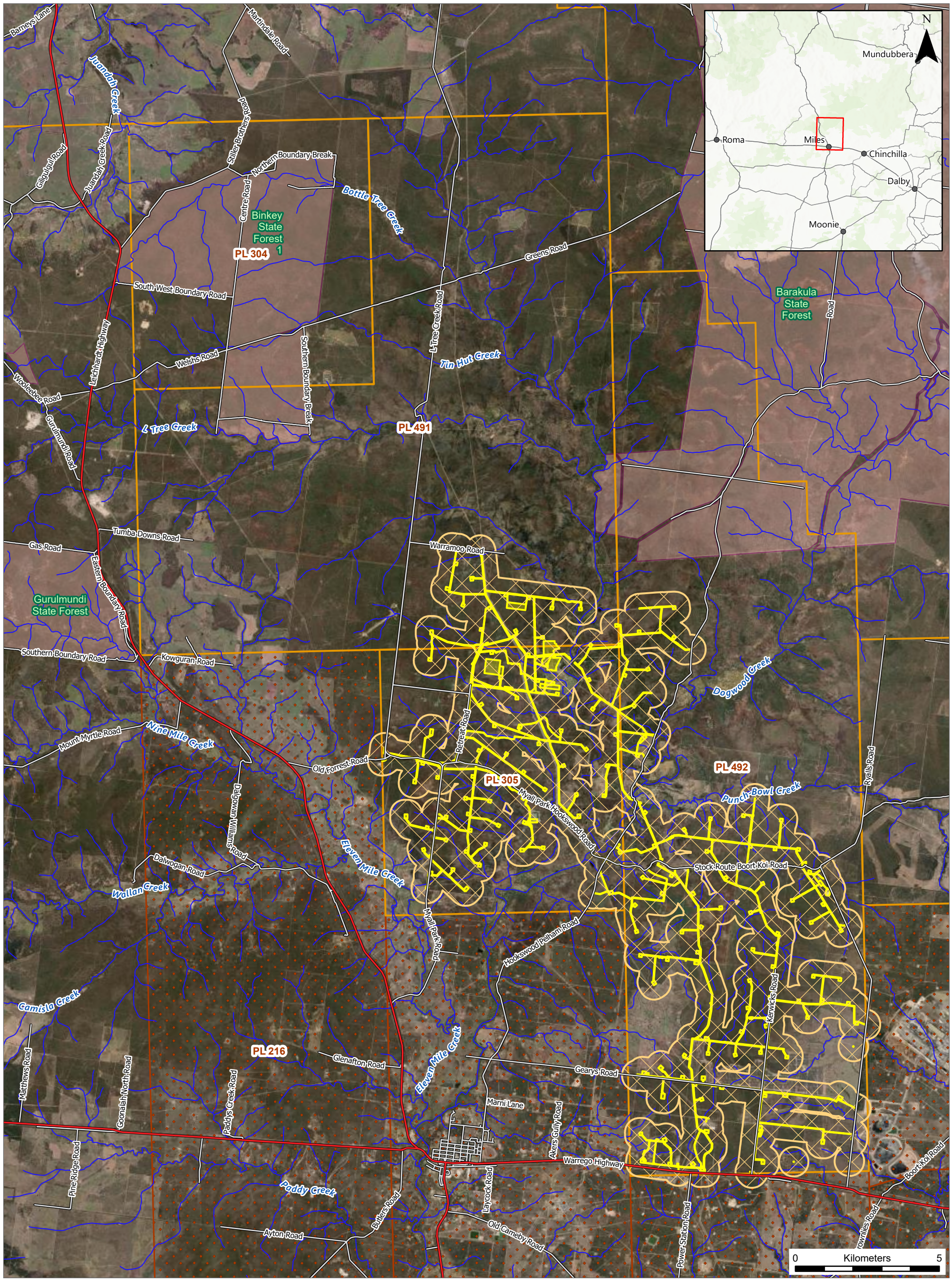
The scope of this report includes the following matters relevant to the EA amendment:

- a review of desktop biodiversity information and ecological field surveys of the Study area to identify any new (i.e. previously unassessed) values relevant to the amendment application (e.g. records and habitat values for species such as Koala, Greater Glider and Painted Honeyeater that were not listed at the time of the original EA application and approval);
- the calculation of predicted impacts on Environmentally Sensitive Areas (ESAs) protected under the EP Act;
- the calculation of predicted impacts on Prescribed Environmental Matters (PEMs) protected under the *Environmental Offsets Act 2014* (Qld) (EO Act);
- an analysis of the extent to which these predicted impacts are already approved under the existing SGP North EA and identification of any further impacts that would trigger the requirement to amend it; and
- an impact assessment for all trigger values, including previously unassessed biodiversity values identified through the desktop assessment.

1.2.1 Limitations

In undertaking the analysis, Attexo has relied on spatial data and data extracts provided by Arrow between 2-4 July 2024 (Stage 1). Any subsequent amendments have not been incorporated into the assessment. For the purposes of this report, Attexo notes the following limitations:

- by agreement with Arrow, all well pads are assumed to constitute 'essential petroleum activities' as defined in the SGP North EA. It is Attexo's understanding that there are some well pads that exceed the size limits imposed by the definition however, Arrow is proposing to authorise these by amending the definition rather than authorise each individually through the inclusion of a despite clause.
- it is understood that all gathering RoWs and other linear corridors have a width of less than 40 m and are compliant with Condition (Biodiversity 5).
- Attexo understands that Arrow is seeking to have impact locations removed from *Schedule F, Table 3 – Significant residual impacts to prescribed environmental matters*. As such, no reference to specific PLs has been incorporated into this table; impact values pertain to the SGP North Stage 1 Project only.



SGP North Study Area

SURAT GAS PROJECT NORTH

- Watercourse
- Highway
- Main Road
- Local Road
- Study Area
- Project Area
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)
- State forest

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_024[E] **FIGURE 1.1**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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1.3 Regulatory Framework

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

The Environmental Impact Statement (EIS) for the broader SGP 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) (included as **Appendix A**).

Disturbance to the habitat of MNES species and communities already approved under EPBC 2010/5344 have been considered in the assessment. There are also MNES that have been included in the assessment where a species that has been historically recorded in the Study area and listed as conservation-significant under both the EPBC Act and Queensland *Nature Conservation Act 1992* subsequent to the original approval in 2013.

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

- *Homoranthus decumbens* – listed as 'endangered' in February 2013;
- Koala, *Phascolarctos cinereus* – first listed in April 2012; upgraded to 'endangered' in February 2022;
- Greater Glider, *Petauroides volans* – listed as 'endangered' in July 2022;
- Glossy Black-cockatoo (south-eastern), *Calyptorhynchus lathami lathami* – listed as 'vulnerable' in August 2022;
- Painted Honeyeater, *Grantiella picta* – listed as 'vulnerable' in July 2015;
- Diamond Firetail, *Stagonopleura guttata* – listed as 'vulnerable' in March 2023;
- Brigalow Woodland Snail, *Adclarkia cameroni* – listed as 'endangered' in December 2016; and
- Dulacca Woodland Snail, *Adclarkia dulacca* – listed as 'endangered' in December 2016.

1.3.2 *Environmental Protection Act 1994* (Queensland)

The primary approval governing the operation of the SGP North Project at the State level is the Environmental Authority (EA0001399) issued under Queensland's EP Act (see **Appendix B**). The EA as currently in force was issued on the 1 October 2021 and authorises up to 588 gas production wells and up 650 km of gathering pipelines across PL304, PL305, PL491, PL492, PL494 and PL1044.

The existing 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 SGP North EA to reflect impacts associated with the current design.

The primary conditions protecting the biodiversity values of the SGP North area are contained in Schedule F of the SGP North EA. A number of amendments are being sought to these conditions to authorise impacts associated with the development of the SGP North gas fields and associated infrastructure. Details of the proposed amendments are provided in **Section 5.0**.

1.3.2.1 Petroleum activities

The Study area defines three categories of petroleum activities which are used to restrict the kinds of activities that can be undertaken in ESAs and their protection zones. These are 'low impact petroleum activities' that involve limited ground disturbance, 'essential petroleum activities' and 'petroleum activities'.

A summary of the types of activities proposed for the development of the Project and their corresponding definitions is provided in **Table 1.1**.

Table 1.1 Petroleum activities proposed for Girrawheen Development Stage 1

Infrastructure type	Essential petroleum activity	Petroleum activity
Well pads	✓	-
RoW (Gathering)	✓	-
Supporting Access Tracks	✓	-
Field Compressor Station (FCS)	-	✓
Water transfer station	-	✓
Proposed quarries and borrow pit	-	✓
Extra work area (pad)	-	✓
Extra work area (pipeline infrastructure)	-	✓
Extra work area	-	✓
Laydowns	-	✓
Communication Tower	-	✓
Warehouse, facility, camp	-	✓
Camp	-	✓

1.3.2.2 Conservation status of Regional Ecosystems

The Regional Ecosystem Description Database (REDD) lists Regional Ecosystem (RE) types by their biodiversity status (BD status) and the vegetation management class (VM class) of each. 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 Environmentally Sensitive Areas (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
- Prescribed environmental matters (PEMs) are based on VM class.

1.3.2.3 Essential Habitat

Under the definitions in the SGP North EA, 'essential habitat' is a Category C ESA only where it is for an endangered or vulnerable species of wildlife, and only to the extent that it has been validated as 'essential habitat' by ground-

truthing surveys in accordance with the *Vegetation Management Act 1999* (VM 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.

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 *Nature Conservation Act 1992* (NC Act) (see Schedule 2 of the 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. Schedule F, Table 1 contains references to 'essential regrowth habitat' however, there is no definition of this included in the SGP North EA.

Essential Habitat impacts in relation to this EA amendment are discussed further in **Section 5.1**.

1.3.3 Environmental Offsets Act 2014

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

- an area of habitat for an animal that is endangered, vulnerable or special least concern ('protected wildlife habitat');
- 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 Innovation (DESI));
- an area that is or is not shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife;
- 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.

Within the EA process under the EP Act, significant residual impacts on these MSES are authorised via their inclusion in *Schedule F, Table 3 – Significant residual impacts to prescribed environmental matters* (refer **Section 5.2**).

1.3.4 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;
- Special Least Concern.

It is noted that habitat for a 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 Study area.

Similarly, habitat for a plant classed as Special Least Concern does not constitute a PEM or ESA however, habitat for a Special Least Concern animal is a PEM for the purposes of the EO Act. As such, the presence of Special Least Concern plants has been noted however, only Special Least Concern fauna species have been included in the PEMs table.

1.3.4.1 Protected Plants Framework

Under the Queensland Government's Protected Plants Framework, where non-exempt clearing of protected plants in the wild is proposed within a high risk area, a proponent is required to complete a flora survey prior to any clearing. The main objective of the flora survey is to locate any extinct, extinct in the wild, critically endangered, endangered, vulnerable or near threatened plants within a clearing impact area. Pre-clearance surveys are typically undertaken within 12 months prior to construction to support an application for a clearing permit under the NC Act where required.

1.3.5 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 REs is referred to in the assessment. The VM class is used to define PEMs for the purposes of the EO Act.

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.

2.0 Methodology

The ecological values discussed in this Biodiversity Impact Assessment report were initially identified through a combination of desktop and field-based assessments undertaken as part of the EIS and Supplementary EIS process for the broader SGP between 2009 and 2013, and follow up surveys conducted by EcoSmart in 2016-17 (EcoSmart, 2017). A number of other ecological surveys have been undertaken across parts of the SGP to support various State and Commonwealth approvals, including field verification of proposed infrastructure locations undertaken by Arrow ecologists. These studies have provided Arrow with a comprehensive understanding of the ecological values and flora and fauna assemblages characteristic of vegetation communities and habitats in the Study area.

The following sections summarise the desktop and field-based information relevant to the Study area and the processes by which this information was collected.

2.1 Desktop ecological assessments

2.1.1 Description of general ecological values

Desktop assessments for the current assessment involved a review of Queensland Government mapping to identify the presence of landscape ecological values and MSES in the Study area. This included reviews of:

- the protected area estate;
- connectivity values (Queensland Statewide Corridors mapping);
- catchment and waterway values (Queensland major watercourse lines mapping, watercourse identification map, MSES – high ecological value waters);
- wetland values (MSES – high ecological significance wetlands mapping, wetland protection areas);
- waterways providing fish passage;
- legally secured offset areas;
- designated precincts in strategic environmental areas;
- fish habitat areas;
- marine plants; and
- highly protected zones of State marine parks.

2.1.2 Desktop flora and fauna assessments

A desktop assessment was undertaken in March 2024 to identify terrestrial flora and fauna values potentially relevant to the Study area. The intent of the desktop assessment was to identify ESAs and PEMs relevant to the Study area, including threatened and migratory species of conservation significance that have been listed since the current SGP North EA was approved (1 October 2021).

Desktop assessments for the current assessment involved a review of:

- The Department of Climate Change, the Environment, Energy and Water's (DCCEEW) Protected Matters Search Tool (PMST) based around the Study area (results included in **Appendix C**);
- DESI WildNet database to identify previously recorded flora and fauna species within the SGP North area plus a 50 km buffer. Search results from March 2024 (based around four point searches in the northern, central (two points) and southern portions of the Study area) are included in **Appendix C**; and
- Queensland Government mapping products, including certified RE Mapping (Version 13) and Protected Plants Trigger Mapping.
- project-specific ground-truthed RE (GTRE) mapping undertaken by suitably qualified ecologists for Arrow and threatened flora records maintained in Arrow's GIS;
- project-specific survey reports, data and habitat mapping rules developed using results from terrestrial fauna surveys relevant to the Study area;
- Recent work undertaken by EcoSmart (2023) to update and consolidate ecological data collected across the broader SGP, which included recent database searches within 50 km of the entire SGP area; and
- Available published ecological information for threatened flora and fauna species where available.

2.1.2.1 Likelihood of occurrence assessment

A Likelihood of Occurrence Assessment was undertaken using the results of the desktop searches described above. This assessment refined the potentially occurring flora and fauna species based on suitable habitat availability, the proximity of known records and the species-specific habitat mapping rules develop by Arrow for the broader SGP Project and determined to be applicable to the Study area.

The following categories were applied in this assessment:

- **Known to Occur**: The species has been recorded within the Study area.
- **Likely to Occur**: Suitable habitat for the species is present within the Study area and historical records exist within 10 km of the Study area (and are less than 20 years old).
- **Possibly Occurring**: Suitable habitat for the species is present within the Study area and historical records occur within 10-50 km.
- **Unlikely to Occur**: Whilst the Study area contains suitable habitat, the nearest historical record is greater than 50 km away, or whilst historical records exist within 50 km of the Study area, no suitable habitat is present.

Threatened fauna species previously recorded within 50 km of the Study area were compiled into a Likelihood of Occurrence table (refer to **Appendix D**). Fauna and flora species identified as known to occur or likely to occur within the amendment have been included in this assessment.

2.2 Field-based assessments

Several ecological surveys have been conducted within the Study area and surrounds. A summary of relevant survey programs is provided in **Table 2.1**, with a more detailed breakdown of flora and fauna survey efforts provided in the following sections.

Data collected during ecological field survey (EFS) by Arrow ecologists is included at **Appendix E**.

Table 2.1 Summary of Ecological Surveys conducted across the Project

Survey	Survey Type	Timing	Undertaken by
Girrahween Solar Farm Ecological Assessments	Flora and Fauna	August 2023	Attexo
Off-Tenement Terrestrial Ecology Survey Report	Flora and Fauna	December 2019	EcoSmart
Surat Gas Project – Terrestrial Ecology Report	Flora and Fauna	October 2016 March 2017	EcoSmart
Surat Pipeline Survey	Flora	Various (2009-2013)	Arrow
Surat Ecological Studies	Flora	2016-2017	Arrow
Supplementary EIS Surveys	Flora and Fauna	February 2013	3D Environmental, EcoSmart
EIS Surveys	Flora and Fauna	October – December 2009 May 2010	3D Environmental, EcoSmart

2.2.1 Flora survey effort

Project-specific RE mapping and the assessment of terrestrial flora values is based on numerous field surveys undertaken across the broader SGP North area since the original EIS in 2013. GTRE mapping across the wider SGP North gas fields builds on mapping prepared for the EIS and refined by EcoSmart Ecology in 2017. Since then, this GTRE mapping has been systematically verified and updated based on field survey efforts that are part of Arrow's scouting and pre-clearance surveys to assist in the implementation of the mitigation hierarchy for the field development layout.

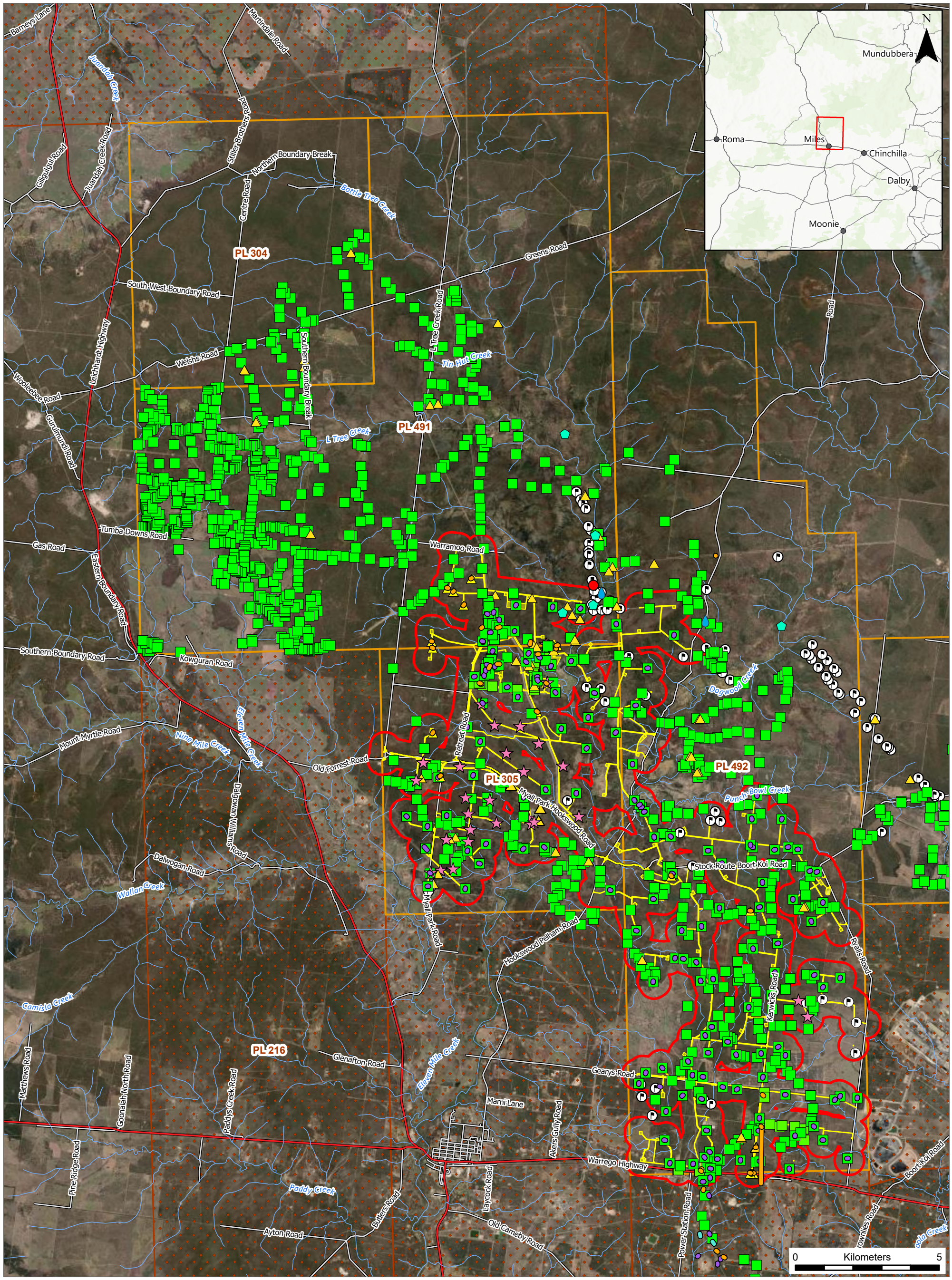
In total, 804 vegetation assessments have been undertaken in the Study area in accordance with the *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (Neldner, 2022), including:

- **Secondary Site Assessments**: Used for the primary classification and detailed descriptions of REs and vegetation communities. They incorporate the collection of the overall structural characteristics of a community and the composition of flora species within each of the structural layers.
- **Tertiary Site Assessments**: Like the secondary site assessments in their collection of structural characteristics and species composition within each structural layer, however these assessments only focus on the dominant species within each of these layers. Tertiary sites were also used in areas where seasonal conditions made it difficult to complete a full secondary site assessment.
- **Quaternary Site Assessments**: Used as the main source of data collection whilst traversing through the survey area, these surveys were undertaken at regular intervals to confirm the presence of already identified vegetation communities and to refine the mapping units of where these vegetation communities change. These assessments are rapid assessments when compared to the more comprehensive secondary and tertiary site assessments.
- **Opportunistic Flora Observations**: Opportunistic observations of flora species not previously noted or infrequently recorded were made during all survey efforts undertaken across the broader SGP. Opportunistic observations of threatened flora species recorded within the Study area or within adjacent and representative vegetation have also been included in this biodiversity impact assessment.

Flora survey sites were initially selected using aerial photograph analysis and State RE mapping but were also undertaken opportunistically whilst field teams were traversed through the broader SGP area. The following assessments have been undertaken within and surrounding the Study area and have been used to inform GTRE mapping for the Study area:

- 76 Secondary assessment sites;
- 5 Tertiary assessment sites; and
- 723 Quaternary assessment sites.

Numerous generic observation sites were also used to refine the RE mapping within the Study area. The location of all survey sites is presented in **Figure 2.1.**



Flora Survey Effort

SURAT GAS PROJECT NORTH

- General Observation Point
- Linear Survey Site
- Quaternary Survey Site
- Road Crossing Survey Site
- Secondary Survey Site
- Tertiary Survey Site
- Watercourse Crossing Survey Site
- RE Assessment Site
- Biocondition Survey
- Quaternary Survey
- Secondary Survey
- Highway
- Main Road
- Local Road
- Watercourse
- Study Area
- Project Area
- Petroleum Lease (Granted)
- SGP North (Petroleum Lease - Granted)

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_025[E] **FIGURE 2.1**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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2.2.2 Terrestrial fauna survey

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 Study area between 2013 and 2023. As a result of this effort, fauna assemblages and characteristic microhabitats associated with the broad vegetation communities and habitats in the Study area are well understood.

The primary Project-specific field assessments that inform the description of terrestrial fauna habitats and fauna assemblages in the Study area are derived from:

- Trapping surveys conducted for the Supplementary EIS in 2013; and
- Terrestrial fauna surveys conducted by EcoSmart in October 2016 and March 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, with efforts also undertaken by Attexo ecologists on the Arrow-owned property, Girrahween Station.

2.2.2.1 Main fauna survey effort

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. Ecological assessments for the Supplementary EIS were focused on properties owned by Arrow where Project infrastructure was proposed to be located. For the broader terrestrial fauna surveys conducted by EcoSmart in 2106 and 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.

- **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 20 L 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 Table 4 of the *Terrestrial Fauna Survey Guidelines* (DES, 2022):
  - 4 pitfall traps (representing 432 trap nights)
  - 6 funnel traps (representing 648 trap nights)
  - 10 Elliot traps (representing 1,080 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 9 am.
- **Diurnal Search**: Active diurnal searches undertaken throughout the Study area 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 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 S. &., 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 throughout the Study area or within adjacent and representative vegetation. 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.
- **Opportunistic Fauna Observations**: Opportunistic observations of fauna species not previously noted or infrequently recorded were made during all survey efforts undertaken across the broader SGP. Opportunistic

observations of threatened fauna species recorded within the Study area or within adjacent and representative vegetation have also been included in this biodiversity impact assessment.

The location of these fauna survey sites has been presented in **Figure 2.2** and **Table 2.2.**

Table 2.2 Summary of seasonal and detailed terrestrial fauna survey effort (Supplementary EIS, EcoSmart 2017)

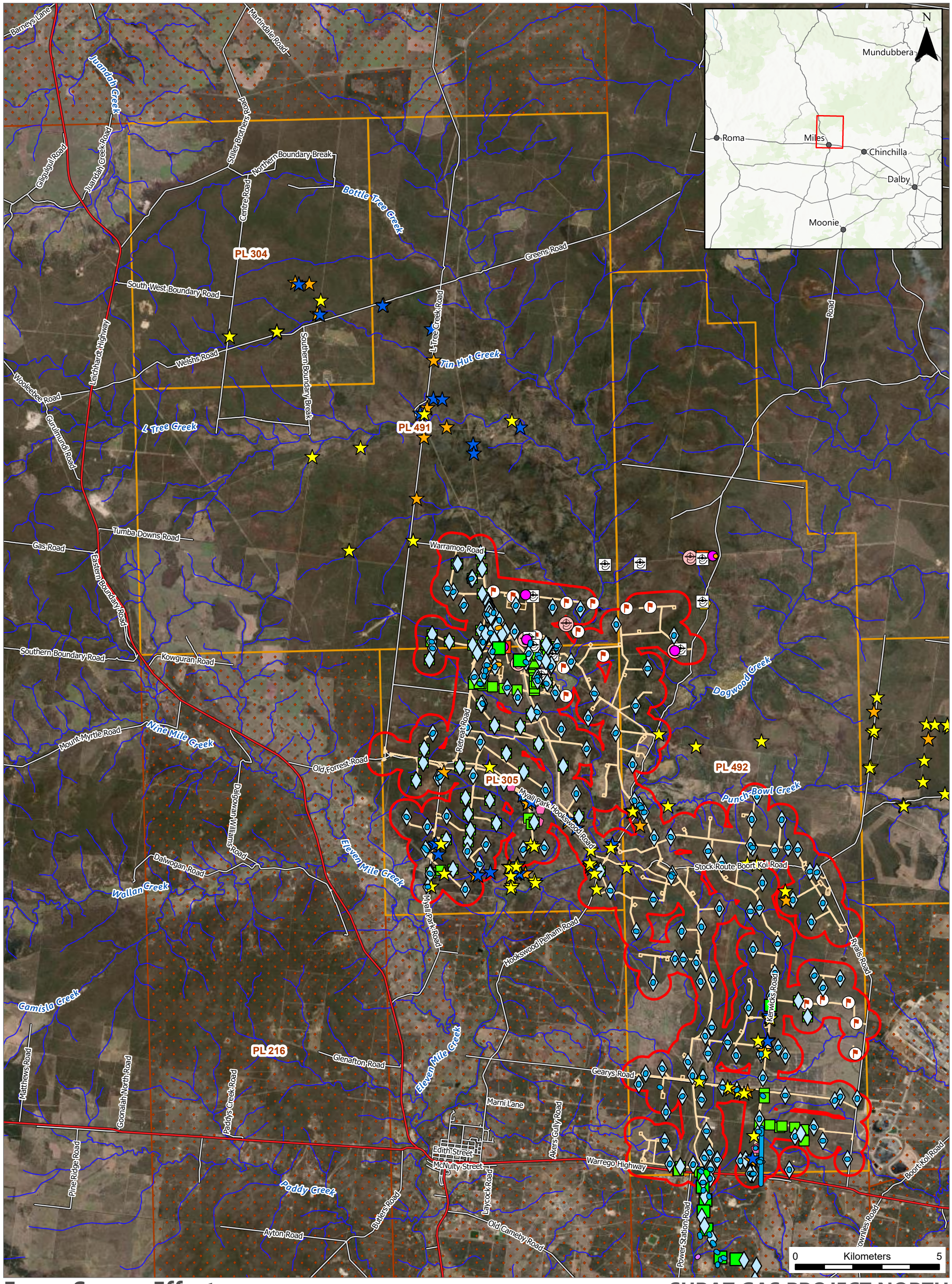
Survey method	Survey effort (Number of sites/duration)			Total survey effort by survey method (number of sites/ duration)
	EcoSmart (2017)		Supplementary EIS	
	October 2016	March 2017	February 2013	
Trap sites	10 (40 nights)	10 (40 nights)	7 (28 nights)	27 (108 trap nights)
Harp trap sites	10 (20 nights)	8 (16 nights)	5 (5 nights)	23 (41 trap nights)
Camera trap sites	14 (56 nights)	15 (60 nights)	1 (4 nights)	30 (120 trap nights)
Anabat	7 (7 nights)	7 (7 nights)	4 (4 nights)	18 (18 detector nights)
Active searches	16 (16 hours)	16 (16 hours)	-	32 (32 person hours)
Bird surveys	14 (28 hours)	12 (24 hours)	13 (26 hours)	39 (78 person hours)
Spotlighting	14 (28 hours)	17 (34 hours)	5 (10 hours)	36 (72 person hours)
Koala SAT surveys	13	5	-	18

2.2.2.2 Supplementary fauna survey

Since 2017, the main fauna survey effort has been supplemented high level pre-clearance surveys, habitat assessments and (where appropriate) Koala SAT surveys undertaken by Arrow's field ecologists (refer **Table 2.3**). EFS survey sheets are included as **Appendix E**.

Table 2.3 Pre-clearance fauna survey effort (Arrow/Attexo ecological assessments)

Survey	SGP North Solar Farm (Attexo, August 2023)	Ecological Field Survey (Arrow, 2020-2023)	Ecological Field Survey (Arrow, 2013-2016)
Habitat assessments and opportunistic observations	14	452	7
Koala SAT Survey	2	2	-



Fauna Survey Effort

SURAT GAS PROJECT NORTH

- Detailed trap sites plus Harp (Elliot, Pitfall, Funnel, Harp + other methods)
- Detailed trap sites (Elliot, Pitfall, Funnel + other methods)
- Harp trap sites (plus other methods)
- Other fauna detection methods
- Anabat
- Camera Trap
- Habitat Assessment Site
- Harp Trap
- Observational Site
- Spotlighting
- Trap Site
- Diurnal Survey
- Koala Spot Assessment
- Diurnal Transect
- Habitat Assessment (Spot) Transect
- Secondary Survey
- Highway
- Main Road
- Local Road
- Watercourse
- Study Area
- Project Area

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_025[E] **FIGURE 2.2**

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Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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2.2.2.3 Targeted fauna survey

Targeted searches were used to detect Greater Glider, Koala and Glossy Black-cockatoo in areas of suitable habitat as part of the main fauna survey effort (EcoSmart, 2017) and subsequent EFS by Arrow's ecologists. Overall, the following targeted detection effort has been undertaken for the Project:

- Koala detection based on the SAT method (Phillips & Callaghan, 2011) but due to high densities of non-koala feed trees, the method was modified to include 20 eucalypt trees (rather than 30 trees of any species) or Koala evidence, whichever occurred first. A total of 22 SAT surveys have been undertaken in the Study area since October 2016.
- Searches were also conducted under *Allocasuarina* spp. for Glossy Black-cockatoo feeding remains (orts). *Allocasuarina inophloia*, *A. littoralis* and *Casuarina cristata* are the primary food tree of this species in the southern Brigalow Belt. Ort searches were conducted until 20 feed trees had been searched or feeding remains located. Searches were only conducted in suitable habitat. In total, nine active searches were conducted across the entire SGP.
- Targeted surveys for Greater Glider are reflected in the spotlighting effort reported in **Table 2.2** (i.e. a total of 36 hours of spotlighting for the main survey effort between 2013 and 2017).

2.2.2.4 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*
- Dulacca Woodland Snail, *Adclarkia dulacca*
- Pale Imperial Hairstreak, *Jalmenus eubulus*
- Dunmall's Snake, *Furina dunmalli*
- Grey Snake, *Hemiaspis damelii*

The invertebrate species are typically associated with Brigalow habitats which are limited in extent in the Study area. While no specific surveys have been aimed at detecting these species, vegetation survey and habitat assessments have been conducted across most of the potential habitat areas and the primary Brigalow habitat areas have been avoided when locating Project-related infrastructure.

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. Spotlighting, opportunistic surveys and active searches are all appropriate survey methods for these species (refer **Table 2.2** and **Table 2.3**), which have not been detected in the Study area.

2.2.3 Threatened species habitat

As part of comprehensive ecological assessments for the broader SGP, EcoSmart and 3D Environmental (2017) developed habitat mapping rules that have been adopted by Arrow to map the distribution of threatened species habitat through the Study area. EcoSmart and 3D Environmental have recently undertaken a review of the original mapping rules and revised them based on new species listings and updated ecological information for the SGP North

area. These habitat mapping rules identify areas of 'general habitat' and 'core habitat' for threatened species, and form the basis of the habitat mapping presented in this report. Rules for individual species are addressed in **Section 3.1.3** (flora) and **Section 3.2.3** (fauna) of this report.

2.3 Impact analysis

The Project footprint and impact calculations provided by Arrow have been compared against Study area conditions and data in Schedule F, Condition (Biodiversity 5) and Table 2, and against Schedule F, Table 3 to identify:

- any departures from Condition (Biodiversity 5) which limits the width of linear infrastructure to 40 m wide in ESAs or their associated protection zones;
- interactions with Category A, B or C ESAs and the extent to which these are authorised by Schedule F, Table 1 which restricts the kinds of activities that can be undertaken in ESAs and their protection zones; and
- interactions with values that are 'Prescribed Environmental Matters' under the EO Act and the extent to which these are authorised by Schedule F, Table 3.

Impacts on ESAs or PEMs in the Study area that are within existing approved limits under the current SGP North EA are taken to be approved, and *no further consideration has been given to these impacts or values*. Impacts on ESAs or PEMs that exceed existing approved limits or are not mentioned in the current EA are considered in **Section 5.0**.

All impact calculations are based on GTRE mapping for the Study area in accordance with Condition (Biodiversity 3) of the SGP North EA, which states that "where mapped biodiversity values differ from [on-the-ground biodiversity values], petroleum activities may proceed…based on the confirmed on-the-ground biodiversity value".

3.0 Description of ecological values

The Study area is located to the north-east of Miles in the Barakula subregion of the Brigalow Belt bioregion. It can generally be described as grazing lands dominated by dry eucalypt woodlands to open woodlands interspersed with small areas of open forest to woodland dominated by Poplar Box (*Eucalyptus populnea*) or Silver-leaved Ironbark (*E. melanophloia*) and Spotted Gum (*Corymbia citriodora*). These dominant vegetation types are dissected by riparian open forests to woodlands associated with Dogwood Creek, Punchbowl Creek and Bottle Tree Creek. There are also small areas of riverine and off-channel palustrine wetlands associated with these creek systems, though these are not mapped as HES wetlands (refer **Figure 3.1**).

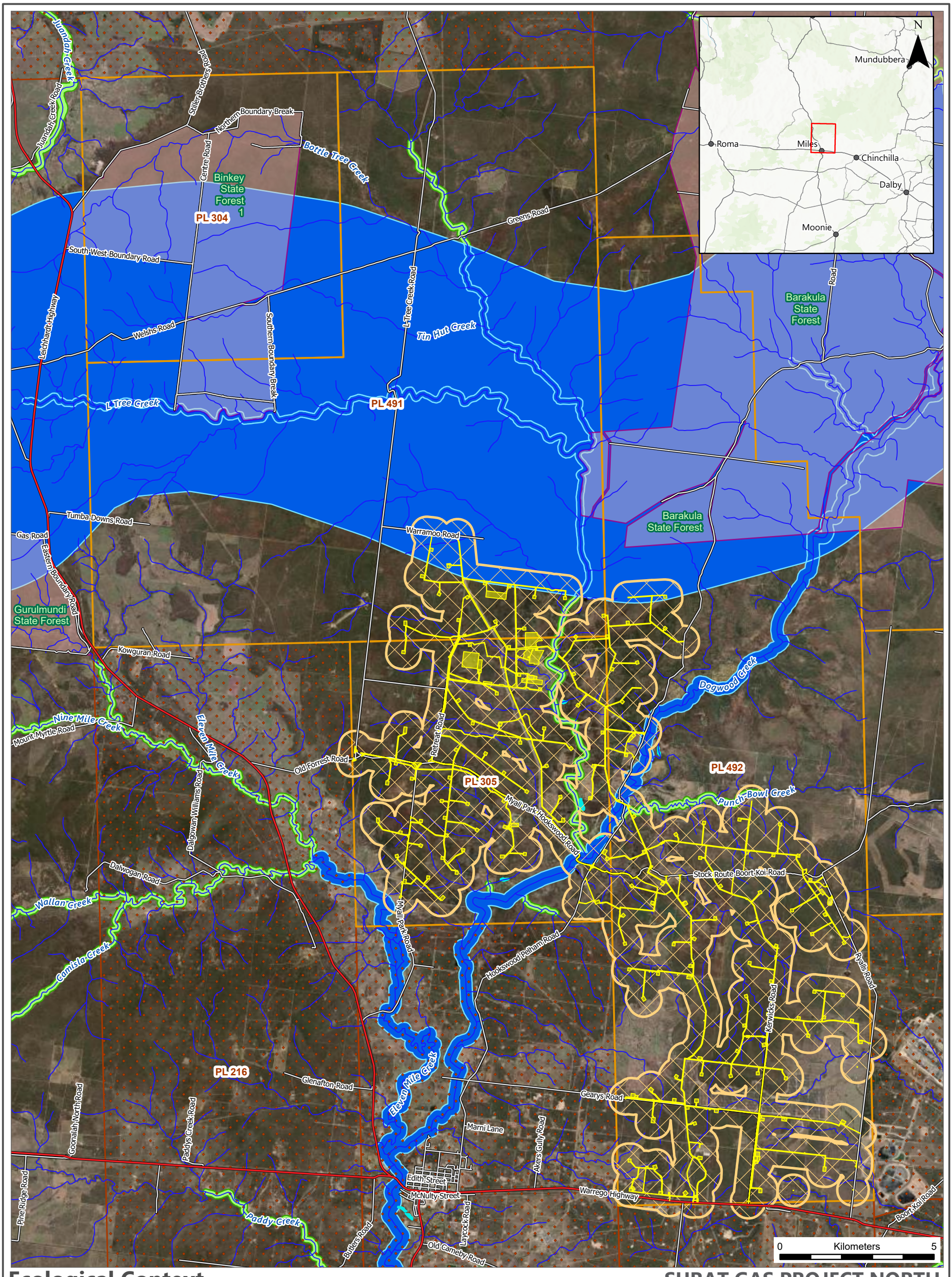
The Barakula to St George Terrestrial Biodiversity Corridor just intersects the northern part of the Study area, linking Barakula State Forest in the east with Binkey State Forest in the west, both of which contain intact areas of remnant vegetation and habitat. Straddling the Great Dividing Range, Barakula State Forest is the largest state forest in Queensland and contains a rich mosaic of vegetation communities, including eucalypt forests, cypress pine woodlands, heathlands and spinifex. The riparian biodiversity corridors of Dogwood Creek, Bottle Tree Creek and Punchbowl Creek traverse the Study area.

ESAs in the Study area as defined by the Environmental Protection Regulation 2019 (EP Reg) and SGP North EA (for Category C ESAs) are summarised in **Table 3.1** and shown in **Figure 3.2a** and **Figure 3.2b**.

Table 3.1 SGP North 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

ESA Category	ESA Type	Occurrence in Study area
	A feature Protection Area, State Forest Park or Scientific area under the *Forestry Act 1959*.	None
	A declared fish habitat area under the *Fisheries Act 1994*.	None
	An 'Endangered Regional Ecosystem' identified in the REDD database (by Biodiversity Status)	None
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*	Mapped essential habitat for Koala and the South-eastern Long-eared Bat; essential habitat noted but not assessed for Near Threatened species (Golden-tailed Gecko). Refer to Section 3.2.6.
	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 endangered and vulnerable species occurs within the amendment area. Refer to Section 3.2.3.
	'Of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.	Occurs in the Study area as watercourse associated REs 11.3.2, 11.3.4 and 11.3.25. Refer to Section 3.1.1.1.



Ecological Context

SURAT GAS PROJECT NORTH

- Highway
- Main Road
- Local Road
- Watercourse
- Study Area
- Project Area
- State Biodiversity Corridor
- Regional Biodiversity Corridor
- Vegetation Management Wetlands Mapping
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)
- State forest

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:115,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_030[E[**FIGURE 3.1**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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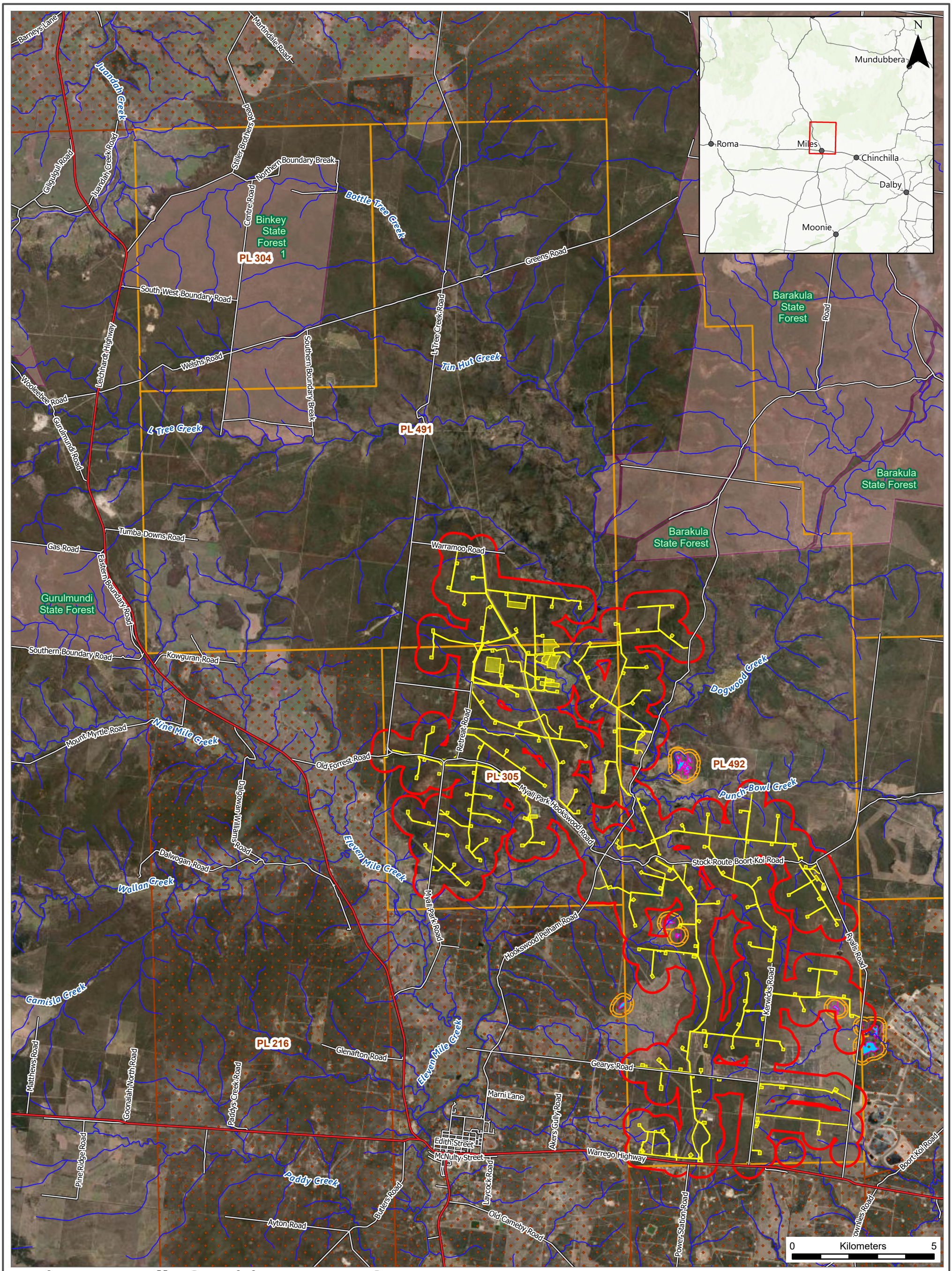

Environmentally Sensitive Areas - Category B

SURAT GAS PROJECT NORTH

- Highway
- Local Road
- Watercourse
- Study Area
- Project Area
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)
- State forest

Category B ESA:

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

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 10/07/2024 **DWG No:** ARR-002_030[E] **FIGURE 3.2a**

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Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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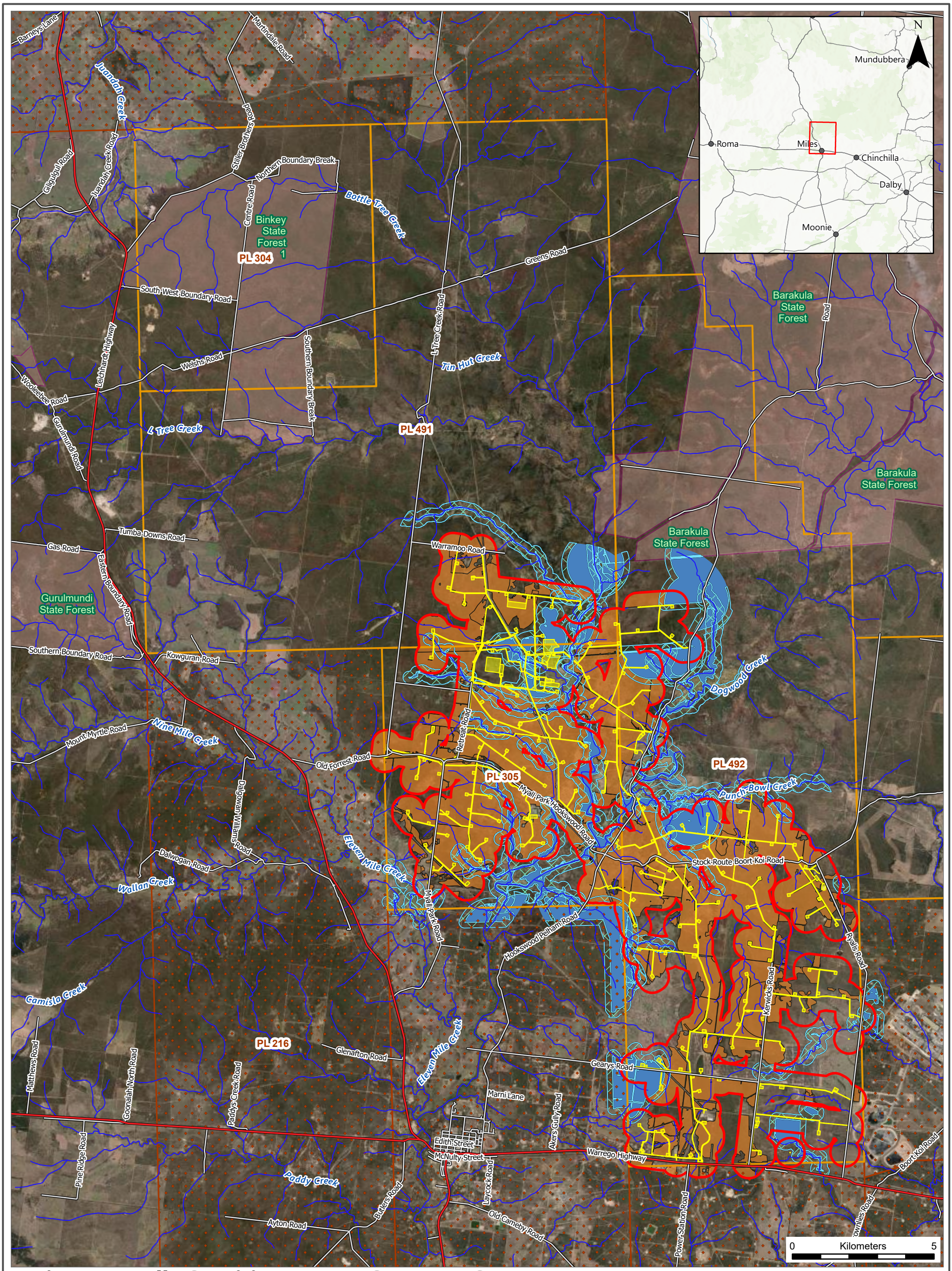

Environmentally Sensitive Areas - Category C

SURAT GAS PROJECT NORTH

- Highway
- Local Road
- Watercourse
- Study Area
- Project Area
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)
- State forest

Category C ESA:

- Category C ESA
- Category C ESA (200m Buffer)
- Category C ESA (Protected Wildlife Habitat)

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 11/07/2024 **DWG No:** ARR-002_029[E] **FIGURE 3.2b**

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Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

3.1 Description of environmental values – terrestrial flora

3.1.1 Vegetation communities

The Study area retains significant native vegetation cover compared with other parts of the Brigalow Belt bioregion, with approximately 77% of the total land area (16,722 ha) supporting remnant native vegetation and a further 6% supporting regrowth and non-remnant vegetation.

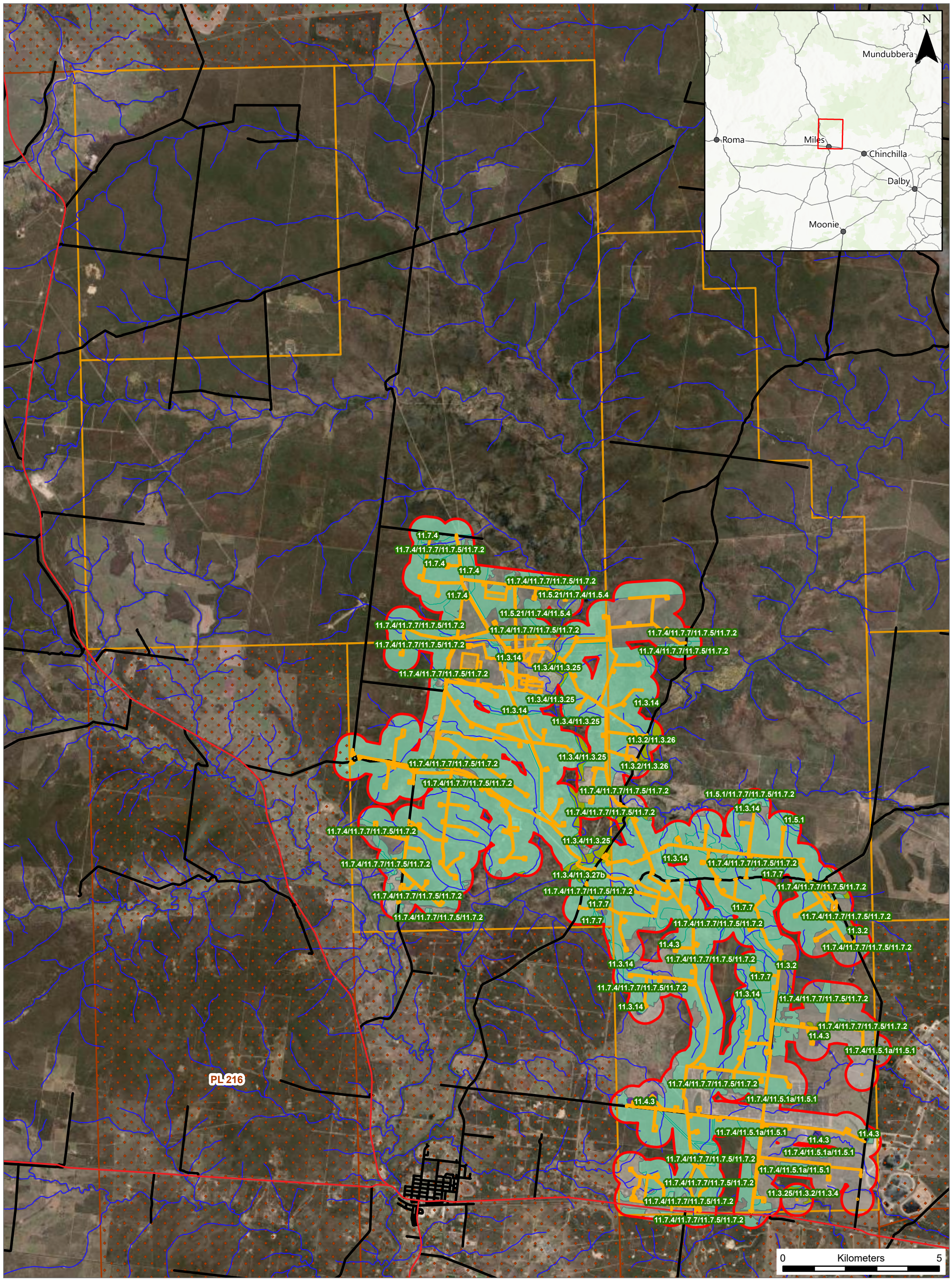
Current vegetation mapping prepared by the Department of Resources (DoR) identifies 15 REs within the Study area (refer **Figure 3.3**). Descriptions and total areas of these mapped REs have been provided in **Table 3.2** and include:

- 1 classified as 'Endangered';
- 4 classified as 'Of concern'; and
- 10 classified as 'Least concern'.

Table 3.2 State Regional Ecosystem mapping by Biodiversity Status (Source: DoR, 2024)

Land zone	RE type	Description	Occurrence in Study area (ha)
Least concern			
3 – Quaternary alluvial plains	11.3.14	*Angophora floribunda*, *A. leiocarpa*, *Eucalyptus tereticornis* and *E. chloroclada* woodland with a secondary tree layer dominated by *Callitris glaucophylla* or *Allocasuarina leuhmanii*. Occurs on Cainozoic alluvial soils.	507.4
	11.3.26	*Eucalyptus moluccana* or *E. microcarpa* woodland to open forest on margins of alluvial plains± *Allocasuarina luehmannii* low tree layer and a grassy ground layer.	12.9
5 – Tertiary-early Quaternary loamy and 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.	49.7
	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.	32.2
	11.5.4	*Eucalyptus chloroclada*, *Callitris glaucophylla*, *C. endlicheri*, *Angophora leiocarpa* woodland on Cainozoic sand plains and/or remnant surfaces.	14.5
	11.5.21	*Corymbia bloxsomei* +/- *Callitris glaucophylla* +/- *Eucalyptus crebra* +/- *Angophora leiocarpa* woodland on Cainozoic sand plains	29.0
7 – Cainozoic duricrusts	11.7.2	*Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone.	529.9

Land zone	RE type	Description	Occurrence in Study area (ha)
	11.7.4	*Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust.	9,211.5
	11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks. Characteristic genera include *Calytrix* spp., *Hakea* spp., *Kunzea* spp. *Micromyrtus* spp., *Acacia* spp., *Melaleuca* spp. and (in the ground layer) *Triodia* spp.	529.9
	11.7.7	*Eucalyptus fibrosa* subsp. *nubilis* +/- *Corymbia* spp. +/- *Eucalyptus* spp. woodland on Cainozoic lateritic duricrust.	1,075.4
Of concern			
3 – Quaternary alluvial plains	11.3.2	*Eucalyptus populnea* woodland to open woodland. Occasionally *E. melanophloia* or *E. crebra* may be present. The ground layer is dominated by a range of tussock grasses, including *Chloris* spp., *Enteropogon* spp. and *Aristida* spp. Occurs on Cainozoic alluvial plains with variable soil types.	107.7
	11.3.4	*Eucalyptus tereticornis* woodland to open forest on Cainozoic alluvial plains. Other tree species that may be present include *E. camaldulensis*, *Corymbia tessellaris*, *C. clarksoniana*, *E. melanophloia*, *E. platyphylla* or *Angophora floribunda*. A shrub layer is usually absent and a grassy ground layer is prominent.	158.0
	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland to open forest on fringing levees and banks of major rivers and drainage lines of alluvial plains. Other tree species, including *Casuarina cunninghamiana*, *E. coolabah*, *Melaleuca bracteata*, *M. viminalis*, *Livistona* spp. (in the north), *Melaleuca* spp. and *Angophora floribunda* may occur.	74.4
	11.3.27b	*Acacia harpophylla* and/or Casuarina cristata open forest on alluvial plains, with or without scattered emergent *Eucalyptus* spp. such as *E. coolabah*, *E. largiflorens*, *E. populnea*, *E. orgadophila* and *E. woollsiana*.	4.6
Endangered			
4 – Tertiary-early Quaternary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	75.6
		Total remnant	**12,412.8**



State Regional Ecosystem Mapping

SURAT GAS PROJECT NORTH

- Highway
- Main Road
- Local Road
- Watercourse
- Area of Interest
- Project Area
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)
- Endangered - Dominant Vegetation
- Of Concern - Dominant
- No Concern At Present
- Non-Remnant Vegetation, Cultivated or Built Environment

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:115,000 **DATE:** 8/07/2024 **DWG No:** ARR-002_030[E] **FIGURE 3.3**

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Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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3.1.1.1 Field-verified Regional Ecosystems

GTRE mapping prepared for the Study area is based on Project-specific vegetation community surveys as described in **Section 2.2**, with the mapping shown in **Figure 3.4** (shown by Biodiversity Status).

Of the 15 REs originally mapped by the DoR for the Study area, three were not recorded during the field survey (refer to **Table 3.3**), including REs 11.3.26, 11.5.4 and 11.3.27b. Of the 17 GTREs recorded during the field survey, six were not mapped by DoR (RE 11.3.1, 11.3.25g, 11.3.27f, 11.4.3, 11.7.6 and 11.5.20).

Table 3.3 Ground-truthed Regional Ecosystems by Biodiversity Status (source: Arrow 2024)

Land zone	RE type	Description	Occurrence in Study area (ha)
Least concern			
3 – Quaternary alluvial plains	11.3.14	*Angophora floribunda*, *A. leiocarpa*, *Eucalyptus tereticornis* and *E. chloroclada* woodland with a secondary tree layer dominated by *Callitris glaucophylla* or *Allocasuarina leuhmanii*. Occurs on Cainozoic alluvial soils.	132.9
5 – Tertiary-early Quaternary loamy and 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.	5925.3
	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.	22.3
	11.5.20	*Eucalyptus moluccana* and/or *E. microcarpa* and/or E. woollsiana ± *E. crebra* woodland on Cainozoic sand plains.	17.4
	11.5.21	*Corymbia bloxsomei* +/- *Callitris glaucophylla* +/- *Eucalyptus crebra* +/- *Angophora leiocarpa* woodland on Cainozoic sand plains	187.1
7 – Cainozoic duricrusts	11.7.2	*Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone.	133.2
	11.7.4	*Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust.	2224.7
	11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks. Characteristic genera include *Calytrix* spp., *Hakea* spp., *Kunzea* spp. *Micromyrtus* spp., *Acacia* spp., *Melaleuca* spp. and (in the ground layer) *Triodia* spp.	177.7
	11.7.6	*Corymbia citriodora* or *Eucalyptus crebra* woodland on Cainozoic lateritic duricrust.	149.7
	11.7.7	*Eucalyptus fibrosa* subsp. *nubilis* +/- *Corymbia* spp. +/- *Eucalyptus* spp. woodland on Cainozoic lateritic duricrust.	3438.6

Land zone	RE type	Description	Occurrence in Study area (ha)
Of concern			
3 – Quaternary alluvial plains	11.3.2	*Eucalyptus populnea* woodland to open woodland. Occasionally *E. melanophloia* or *E. crebra* may be present. The ground layer is dominated by a range of tussock grasses, including *Chloris* spp., *Enteropogon* spp. and *Aristida* spp.	3.6
	11.3.4	*Eucalyptus tereticornis* woodland to open forest on Cainozoic alluvial plains. Other tree species that may be present include *E. camaldulensis*, *Corymbia tessellaris*, *C. clarksoniana*, *E. melanophloia*, *E. platyphylla* or *Angophora floribunda*..	199.5
	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland to open forest on fringing levees and banks of major rivers and drainage lines of alluvial plains. Other tree species, including *Casuarina cunninghamiana*, *E. coolabah*, *Melaleuca bracteata*, *M. viminalis*, *Livistona* spp. (in the north), *Melaleuca* spp. and *Angophora floribunda* may occur..	211.6
	11.3.25g	*Eucalyptus populnea* woodland to open woodland on Cainozoic alluvial plains. Occasionally *E. melanophloia* or *E. crebra* may be present. The ground layer is dominated by a range of tussock grasses, including *Chloris* spp., *Enteropogon* spp. and *Aristida* spp.	1.1
	11.3.27f	Freshwater wetlands. Vegetation is variable including open water with or without aquatic species and fringing sedgelands and eucalypt woodlands. Occurs in a variety of situations including lakes, billabongs, oxbows and depressions on floodplains.	8.7
Endangered			
3 – Quaternary alluvial plains	11.3.1	*Acacia harpophylla* and/or Casuarina cristata open forest on alluvial plains, with or without scattered emergent *Eucalyptus* spp. such as *E. coolabah*, *E. largiflorens*, *E. populnea*, *E. orgadophila* and *E. woollsiana*.	1.7
4 – Tertiary-early Quaternary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* open forest on Cainozoic clay plains. *A. harpophylla* forms a continuous canopy with varying densities of *C. cristata*, forming part of the canopy or emerging above it. *C. cristata* may be dominant or form pure stands particularly in the south of the bioregion.	3.8
		Total (remnant)	**12,838.9**
Regrowth			

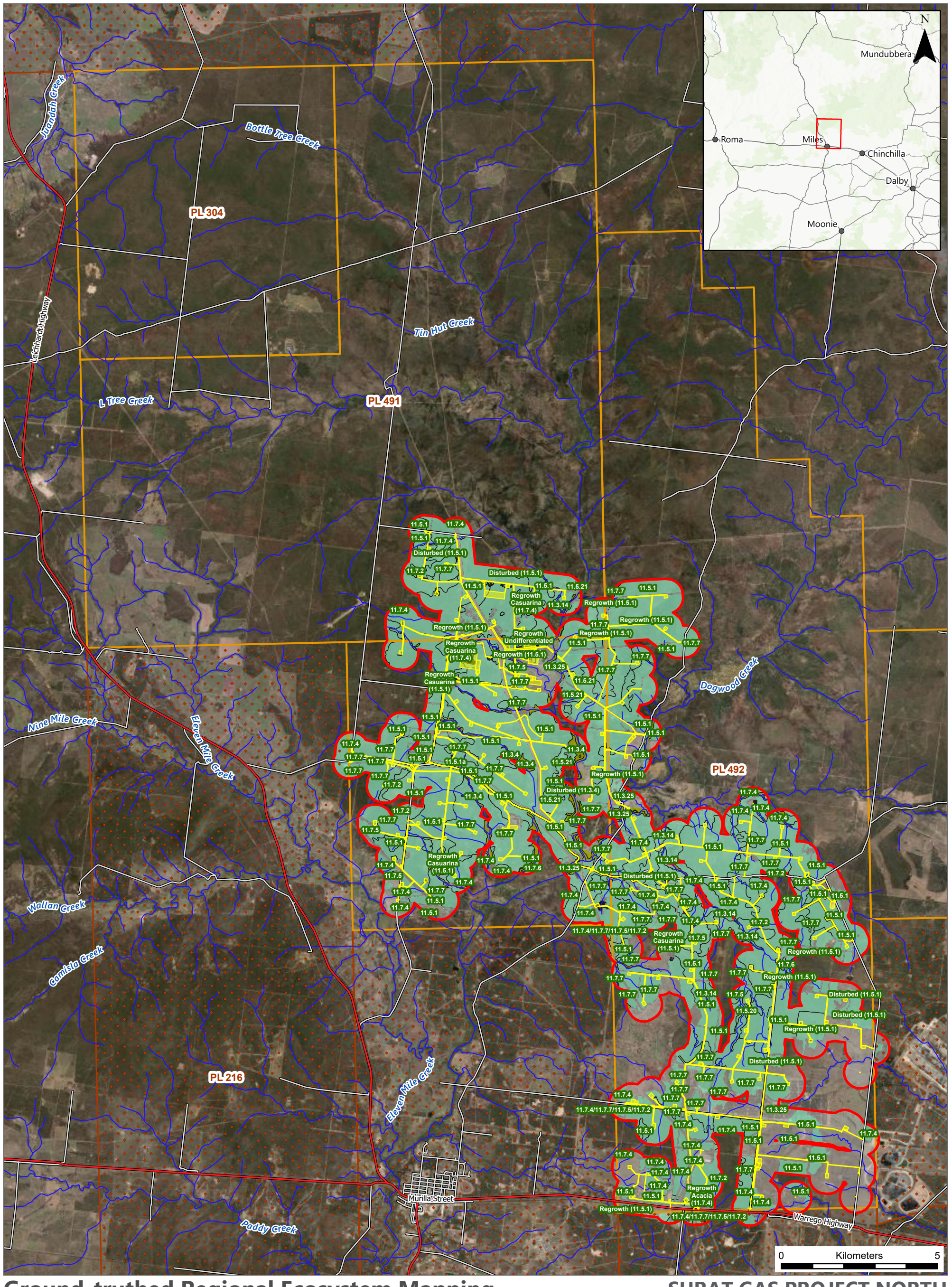
Land zone	RE type	Description	Occurrence in Study area (ha)
5 – Tertiary-early Quaternary loamy and sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces.	833.1
	11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones.	1.2
7 – Cainozoic duricrusts	11.7.4	*Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust.	2.4
	11.7.6	*Corymbia citriodora* or *Eucalyptus crebra* woodland on Cainozoic lateritic duricrust.	90.3
		Undifferentiated regrowth	21.8
		Total (regrowth)	**948.8**

3.1.1.2 Threatened ecological communities

Of the 17 REs ground-truthed for the Study area, two (RE 11.3.1 and RE 11.4.3) correspond to the Brigalow threatened ecological community (TEC) as listed under the EPBC Act. Neither of these REs are present within the Project footprint.

3.1.2 Protected plants trigger mapping

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



Ground-truthed Regional Ecosystem Mapping

SURAT GAS PROJECT NORTH

- Highway
- Main Road
- Local Road
- Watercourse
- Study Area
- Project Area
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)

Biodiversity Status:

- Endangered
- Of Concern
- Least Concern
- No Concern At Present
- Non-Remnant
- Water
- N/A

Attexo

REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:115,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_030[E] **FIGURE 3.4**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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3.1.3 Conservation-significant flora

The desktop assessment identified 28 threatened and nine near-threatened flora species within 50 km of the Study area. Those species known or considered likely to occur in the Study area are summarised in **Table 3.4**.

It is noted that habitat for a 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 SGP North EA however, the presence of these species is noted in **Table 3.4**.

Table 3.4 Summary of "Known to Occur" and "Likely to Occur" flora species

Species Name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
Cryptandra ciliata	-	NT	**Known to Occur** Suitable habitat is present within the Study area and records have been identified within the Project from 2012.
Gurulmundi Fringe Myrtle, *Calytrix gurulmundensis*	E	E	**Likely to Occur** There is one record of this species from the southern end of Binkey State Forest, 8 km to the north-west of the Study area. Suitable habitat is present in the Study area. Impacts to 1,210 ha of habitat for this species are approved under EPBC 2010/5344.
Gurulmundi Heath Myrtle, *Micromyrtus carinata*	-	E	**Likely to Occur** This species is only known from Gurulmundi State Forest, with a subpopulation located on the Wyona Property 10 km to the north of Miles (within PL304) approximately 4 km west of the Study area. Suitable habitat is present within the Study area.
Red-soil Woolly Wrinklewort, *Rutidosis lanata*	-	NT	**Likely to Occur** Suitable habitat is present within the Study area and a nearby record from 2016 has been identified 4 km from the south-eastern boundary of the Study area.

3.1.3.1 *Calytrix gurulmundensis*, Gurulmundi Fringe Myrtle

This species is endemic to the Gurulmundi and Barakula areas north of Chinchilla where it has been recorded growing in patches of shrubland on very shallow soils. Soils are lateritic sandstone ridges, which contain yellow sandy-clay that retains moisture (EcoSmart, 2023). Vegetation is predominantly eucalypt, acacia and casuarina dense shrublands with spinifex, and spinifex grassland with scattered shrubs. This habitat description is consistent with RE 11.7.5, while the coordinates of collections derived from the Queensland Herbarium's Herbrecs database place them in areas mapped as RE 11.7.4, 11.7.5, 11.7.6 and 11.7.7.

The aforementioned RE types are widespread across the Study area however, these represent only general habitat for *Calytrix gurulmundensis*. As this species is typically associated with ridge lines (DEWHA, 2008b), it is likely that the extent of these REs (which does not account for landform or landscape position) significantly overestimates the actual area of habitat for this species. There are potentially suitable ridgelines in the south-west and north-east of the Study area (on PL492) and in the north-west of PL305 however, there is a lower likelihood of encountering *C. gurulmundensis* elsewhere in the Study area.

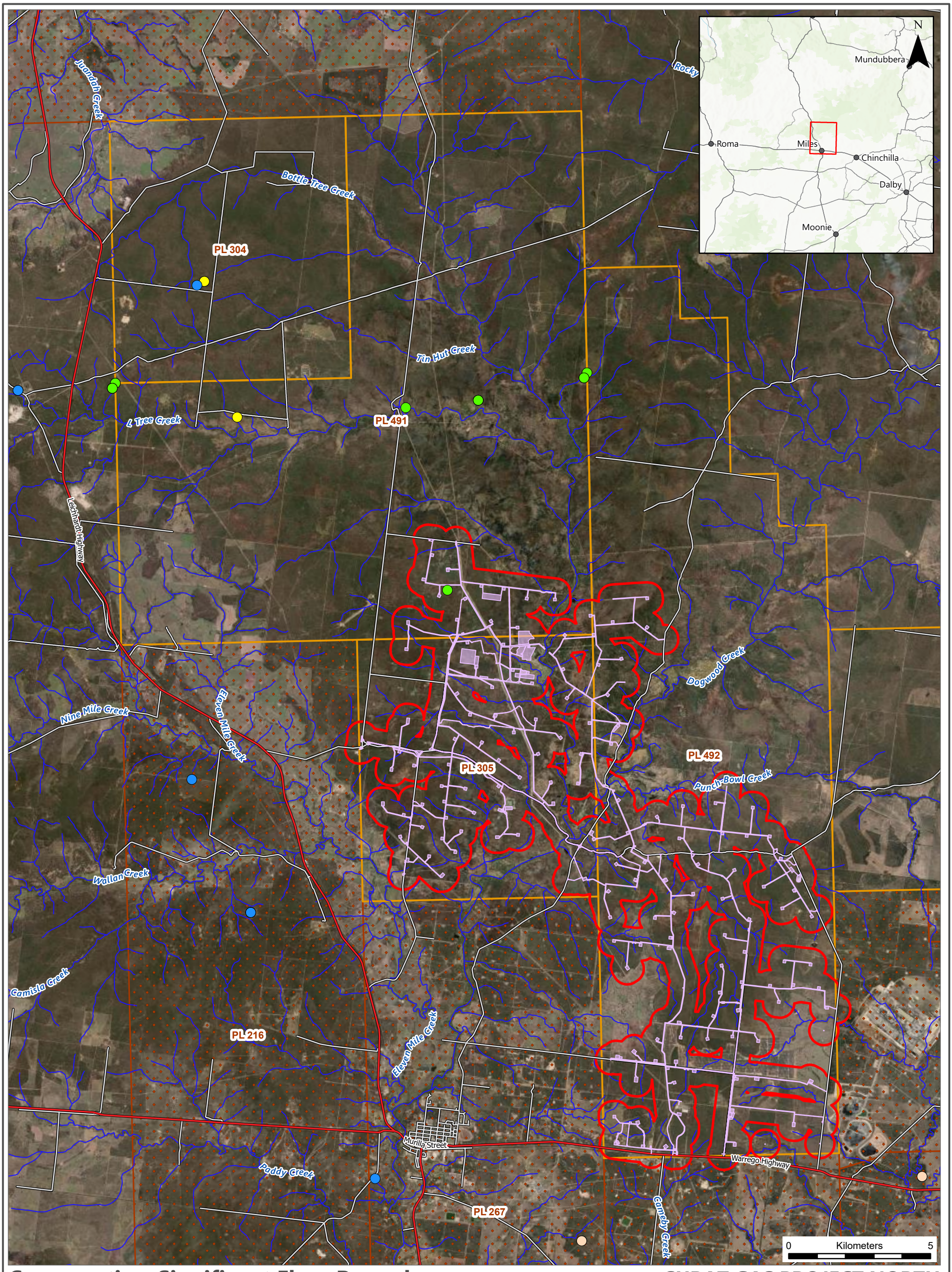
Records of the species are shown in **Figure 3.5**.

3.1.3.2 *Micromyrtus carinata*, Gurulmundi Heath Myrtle

This species is only known from Gurulmundi State Forest, with a subpopulation located on the Wyona Property 10 km to the north of Miles (within PL304). The Wyona property is approximately 4 km from the Study area and more than 5 km from any proposed disturbance areas. Herbarium records indicate that *Micromyrtus carinata* is associated with the tops of laterised ridges formed on laterised sediments with an upper soil layer of red to yellow sand (DES, 2024). Associated habitats include heath and shrubland (RE 11.7.5) and low woodland dominated by *Eucalyptus exserta*, *Corymbia trachyphloia* and *Callitris glaucophylla* (RE 11.7.4).

The aforementioned RE types are widespread across the Study area however, these represent only general habitat for *Micromyrtus carinata*. As this species is typically associated with ridge lines, it is likely that the extent of these REs (which does not account for landform or landscape position) significantly overestimates the actual area of habitat for this species. There are potentially suitable ridgelines in the south-west and north-east of the Study area (on PL492) and in the north-west of PL305 however, there is a lower likelihood of encountering *Micromyrtus carinata* elsewhere in the Study area.

Records of the species are shown in **Figure 3.5**.



Conservation-Significant Flora Records

SURAT GAS PROJECT NORTH

- *Calytrix gurulmundensis*
- *Cryptandra ciliata*
- *Micromyrtus carinata*
- *Rutidosis lanata*
- Highway
- Main Road
- Local Road
- Watercourse
- Study Area
- Project Area
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)

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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:125,000 | **DATE:** 24/07/2024 | **DWG No:** ARR-002_033

FIGURE 3.5

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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3.2 Description of environmental values- terrestrial fauna

3.2.1 Habitat types and condition

The Study area is dominated by eucalypt woodland to open forest habitats on depositional plains, low ridges and floodplains. Ecosystem types on soils of low fertility, typically those REs associated with land zones 5 and 7, form the largest and most continuous tracts of vegetation, these have been heavily used for their timber resources with varying degrees of impact. In particular, habitats dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*), Narrow-leaved Grey Box (*E. woollsiana*) and *E. elegans* have been logged to a such a degree that all mature canopy trees have been removed. The remaining vegetation comprises secondary growth with a thickened shrub layer forming the canopy. The impact of logging is also evident in the majority of remnant vegetation on freehold land. The future of these areas may be affected by changes to fire regime.

A number of ecosystems appear more resilient to landscape-wide processes of degradation. In particular, Blue-leaved Ironbark (*Eucalyptus fibrosa* subsp. *nubila*) forest communities (RE 11.7.7) generally have a better-preserved canopy structure, a greater number of mature canopy trees and fewer large canopy gaps. This preservation is likely to be due to the quality and usefulness of the timber resource rather than an inherent ability to recover from disturbance.

The following broad habitat types are present within the Study area based on ground-truth RE mapping (refer **Figure 3.4**):

- Eucalypt woodlands to open forests (16,330.7 ha) – dominant habitat type, representing approximately 95% of the available habitat in the Study area;
- Riparian and alluvial woodlands to open forests (548.8 ha) – typically occurs in riparian and alluvial areas associated with major creek systems, particularly Bottle Tree Creek, Dogwood Creek and Punchbowl Creek. This represents approximately 3.2% of the available habitat in the Study area;
- *Acacia* dominated woodlands (133.2 ha)– occurs as RE 11.7.2 and comprises approximately 0.8% of the available habitat in the Study area;
- Heaths (177.7 ha) – occurs as RE 11.7.5 and comprises approximately 1.0% of the available habitat in the Study area;
- Freshwater wetlands (8.7 ha) – very small, discrete areas mapped in association with Dogwood Creek, Punchbowl Creek and Bottle Tree Creek systems representing <0.1% of the available habitat in the Study area;
- Brigalow open forests to woodlands – small, discrete patches representing <0.1% of the available habitat in the Study area; and
- Regrowth and non-remnant woody vegetation (cleared, fragmented or disturbed).



Plate 1 Example of Eucalypt woodlands to open forest habitat type (EFS 20 – RE11.7.4-1)



Plate 2 Example of Riparian woodlands to open forest habitat type (EFS 7 – 11.3.2 -1)



Plate 3 Example of *Acacia* dominated woodland habitat type (EFS 22 - Bellevue 1)



Plate 4 Example of heath habitat type (EFS 12 – Alderley 213, photo from SGP North)



Plate 5 Example of regrowth and non-remnant woody vegetation (EFS 24 - Regrowth 11.7.4-2)



Plate 6 Example of cleared area (EFS 31 - McNulty Cleared EWA)

3.2.2 Watercourses

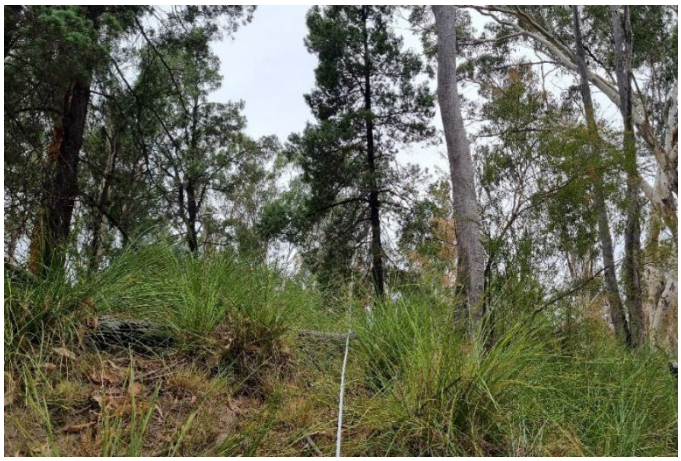
Major watercourses are important landscape elements which act as significant migratory and dispersal pathways for many species of fauna and flora, contain important habitat resources (including food, water, sheltering, roosting and nesting sites) as well as provide refugia during periods of drought. 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 (refer to Dogwood Creek photos in **Plate 7**). However, the major creek systems in the Study area represent habitats that are often less impacted by historical clearing and also more likely to contain large trees due to their position in the landscape.

There are three major creek systems in the Study area – Bottle Tree Creek, Dogwood Creek and Punchbowl Creek. It is also in the headwaters for Columboola Creek and Cameby Creek in the south and Eleven Mile Creek in the south-west of PL 305, all of which form part of the Balonne-Condamine system. An overview of key characteristics at the significant (if stream order greater than 2 or vegetation at crossing on land zone 3) crossing points (generally from north-west to south-east) is provided below:

- Three unnamed tributaries west of Bottle Tree Creek – stream order 2, ephemeral, riparian woodland to open forest (RE 11.3.4) at 4 crossings;
- Bottle Tree Creek - stream order 5, ephemeral, riparian woodland to open forest (RE 11.3.25 and RE 11.3.14);
- Dogwood Creek – stream order 5, ephemeral, riparian woodland to open woodland (RE 11.3.25);
- Punchbowl Creek – stream order 4, ephemeral, riparian woodland to open woodland (RE 11.3.2, 11.3.25);
- Unnamed tributary of Punchbowl – stream order 3, ephemeral, riparian woodland to open woodland (RE 11.3.25).
-



South face of transect



West face of transect

Plate 7 Photos at Dogwood Creek (EFS Bellevue 4 - 9/03/2023)

3.2.3 Conservation-significant fauna

The desktop assessment identified records for 53 threatened fauna species considered as part of the Likelihood of Occurrence Assessment (**Appendix D**). Of these:

- Fourteen species are listed as MNES but are not listed as threatened under the NC Act and are excluded from further assessment, namely:
  - Black-faced Monarch (*Monarcha melanopsis*)
  - Common Greenshank (*Tringa nebularia*)
  - Common Sandpiper (*Actitis hypoleucos*)
  - Fork-tailed Swift (*Apus pacificus*)
  - Latham's Snipe (*Gallinago hardwickii*)
  - Oriental Cuckoo (*Cuculus optatus*)
  - Pectoral Sandpiper (*Calidris melanotos*)
  - Rufous Fantail (*Rhipidura rufifrons*)
  - Satin Flycatcher (*Myiagra cyanoleuca*)
  - Sharp-tailed Sandpiper (*Calidris acuminata)*
  - Yellow Wagtail (*Motacilla flava*)
  - Silver Perch (*Bidyanus bidyanus*)
  - Grey-headed Flying-fox (*Pteropus poliocephalus*)
  - Northern Quoll (*Dasyurus hallucatus*)

Study areaThere are 14 species assessed as known or likely to occur in the Study area. These species have been summarised in **Table 3.5** with records shown in **Figure 3.6** to **Figure 3.8**.

Table 3.5 Prescribed Environmental Matters – Fauna species known or likely to occur in the Study area

Species Name	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
Bird Species			
Glossy Black-cockatoo (south-eastern), *Calyptorhynchus lathami lathami*	V	V	**Known to Occur** A single record from 2013 was identified within the Study area. This subspecies was not considered during assessments across the SGP, but the parent species was. Suitable habitat present within the Study area.
Painted Honeyeater, *Grantiella picta*	V	V	**Likely to Occur**

Species Name	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
			Suitable habitat is present and there are historical records immediately to the west of the Study area.
Diamond Firetail, *Stagonopleura guttata*	V	V	**Known to Occur** Suitable habitat is present within the Project and historical records from 2019 have been identified nearby. Other historical records have been recorded within the Study area but no dates were provided.
White-throated Needletail, *Hirundapus caudacutus*	V, Mi, Ma	V	**Known to Occur**[#] Two records of this species have been confirmed within the Study area (most recently 2013) and suitable habitat is also abundant. This species is almost exclusively aerial, breeding in the northern hemisphere. As such, the loss of terrestrial habitat is not expected to be significant and this species has not been considered further in the impact assessment.
Squatter Pigeon, *Geophaps scripta scripta*	V	V	**Known to Occur**[#] A pair of Squatter Pigeons was observed on a stock route in the Study area in 2012. This species has been periodically recorded within 50 km, most recently from Nudley State Forest in 2022 (approx. 70 km to the east). Remnant habitats in the Study area are generally too heavily wooded to be considered high amenity, though it may occur in non-remnant habitats throughout. Despite suitable habitat being present, this species is likely to be vagrant, with individuals not representing a resident or seasonal population. As such, this species is not considered further in the impact assessment. It is noted that impacts on habitat for this species are approved under EPBC 2010/5344.
Fork-tailed Swift, *Apus pacificus*	Mi, Ma	SLC	**Likely to Occur**[#] Species was recorded during surveys for the broader SGP. Suitable habitat is abundant across the Study area. This species is almost exclusively aerial, breeding in Siberia over the northern summer. As such, the loss of terrestrial habitat is not expected to be significant and this species has not been considered further in the impact assessment.
Invertebrates			
Brigalow Woodland Snail, *Adclarkia cameroni*	E	V	**Likely to Occur** Suitable habitat is present within the Study area, and historical records have been identified within 5 km (ALA, 2011).
Dulacca Woodland Snail, *Adclarkia dulacca*	E	E	**Likely to Occur**

Species Name	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
			There is a record in Arrow's internal database 12 km to the east of the Project area. There are very limited areas of suitable habitat in the Study area.
Mammal Species			
Corben's Long-eared Bat, *Nyctophilus corbeni*	V	V	**Known to Occur[#]** This species was recorded from one (1) location on Girrahween Station during Project surveys in 2013, and from two locations south of Myall Park Hookswood Road in 2016. There are also a number of records for *Nyctophilus* sp. from passive acoustic detection sites. Suitable habitat is present throughout. Impacts on habitat for this species approved under EPBC 2010/5344.
Greater Glider (southern and central), *Petauroides volans*	E	E	**Known to Occur** Greater Glider has been recorded from five (5) locations in the Study area during surveys for the SGP Supplementary EIS, associated with Dogwood and Punchbowl Creeks and their tributaries.
Yellow-bellied Glider (southern subspecies), *Petaurus australis australis*	V	V	**Likely to Occur** This species is well represented in Barakula and Gurulmundi State Forests and there are large contiguous areas of forest, particularly in the north of the Study area. It is yet to be detected in the broader SGP but is considered likely to occur.
Koala, *Phascolarctos cinereus*	E	E	**Likely to Occur** This species has been recorded from two locations in the Study area, the most recent from 2016. There are also older records (1987) to the south of the amendment area. There is an abundance of suitable habitat.
Short-beaked Echidna, *Tachyglossus aculeatus*	-	SLC	**Likely to Occur** This species has been recorded from a single location in the Study area (WildNet, 2009) on a stock route south of Punchbowl Creek. There is an abundance of suitable habitat.

Species Name	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
Reptile Species			
Golden-tailed Gecko, *Strophurus taenicauda*	-	NT	**Known to Occur** This species has been recorded within the Study area at numerous locations. An abundance of suitable habitat is present.

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

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

MNES species that have impacts approved under EPBC approvals 2010/5344

3.2.3.1 Diamond Firetail, *Stagonopleura guttata*

There are scattered (undated) records with low spatial accuracy in the Study area however, this species has not been recorded during the extensive survey effort undertaken for the broader SGP. It does occur across a range of habitat types, including eucalypt woodland, banksia shrubland and cypress forest. Populations appear unable to persist in fragmented areas which lack remnant patches of larger than 200 ha (DCCEEW, 2023).

The Diamond Firetail is granivorous, with a diet consistent predominantly of grass seeds, with the remainder of the diet typically made up of forbs. Foraging occurs almost exclusively on the ground, with only a small number of foraging bouts at 1-2 m above the ground (DCCEEW, 2023). Ideal foraging habitat for Diamond Firetails is characterised by mostly open areas with low tree density, low percentage cover of fallen logs and high percentage cover of grass, with patches of bare ground, moss and forbs.

No accurate records are available for this species and, in the absence of data, evaluating important REs can only be achieved through descriptive comparison of each RE to known high amenity habitat features. This suggests all forests and woodlands within the Study area could potentially be inhabited though, on balance, heathland habitats (RE 11.7.5) and *Acacia*-dominated woodlands (RE 11.7.2) are likely too thick and with reduced grass cover (EcoSmart 2023).

Potentially suitable habitat within the Study area is shown in **Figure 3.6**.

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

Glossy Black-cockatoos are well represented in the broader SGP area, though records in the Study area are less frequent than in the south with most records from Lake Broadwater and Kumbarilla State Forest. A single record from 2013 was identified within the Study area within non-remnant habitat.

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).

Birds inhabit woodlands and forests that contain abundant *Allocasuarina* spp. and large hollows suitable for nesting. Many populations are restricted to remnant vegetation within hills and gullies surrounded by agricultural land though some populations move through artificial landscapes to access favoured food resources (EcoSmart, 2023). Groups are

never far from waterbodies, which are visited daily. Being highly mobile, birds may travel considerable distances to isolated fragments in search of food. Advanced regrowth may also provide some foraging opportunities.

Within the Study area, only RE 11.7.4 contains preferred feed tree species (*Allocasuarina littoralis*) though EcoSmart (2023) observed that *A. littoralis* is more likely to be present in areas south of the Warrego Highway. The dominant she-oak species associated with RE 11.5.1 (*Allocasuarina leuhmanii*) is not regarded as a preferred feed tree species though it is thought to be an occasional food source in inland NSW and may be used in some years (DCCEEW, 2022). Other RE types in the broader SGP area recorded by EcoSmart (2023) containing *Casuarina cristata* (11.3.1, 11.3.17, 11.4.3, 11.4.3a, 11.9.5) and *Allocasuarina inophloia* (11.5.4) do not occur in the Study area.

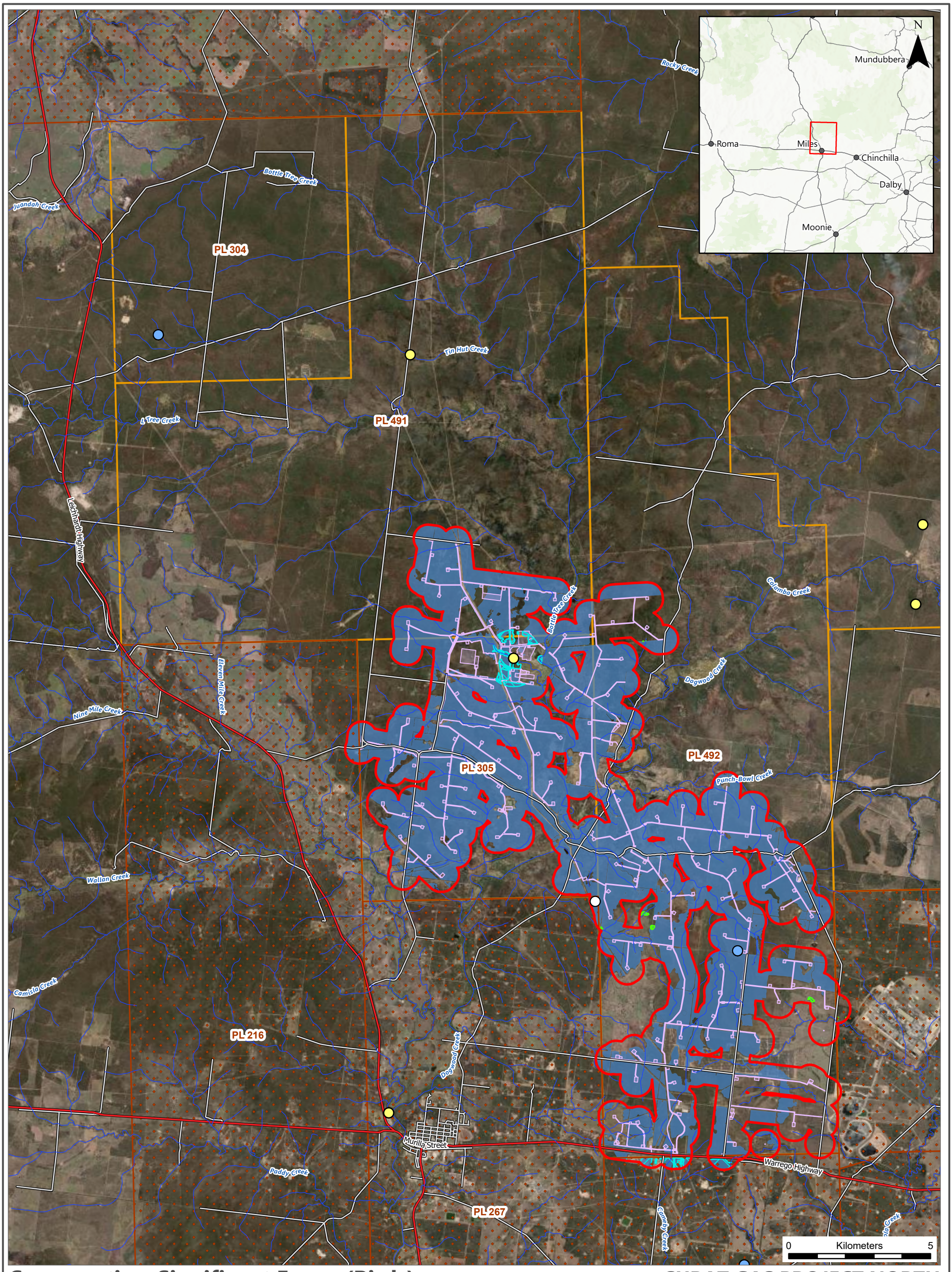
Suitable habitat within the Study area is shown in **Figure 3.6**.

3.2.3.3 Painted Honeyeater, *Grantiella picta*

A single record from 1997 was identified 5 km south-west of the Study area. There is also a cluster of records approximately 14 km to the south-east of the Study area, and 30 km to the south-east around Chinchilla. This species is the most specialised of Australia's honeyeaters, as their diet consists of mistletoe fruits but can also include nectar (from mistletoes, eucalypts and possibly banksias) and arthropods, especially during the non-breeding season (DoE, 2015). This species inhabits mistletoes in a range of woodland communities including eucalypt forests/woodlands, riparian woodlands of black box and river red gum and *Acacia* dominated woodlands.

An analysis of records undertaken by EcoSmart (2023) identified that the vast majority of records (97% of 533 records) for this species occur within non-remnant habitats or within remnant habitats associated with BVG 25a which are dominated by Brigalow (*Acacia harpophylla*). A very small number of records (<0.2%) are within other vegetation types. On this basis, only remnant, disturbed and regrowth REs dominated by Brigalow (comprising RE 11.3.1, 11.3.17, 11.4.3, 11.43a and 11.9.5) are considered 'core habitat' within the SGP.

Suitable habitat within the Study area is shown in **Figure 3.6.**



Conservation-Significant Fauna (Birds)

SURAT GAS PROJECT NORTH

- Glossy Black Cockatoo (Calyptorhynchus lathami)
- Painted Honeyeater (Grantiella picta)
- Diamond Firetail (Stagonopleura guttata)
- Watercourse
- Highway
- Local Road
- Project Area
- Study Area
- Painted Honey-Eater (Grantiella picta) Habitat
- Glossy Black Cockatoo (Calyptorhynchus lathami) Habitat
- Diamond Firetail (Stagonopleura guttata) Habitat
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_035[E] **FIGURE 3.6**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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3.2.3.4 Koala, *Phascolarctos cinereus*

The species has been recorded from two locations within the Study area – one record 350 m north-east of a drill pad from 1987 in RE 11.5.1 and one record 10 m east of a RoW in RE 11.5.1. Records surrounding the Study area are from over 35 years ago. Koalas are well represented in the broader SGP area, within over 700 records within 50 km including numerous records within the Study area and in all surrounding directions. 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 (DAWE, 2022a). 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*.

Analysis of available spatially accurate recent (1975+) records across the broader SGP identifies their presence in a wide range of BVGs that correspond to many of the REs present. While some identified REs do not appear to contain eucalypts on the basis of their description, closer inspection of the REDD reveals that emergent eucalypts are often present. Based on REDD, potential foraging trees are present in all remnant types except RE 11.9.5 (EcoSmart, 2023).

Suitable habitat within the Study area is shown in **Figure 3.7a**.

3.2.3.5 Greater Glider (southern and central subspecies), *Petauroides volans*

Greater Gliders are predominantly restricted to eucalypt forests and woodlands where they are most common in taller, moist, montane eucalypt forests with larger, relatively old trees and abundant hollows though in areas west of the Great Dividing Range, they are found in low woodlands (Mackay, 2008). There are six records for this species from 2016 within the Study area, five of which are associated with riparian habitats on Dogwood and Punchbowl Creeks. The distribution of these records (both upstream and downstream of the proposed crossing) indicates the presence of a resident population of Greater Glider in this location. Potentially similar habitats are associated with Bottle Tree Creek (and possibly downstream of the Project footprint on Cameby Creek) however, no spotlighting surveys have been undertaken in these locations.

Based on available research (Eyre, Smith, & Venz, 2022), Greater Gliders in the southern Brigalow Belt are primarily associated with forests dominated by *Eucalyptus tereticornis*, *E. moluccana*, *E. fibrosa* and *E. citriodora*. Forests containing *E. crebra* and *E. melanophloia* are also possibly important (Eyre et al, 2022). The occurrence of these tree species corresponds with REs 11.3.4, 11.3.25, 11.3.26, 11.3.27, 11.5.1, 11.5.20, 11.7.6 and 11.7.7. Other REs that match the habitat profile for Greater Glider including RE 11.3.14, 11.5.21, 11.7.4, 11.9.2 and 11.9.7 (EcoSmart, 2023).

These RE associations reflect potentially suitable habitat in the Study area however, it is noted that this species is hollow-dependent. Many eucalypt species do not start forming hollows until they reach at least 50 cm in diameter at breast height (Eyre, Smith, & Venz, 2022) however, this characteristic is not reflected in the habitat mapping. As such, the extent of habitat shown in **Figure 3.7b** is likely to be an overestimate of the actual extent of habitat in the Study area.

3.2.3.6 Yellow-bellied Glider (southern subspecies), *Petaurus australis australis*

The Yellow-bellied Glider is typically restricted to large, contiguous or near-contiguous patches of coastal forest and mountain ranges from the Wet Tropics to Victoria, with areas less than 18,000 ha unlikely to support viable populations (DAWE, 2022b). The species is well-represented in the nearby Barakula and Gurulmundi State Forests to the north but is yet to be detected in the broader SGP. Yellow-bellied Glider has been included in the assessment given the connectivity of vegetation in the Study area with known populations in the State Forests to the north, and the availability of potentially suitable habitat, but it has not been recorded in the Study area.

Based on available location data analysed by (EcoSmart, 2023) the majority (~67%) of Yellow-bellied Glider records within 50 km of the broader SGP are located within REs 11.7.6 and RE 11.10.1, of which only RE 11.7.6 (~150 ha) has been mapped within the Study area. Other REs identified as potential habitat by cross-referencing (TSSC, 2022) known tree associations with tree species identified the following habitat resources as occurring in the Study area: *Corymbia trachyphloia*, *Eucalyptus tereticornis*, *E. crebra*, *E. fibrosa* and *E. moluccana*. On this basis, the following have been mapped as containing foraging resources for Yellow-bellied Glider: REs 11.3.4, 11.3.25, 11.5.1, 11.5.20 and 11.7.7.

This species has a clear preference for forests with a high proportion of winter-flowering and smooth-barked eucalypts. It is also hollow-dependent, using primarily living, smooth-barked eucalypts for denning (DAWE, 2022b). As trees do not usually start forming hollows until they reach at least 50 cm dbh (Goldinggay, 2012), it is possible that the lack of records in the Study area is due to historical disturbance and the lack of available hollows however, this characteristic is not reflected in the habitat mapping. As such, the extent of habitat shown on **Figure 3.7b** is likely to be an overestimate of the actual extent of habitat in the Study area.

3.2.3.7 Corben's Long-eared Bat, *Nyctophilus corbeni*

Corben's Long-eared Bat was recorded from one location on Girrahween Station during Project surveys in 2013, and from two locations south of Myall Park Hookswood Road in 2016. In Queensland, Corben's Long-eared Bat inhabits a variety of vegetation types but is distinctly more common in box/ironbark/cypress pine woodland vegetation that occurs on the western slopes and plains of the Great Dividing Range. This species is considered naturally rare across its range and has been found to be more abundant in larger remnants with a well-developed understorey (TSSC, 2015). Summer roosts of male *Nyctophilus* spp. are typically under exfoliating bark, whereas the roosts of females, which form small maternity colonies, are typically in tree hollows. Law et al (2016) recorded capture of males up to 4 km from roost sites, with other studies recording males at foraging distances from roost of up to 7 km (TSSC, 2015).

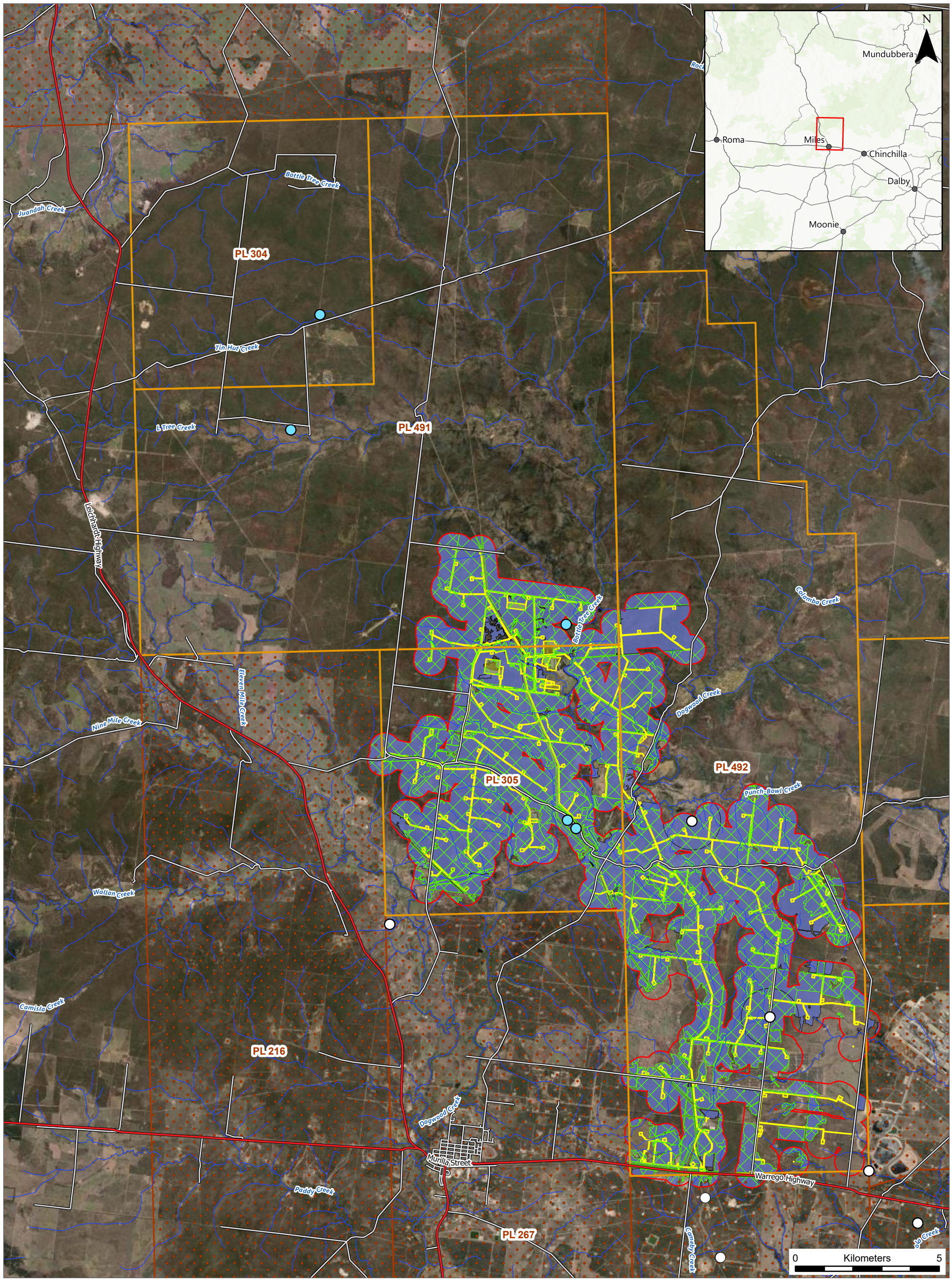
All members of this genus have broad wing and tail membrane surface that allows slow, highly manoeuvrable flight with foraging usually undertaken within several kilometres of their roosting site (TSSC, 2015). These bats forage at a low height, close to vegetation and around tree trunks, and also glean invertebrates from surfaces. These features suggest that *Nyctophilus* spp. are generally associated with forests, woodlands and tall shrublands that contain an abundance of feeding substrates in the first few metres above the ground and hollow bearing trees that provide suitable roosting conditions. As such, *N. corbeni* is generally considered to be 'clutter-adapted' and forest-dependent (TSSC, 2015).

Of the nine accurate records available from which to derive habitat information, five fell within RE 11.5.1, three within polygons mapped as RE 11.7.5/11.7.7 and one within mapped RE11.7.4/11.7.7 (EcoSmart, 2023). RE 11.7.5 is low shrubland which is unlikely to be suitable habitat. Extrapolation based on BVG 12a and 18b suggests suitable habitat could also include RE 11.5.4. However, considering the low number of records from which to glean habitat data, other REs were considered based on habitat description. Studies have found the species preferring areas of abundant shrub layers and *Allocasuarina leuhmanii* (TSSC, 2015). REs within the broader SGP matching that description include 11.3.1, 11.3.14, 11.3.18, 11.4.3, 11.4.3a, 11.5.1, 11.5.1a, 11.5.4, 11.5.21, 11.7.4, 11.7.7, 11.9.5 and 11.9.10.

Suitable habitat and the location of nearby records for this species have been shown on **Figure 3.7a.**

Conservation-Significant Fauna (Mammals)

SURAT GAS PROJECT NORTH



Koala (Phascolarctos cinereus)

South-Eastern Long-Eared Bat (Nyctophilus corbeni)

Highway

Main Road

Local Road

Watercourse

Study Area

Project Area

Corbens Long Eared Bat (Nyctophilus corbeni) Habitat

Koala (Phascolarctos cinereus) Habitat

SGP North (Petroleum Lease - Granted)

Petroleum Lease (Granted)

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REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:125,000 **DATE:** 11/07/2024 **DWG No:** ARR-002_035[E] **FIGURE 3.7a**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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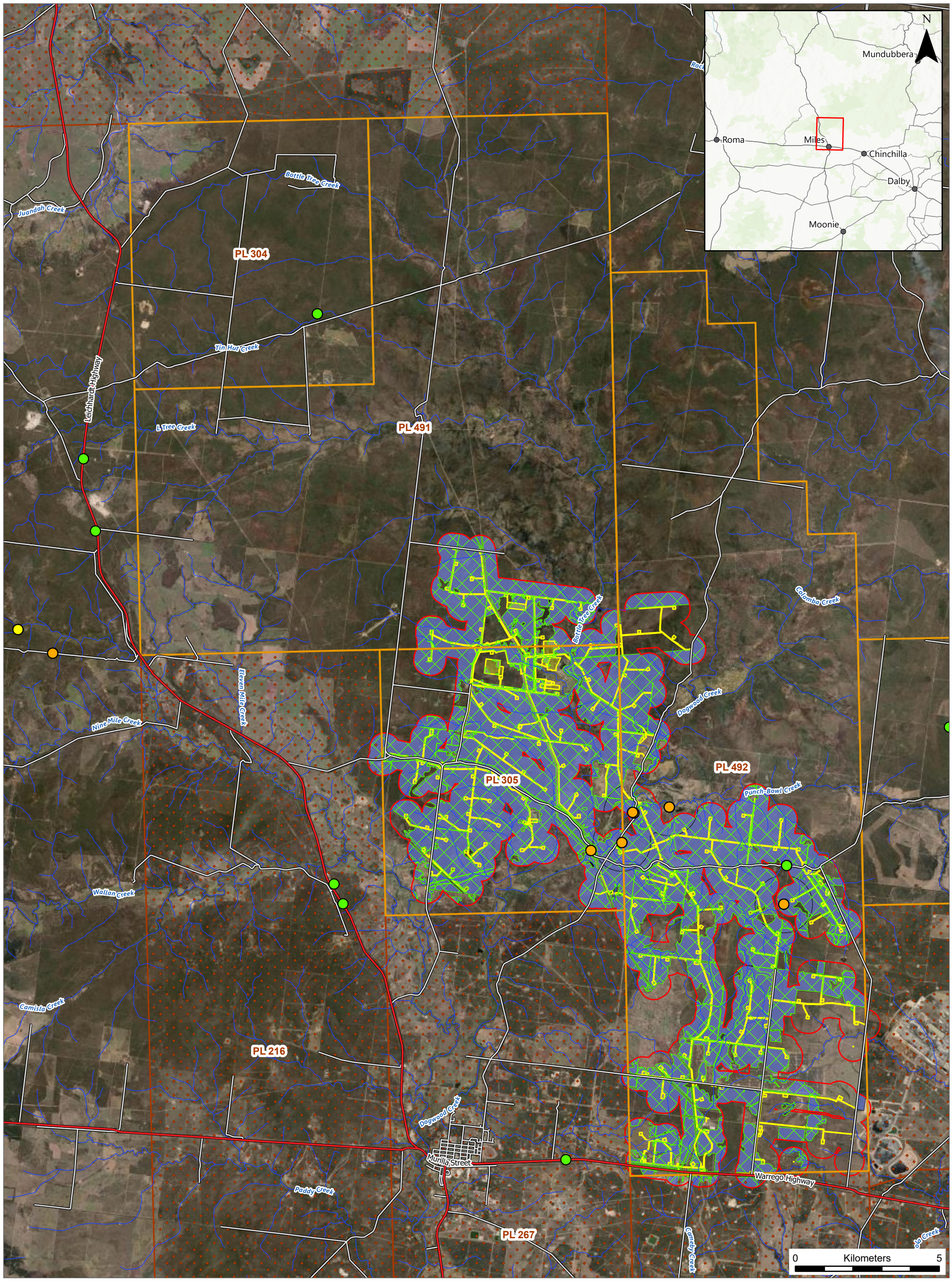
Conservation-Significant Fauna (Mammals)

SURAT GAS PROJECT NORTH



- Greater Glider (Petauroides volans)
- Short-Beaked Echidna (Tachyglossus aculeatus)
- Yellow Bellied Glider (Petaurus australis)
- Highway
- Main Road
- Local Road
- Watercourse
- Study Area
- Project Area
- Yellow-bellied Glider (Petaurus australis) Habitat
- Greater Glider (Petauroides volans) Habitat
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)

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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:125,000 | **DATE:** 12/07/2024 | **DWG No:** ARR-002_035[E] **FIGURE 3.7b**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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3.2.3.8 Brigalow Woodland Snail, *Adclarkia cameroni*

While not previously recorded within the Study area, the presence of records approximately 5 km to the south-west indicates that this species is likely to occur. The Study area is situated along the northernmost extent of the currently known distribution of this species, with records extending from the south-western corner of Gurulmundi State Forest (~31 km west) to Barakula State Forest (~49 km north-east). While the species is described as occurring within the Condamine floodplain, several records are located a considerable distance from this waterway (e.g. two from Barakula State Forest, ~50 km to the north-east). This suggests that the species could occur more broadly.

This species is found in Brigalow and alluvial eucalypt woodlands which have dense cover and scattered debris, especially logs, dense leaf litter, piles of fallen bark and flood debris (TSSC, 2016). It has also been recorded from highly disturbed and cleared habitats if there is suitable shelter on the ground (e.g. logs) (TSSC, 2016). Within the broader SGP, these habitats are most consistent with REs 11.3.1, 11.3.2, 11.3.3, 11.3.17, 11.3.25, 11.3.27, 11.4.3, 11.4.3a, 11.9.5, 11.9.7 and 11.9.10. The species can also occasionally occur in RE 11.5.1 when nearby favourable habitat is removed (Eddie, 2023). RE 11.5.1 is not consistent with the current understanding of high amenity habitat, though revision of this may be required in the future as additional surveys and information shed light on the species requirements (EcoSmart, 2023).

Suitable habitat for this species within the Study area has been shown on **Figure 3.8**.

3.2.3.9 Dulacca Woodland Snail, *Adclarkia dulacca*

While not previously recorded in the Study area, the presence of records approximately 12 km to the east of the Study area indicates that this species could occur.

The species has been located in a variety of habitats including vine thicket and Brigalow (*A. harpophylla*) woodland with rock outcrops and Lancewood (*A. shirleyi*), ironbark and *E. woollsiana* woodlands on ridges with and without rock. In the SGP this habitat corresponds with REs 11.3.1, 11.3.17, 11.4.3, 11.4.3a, 11.9.5 and 11.9.10. It shelters in moist microhabitats under wood, rocks and other debris, as well as under bark at the base of trees. It has been found persisting in Brigalow regrowth but only where there is abundant suitable microhabitats (e.g. logs, dense leaf litter). It tends to avoid areas susceptible to flooding and so is not prevalent on alluvial systems.

Eggs are laid in suitable microhabitat locations during summer rains. Suitable habitat for this species within the Study area is shown on **Figure 3.8**.

Conservation-Significant Fauna (Invertebrates)

SURAT GAS PROJECT NORTH

- Brigalow Woodland Snail (Adclarkia cameroni)
- Dulacca Woodland Snail (Adclarkia dulacca)
- Highway
- Local Road
- Watercourse
- Study Area
- Project Area
- Dulacca Woodland Snail (Adclarkia dulacca) Habitat
- Brigalow Woodland Snail (Adclarkia cameroni) Habitat
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)

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GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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3.2.4 Near Threatened fauna species

Golden-tailed Gecko (*Strophurus taenicauda*) is known to occur in the Study area. Habitat for a 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 SGP North EA however, the presence of these species is noted.

3.2.5 Special Least Concern species

One record of the Short-beaked Echidna (*Tachyglossus aculeatus*) exists within the Study area and several records are present in the vicinity. Whilst most of these observations have been recorded along either the Leichardt Highway (running north-south) or the Warrego Highway (running east-west), this species lives in forests and woodlands, heaths, grasslands and arid environments (BHA, 2024).

The species occupies a broad range of habitat types and 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).

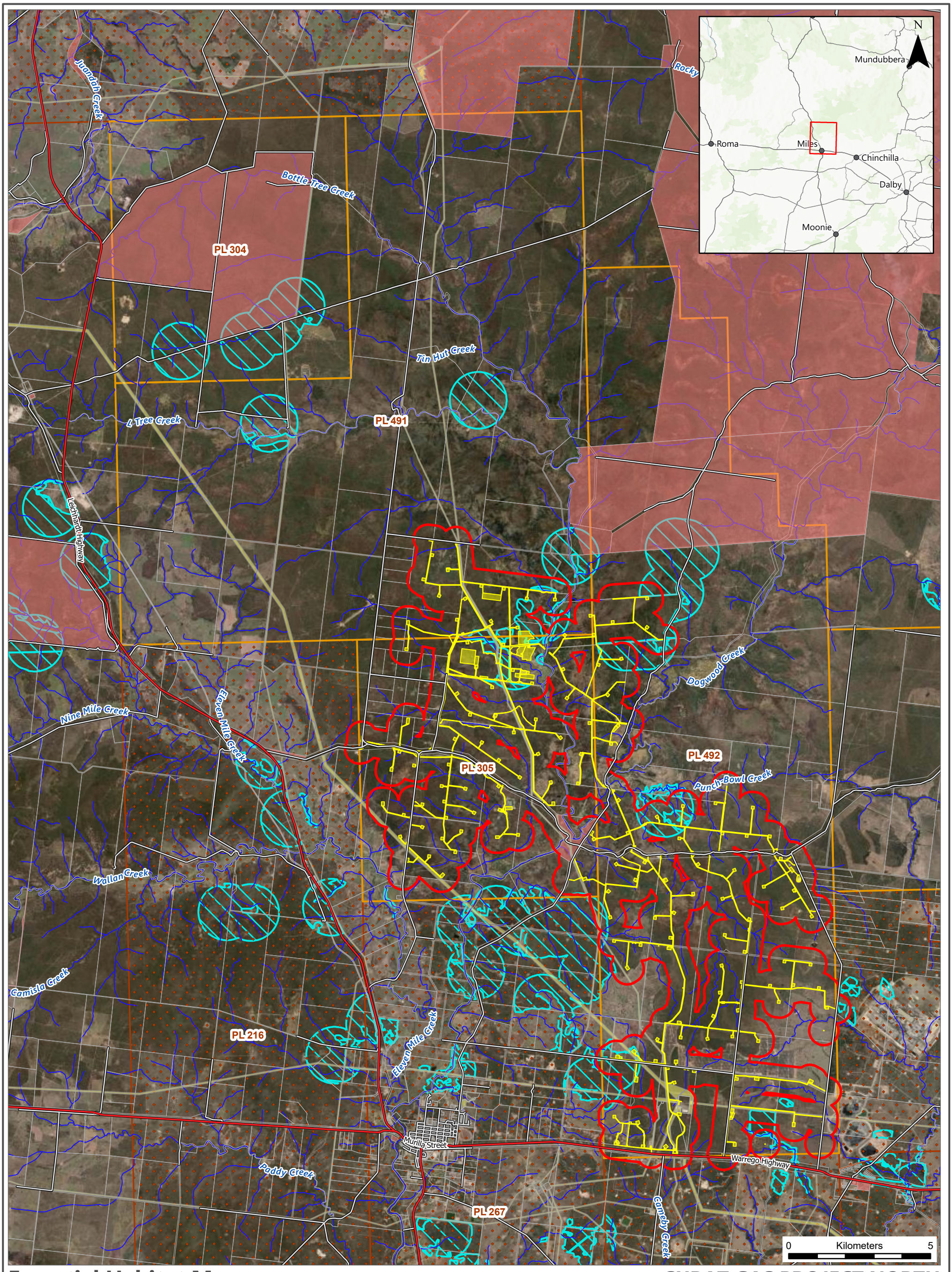
Suitable habitat and the location of nearby records for this species have been shown on **Figure 3.7b**.

3.2.6 Essential habitat mapping

The majority of the mapped essential habitat in the Study area is associated with records for the Golden-tailed Gecko. This species is listed as near threatened under the NC Act; as such, mapped essential habitat for this species does not constitute an ESA or a PEM for the purposes of the EA.

Areas of essential habitat for endangered or vulnerable fauna species include:

- mapped essential habitat for Koala on Lot 27AU49; and
- mapped essential habitat for the Corben's Long-eared bat on Girrawheen Station (Lot 16AU38, Lot 17AU199).



Essential Habitat Map

SURAT GAS PROJECT NORTH

- Highway
- Local Road
- Watercourse
- Study Area
- Project Area
- Essential Habitat Map
- Base Parcel
- Easement Parcel
- Strata (Lot) Parcel
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)

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FIGURE 3.9

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

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4.0 Impact assessment

4.1 Planning and design

Coal seam gas developments apply an iterative process in terms of locating wells and gathering lines to manage competing constraints associated with the 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's first preference is to avoid PEMs, threatened ecological communities and threatened species habitat.
- 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 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 will offset unavoidable significant residual impacts to PEMs.

The Study area retains significant native vegetation cover compared with other parts of the Brigalow Belt bioregion, with approximately 77% of the total land area (16,722 ha) supporting remnant native vegetation and a further 6% supporting regrowth and other non-remnant vegetation. As such, it is not possible to access the gas resource for SGP North without clearing remnant vegetation, with 122 of the 161 proposed well pads impacting an area of remnant vegetation.

4.1.1 Field development layout

The proposed field development layout has been designed using the management hierarchy as described in **Section 4.1**. The proposed flowlines and other linear infrastructure are co-located adjacent to existing infrastructure or in disturbed areas as much as possible to avoid fragmenting vegetated areas which also allows for less temporary construction disturbance.

Due to the highly vegetated nature of the gas field the use of deviated wells (instead of traditional vertical wells) has been identified as a key method of reducing the disturbance area and managing surface constraints to avoid high value ecological areas. A total of 95 deviated wells are planned for the proposed development of SGP North Stage 1, with 92 of these deviated wells to be located on 26 multi-well pads, and three (3) of the deviated wells on three (3) single well pads. There are often two (2) to six (6) deviated wells per multi-well pad with one (1) multi-well pad containing eight deviated wells. In addition to the 214 petroleum wells there will be 11 water observation / monitoring bores installed and these are located in previously disturbed areas or on the edge of a proposed production well pad.

There are a number of significant planning and access constraints that have also influenced the proposed field layout and limited the choice of infrastructure locations. For example, in the south of the Study area within PL 492 there is a large solar farm which is a major constraint in accessing areas in a north-south orientation.

4.1.2 Planning of facilities

Where possible, facilities requiring larger areas of clearing have been located in cleared areas or lesser quality (non-remnant or regrowth) vegetation. This includes the siting of key facilities for the SGP North development on land purchased by Arrow in 2012 (Girrawheen Station), including the FCS, a warehouse, office facility, camp, laydowns, pipe yards, quarries and laydowns on land. This property includes large areas mapped as Category X (non-remnant) which have been ground-truthed as containing a mix of cleared, non-remnant, regrowth and some remnant vegetation. All facilities on Girrawheen Station have been sited to take advantage of existing cleared areas, with minor clearing in adjoining regrowth or remnant areas required for establishment.

For facilities beyond Girrawheen Station, there is a requirement to clear remnant vegetation given the highly vegetated nature of the amendment area. This includes clearing for camps, laydown areas, communications towers and a borrow pit.

4.1.3 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 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.

A review of waterway crossing methods will be undertaken for all waterways that are stream order 4 or higher during the engineering design process. Currently major crossings at Bottle Tree Creek (stream order 5), and Dogwood Creek (stream order 5) and Punchbowl Creek (stream order 4) have been assessed to evaluate the feasibility of HDD to avoid environmental impacts on riparian woodland habitats and limit impacts to connectivity values for fauna habitat. A description of the Bottle Tree Creek crossing methodology and the Dogwood and Punchbowl Creek crossing methodologies are presented below.

4.1.3.1 Bottle Tree Creek crossing

The riparian zone around Bottle Tree Creek is relatively narrow, with a large, cleared area on the western bank. HDD is considered feasible to avoid impacts at the watercourse crossing location. Preliminary engineering design of this

crossing point involves a 300 m long HDD that passes 5 m below the bed of Bottle Tree Creek (**Figure 4.1** and **Figure 4.2**). Entry and exit points for the HDD are to be located beyond sensitive riparian vegetation, thereby avoiding impacts on these values.



Figure 4.1 Bottle Tree Creek HDD crossing footprint inclusive of SGPN development footprint

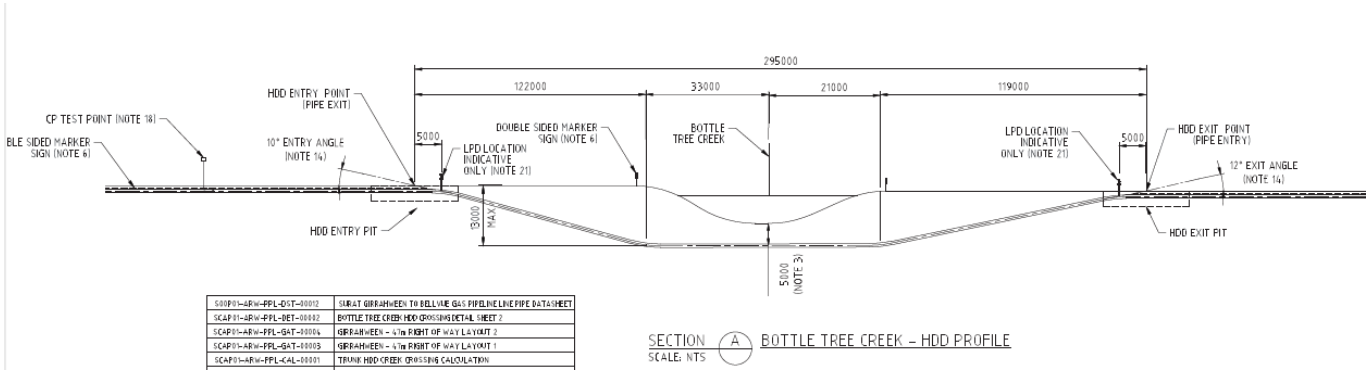


Figure 4.2 Preliminary HDD drawings for the Bottle Tree Creek crossing

4.1.3.2 Dogwood and Punchbowl Creek crossings

By contrast, the RoW profile (dog-leg shape) and close proximity of the creek crossings for Dogwood and Punchbowl Creeks mean that a single 710 m-HDD would be required at the crossing location. The length of this drill shot increases the risk that the pipe would be damaged on pull through. Further, in order to minimise the risk of hydro-fracture of drilling fluids and release of drilling muds into the creek bed, it was determined that a cover of at least 8 m below the creek bed would be required. Overall, this means a total HDD depth of 24 m below surface to account for the ground level difference between the entry and exit points (~16 metres)(refer **Figure 4.3**). The HDD is also constrained to a maximum distance of 450-600 m and intermediate entry and exit pits would be required to facilitate.

Overall, it was determined that the technical risks means that HDD is not feasible for these creek crossings.

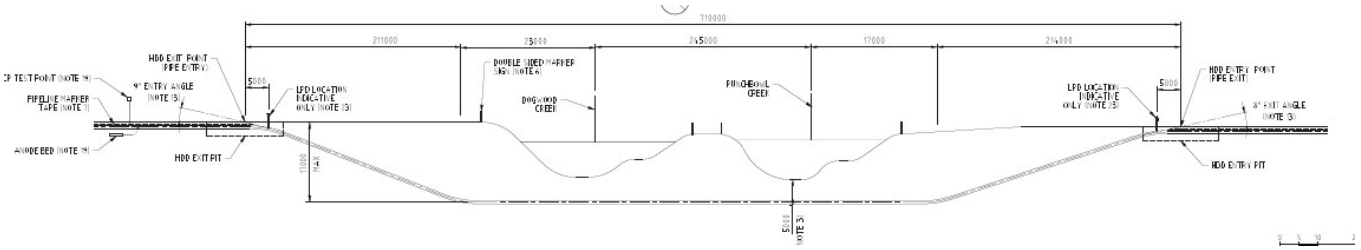


Figure 4.3 Preliminary HDD profile assessed for Dogwood and Punchbowl Creeks

Instead, it is proposed to constrain the RoW to limit impacts associated with creek crossing construction through these riparian corridors (refer **Figure 4.4**). The narrowest possible RoW of 40 m (of which 20 m will be attributed to the Project, refer **Figure 4.5**) is proposed at these crossing locations. In addition to RoW narrowing the pipeline alignment has been adjusted to avoid major tree clearing with in survey corridor. RoW narrowing or micro-siting will also be undertaken during construction with site-specific assessment for the retention of habitat values including tall trees and stags where they occur near the edge of the RoW and can be accommodated from a constructability perspective. These values will be pre-identified by suitably qualified fauna spotter catchers supervising the clearing works.

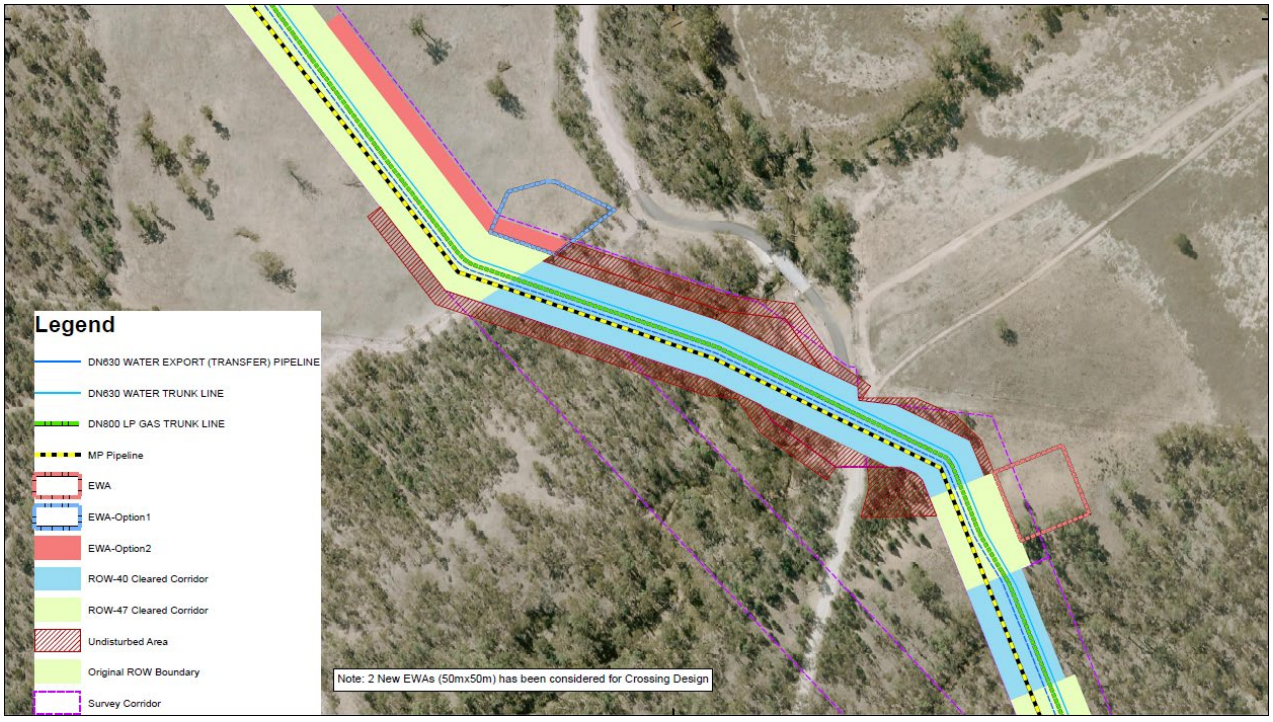


Figure 4.4 RoW narrowing through Dogwood and Punchbowl Creeks

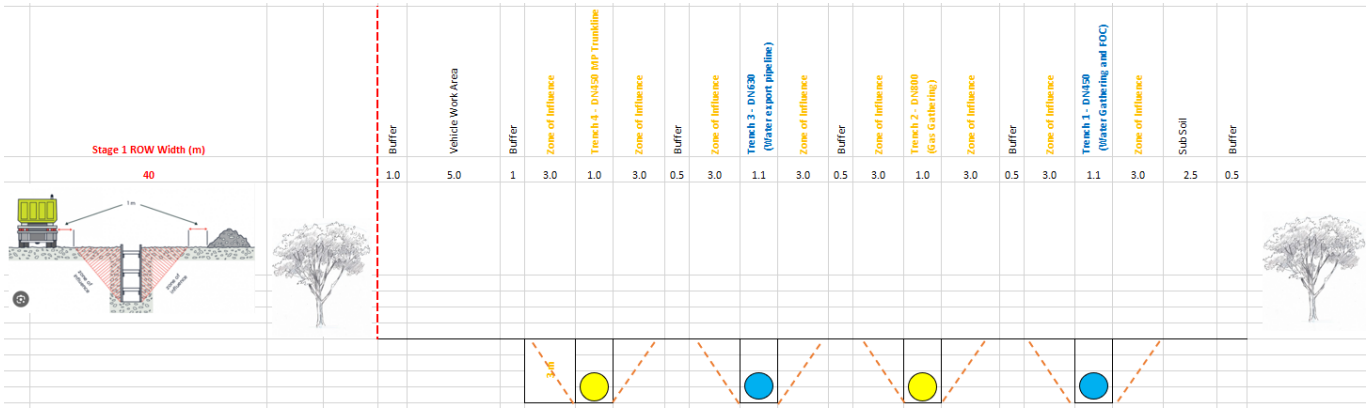


Figure 4.5 Configuration of the narrowest possible RoW (40 m) for the proposed pipelines

4.2 Overview of impacts

4.2.1 Vegetation clearing

The most significant impact associated with the development of Study area is the direct loss of the following resulting from the establishment of well pads, gathering and associated infrastructure:

- approximately 501.0 ha of remnant vegetation (representing approximately 3.9 % of the total remnant vegetation within the Study area); and
- approximately 75.6 ha of native regrowth vegetation (representing approximately 8.0% of the total regrowth vegetation in the Study area).

Given the highly vegetated nature of the Study area, clearing of remnant vegetation and associated habitat is an unavoidable aspect of the Project development however, the majority of the clearing proposed is in widespread, least concern vegetation types (predominantly RE 11.5.1, 11.7.4 and 11.7.7). **Table 4.1** summarises the total area of remnant and regrowth vegetation in the areas to be disturbed by the Project.

Table 4.1 Vegetation clearing for SGP North by RE type

RE Type	VM Act Status	Biodiversity Status	Impact area (ha)
Remnant			
11.3.2	Of concern	Of concern	0.4
11.3.4	Of concern	Of concern	1.0
11.3.25	Least concern	Of concern	1.1
11.5.1	Least concern	No concern at present	231.0
11.5.1a	Least concern	No concern at present	2.5
11.5.20	Least concern	No concern at present	0.2
11.5.21	Least concern	No concern at present	8.2

RE Type	VM Act Status	Biodiversity Status	Impact area (ha)
11.7.2	Least concern	No concern at present	10.6
11.7.4	Least concern	No concern at present	95.1
11.7.5	Least concern	No concern at present	18.0
11.7.6	Least concern	No concern at present	2.1
11.7.7	Least concern	No concern at present	130.8
		Subtotal (remnant)	**501.0**
Regrowth			
11.5.1	Least concern	No concern at present	49.2
11.5.1a	Least concern	No concern at present	0.6
11.7.4	Least concern	No concern at present	6.9
11.7.7	Least concern	No concern at present	1.7
Undifferentiated			17.2
		Subtotal (regrowth)	**75.6**
Cleared and non-remnant			
Non-remnant	-	-	10.4
Cleared land	-	-	184.9
		Total clearing	**771.9**

4.2.2 Habitat fragmentation and landscape connectivity

Habitat fragmentation occurs when continuous areas of habitat are subdivided into a number of 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') (Bennet, 2006). The impacts of habitat fragmentation are 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).

While the overall clearing areas are large, clearing within remnant vegetation for gas field development is undertaken in 'chunks', with disturbance areas of 1-2 ha for individual well pads or linear corridors of 20-27 m width with surrounding vegetation left intact. The Landscape Fragmentation and Connectivity (LFC) Tool has determined the impacts on connectivity areas within the Study area to be significant based on Arrow's GTRE mapping (total area of RVM Cat B clearing is 500.43 ha), but not significant using DESI RE mapping. Impact values generated by the LFC Tool have been included in the PEMs table (refer **Table 5.4**). The outputs from the LFC Tool analysis are attached in **Appendix F**.

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 Indirect impacts

Indirect impacts on ecological values that may arise as a result of the Study area development 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 in 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 Study area 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 Endangered REs by VM Class

All endangered REs have been avoided and there are no impacts to the 5.5 ha of endangered REs within the Study area .

4.4.2 Of concern REs by VM Class

Within the Study area, 'of concern' REs are restricted to alluvial systems, typically occurring as linear remnants or small patches along waterways and drainage features. No well pads or infrastructure have been located in these areas however, there are some limited impacts associated with linear infrastructure crossings including:

- RoWs for gathering infrastructure and access tracks through narrow linear remnants of 'Of concern' RE 11.3.4 associated with un-named tributaries of Bottle Tree Creek; and
- RoWs, access tracks and extra work areas through a patch of 'Of concern' RE 11.3.2 on Punchbowl Creek and an unnamed tributary of Columboola Creek in the south of the Study area.

Impacts on 'Of concern' REs by VM Act class are limited to RE 11.3.4 (1.0 ha) and RE 11.3.2 (0.4 ha). These impacts are within the existing approved limits in Schedule F, Table 3 (PEMs table) and do not trigger a requirement to amend the EA.

4.4.3 Impacts on watercourse vegetation

Impacts on regulated vegetation within a defined distance from the defining banks of watercourses are within the existing approved limits specified in the EA apart from 0.2 ha of RE 11.5.1a (17a) and 0.2 ha of RE 11.7.2 (24a).

As per the distances set out in *Code 16: Native vegetation clearing of the State Development Assessment Provisions*, the following buffer distances have been defined to determine impacts on regulated vegetation within a defined distance from the defining banks of watercourses associated with the Project:

- stream order 1 or 2 – 10 m
- stream order 3 or 4 – 25 m
- stream order 5 or greater – 50 m

In the absence of Project-specific data defining the actual spatial location of defining banks, the watercourse centre line has been used to calculate the GTRE mapped vegetation within the defined distance relevant to the watercourse.

Impacts on watercourse vegetation associated with the Project are identified in **Table 5.4**. The majority of this vegetation is associated with minor waterways (stream order 1 or 2). The majority of these creek crossings are of minor waterways, which will be trenched outside the wet season in accordance with Arrow's standard crossing methodologies. A review of waterway crossing methods will be undertaken for all waterways that are stream order 4 or higher during the engineering design process. Refer to **Section 4.1.3** for the crossing details on the major crossings at Bottle Tree Creek (stream order 5), and Dogwood Creek (stream order 5) and Punchbowl Creek (stream order 4).

4.4.4 Impacts on habitat for endangered and vulnerable flora species

The SGP North development will impact on general habitat only for the following threatened flora species:

- Gurulmundi Heath Myrtle, *Micromyrtus carinata* (Endangered under the NC Act); and
- Gurulmundi Fringe Myrtle, *Calytrix gurulmundensis* (Vulnerable under the NC Act).

The associated REs for *Micromyrtus carinata* (RE 11.7.4 and 11.7.5) and *Calytrix gurulmundensis* (RE 11.7.4, 11.7.5, 11.7.6 and 11.7.7) are widespread throughout the Study area however, these represent general habitat only (rather than core habitat). As both species are associated with ridgelines, it is likely that the extent of these REs shown in **Figure 3.4** (which does not account for landform or landscape position) significantly overestimates the actual area of habitat for these species. There are potentially suitable ridgelines in the south-west and north-east of the Study area (on PL492) and in the north-west of PL305 however, there is a lower likelihood of encountering *Calytrix gurulmundensis* and *Micromyrtus carinata* elsewhere in the Study area.

Pre-clearance surveys will be conducted in all proposed infrastructure areas prior to development proceeding in accordance with requirements under the NC Act. In the event that either of these plant species are identified, infrastructure locations would be reviewed with further EA amendments sought to authorise any impacts on associated PEMs and ESA values.

Significant Residual Impact (SRI) Assessments have been undertaken in accordance with the *Significant Residual Impact Guidelines* (SRI Guidelines) (DEHP, 2014) for endangered, vulnerable and special least concern flora species

and are documented in the sections below. The SRI Guidelines provide an explanation of some key terms used in these impact assessments, which have been summarised below:

- **Habitat**: is the are 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**: Any 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 Impacts on terrestrial fauna values

The Project will have an impact on protected wildlife habitat for the species known or considered likely to occur in the Study area listed in **Table 4.2**. The Project will also impact on habitat for the Golden-tailed Gecko however, habitat for a near threatened species does not constitute a PEM under the EO Act and there is no requirement to offset this impact. Instead, impacts on habitat for Golden-tailed Gecko will be limited by restrictions imposed under the EA on petroleum pipeline activities in ESAs. As such, impacts on habitat for Golden-tailed Gecko have been excluded from **Table 4.2**.

Table 4.2 Summary of Project impacts on protected wildlife habitat

Species	Area of impact (ha)
Habitat for animals listed as endangered wildlife under the NC Act	
Phascolarctos cinereus, Koala	561.9
Petauroides volans, Greater Glider (southern and central)	473.0
Petaurus australis australis, Yellow-bellied Glider (south-eastern)	473.0
Adclarkia dulacca, Dulacca Woodland Snail	No impact
Habitat for animals listed as vulnerable wildlife under the NC Act	
Calyptorhynchus lathami lathami, Glossy Black-cockatoo (south-eastern)	7.9
Grantiella picta, Painted Honeyeater	No impact
Stagonopleura guttata, Diamond Firetail	467.3
Nyctophilus corbeni, Corben's Long-eared Bat	468.6
Adclarkia cameroni, Brigalow Woodland Snail	2.5
Habitat for animals listed as special least concern wildlife under the NC Act	

Species	Area of impact (ha)
Tachyglossus aculeatus, Echidna	10.7

SRI Assessments have been undertaken in accordance with the SRI Guidelines (DEHP, 2014) for endangered, vulnerable and special least concern fauna species and are documented in the sections below. The SRI Guidelines provide an explanation of some key terms used in these impact assessments, which have been summarised below:

- **Habitat**: is the are 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**: Any 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 Koala, *Phascolarctos cinereus*

Development of the SGP North will result in the direct loss of approximately 561.9 ha of potentially suitable habitat for Koala and would be expected to result in the loss of food trees wherever clearing occurs. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Koala has been provided in **Table 4.3**. Suitable habitat mapping for this species can be found in **Figure 3.7a**.

Table 4.3 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?	**Likely** The species has been recorded from two locations in the Study area– one record 350 m north-east of a drill pad from 1987 in RE 11.5.1 and one record 10 m east of a RoW in RE 11.5.1. Records surrounding the Study area are from over 35 years ago. The presence of Koala records in the region surrounding the Study area suggests that there is sufficient suitable habitat to support a local population of this species. Population numbers are likely to be sparse given the nature of the available habitat in the Brigalow Belt (DAWE, 2022a). 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. Clearing for establishment of the Project represents the direct loss of 561.9 ha of this habitat containing known browse species for Koala. The nature of coal seam gas infrastructure (which typically comprises clearing for well pads of 1-2 ha in size, and up to 30 m wide for linear

SRI Criteria	Project Response
	infrastructure) means this clearing will not be concentrated in a single location, rather it will be dispersed over a large area. Despite this, impacts associated with the Project do have the potential to 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 (ALA, 2015). Given that the Project is located well within the known distribution of the Koala, it is considered unlikely that the Project will reduce the extent of occurrence of 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, 2022a) they are capable of dispersing between areas of suitable habitat and persisting in highly fragmented habitats for long periods of time (Youngentob, Marsh, & Skewes, 2021). 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 (Youngentob, Marsh, & Skewes, 2021). Whilst the construction of the Project will lead to some fine scale habitat fragmentation, it is considered unlikely that these impacts will 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** 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 Projects location within the QLD and NSW Koala management unit, any localised habitat fragmentation is unlikely to result in a genetically distinct subpopulation from forming. There is also a broad recognition of the Koala's dispersal capabilities across cleared land (Youngentob, Marsh, & Skewes, 2021). It is therefore considered 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). Dogs are already established in the Study area, and development of the Project is unlikely to have a significant impact on numbers. However, the requirement to navigate the cleared corridor does have the potential to exacerbate the threat for Koalas moving across cleared land. To help manage pest species across the Project, Arrow have developed an overarching pest management strategy and developed a PMP for the broader SGP. This PMP will help to ensure that appropriate

SRI Criteria	Project Response
	management strategies are implemented to control pest species that could occur within the Project footprint. Thus, impacts to suitable habitat are unlikely to result in invasive species that are harmful to Koala becoming established in Koala habitat.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** Koala retrovirus and Chlamydia (*Chlamydia percorum*) are known to be prevalent amongst Koala populations in northern Australia (DAWE, 2022a). It is currently unknown whether these diseases are present within the local population of Koalas that have been identified in the vicinity of the Project, but it is considered unlikely that the construction and ongoing operation of the Project will introduce these diseases to local populations or exacerbate any pre-existing diseases that may already be present.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** Considering 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, 2022a) and the *South-East Queensland Koala Conservation Strategy 2020-2025* (DES, 2020) lists increasing habitat protection and habitat restoration as priority conservation and recovery objectives. Considering that the construction of the Project will require the removal of 561.9 ha of potentially suitable habitat for the Koala, it is 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?	**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). Development of the Project will result int eh removal of 561.9 ha of potentially suitable habitat for the Koala, and 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.	

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

Development of the SGP North will result in the direct loss of 473.0 ha of potentially suitable habitat for 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 can be found in **Figure 3.7b.**

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?	**Likely** Multiple records for Greater Glider are centred on riparian vegetation (RE 11.3.4) associated with Dogwood and Punchbowl Creeks. There are also other records associated with remnant RE 11.7.7 to the south of Punchbowl Creek and RE 11.7.6 to west of the Study area indicating the presence of a population of Greater Glider through the centre of the Study area. Bottle Tree Creek provides similar habitat to the other creek systems however, no targeted spotlighting has been undertaken for Greater Gliders in this location. Greater Gliders are known to be sensitive to fragmentation and, given the history of clearing and land disturbance, it is likely that a significant proportion of the Study area does not contain trees of sufficient size (>50 cm dbh) to provide shelter for this hollow-dependent species. As such, the habitat mapping (which is based on RE associations only and does not account for hollow availability) is likely to overestimate the area occupied by this species. Despite this, the extent of habitat removal required for Project development has the potential to result in a long-term decrease in the size of the local Greater Glider 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 (ALA, 2015). Given that the Project is located well within the known distribution of the Greater Glider, it is considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Likely** Greater Gliders typically move through woodland and forest habitat by gliding from tree-to-tree without coming to ground. Assuming a maximum glide angle of between 31 to 40 degrees from horizontal then Greater Gliders are unlikely to cross clearings >50 m except if trees were >30 m. If trees were <20 m, then Greater Gliders would be unlikely to cross clearings >30 m (Eyre, Smith, & Venz, 2022). There are Greater Glider records on the east and west sides of the Project in the vicinity of Dogwood and Punchbowl Creeks. The fragmentation impacts of the combined north-south ROW with the Girrahween to Bellevue (G2B) pipeline are considered in the Biodiversity Assessment Report for that Project however, it is worth noting that this ROW (which has a combined width of 47 m, refer **Section 4.1.3.2**) would be expected to represent a barrier to east-west movement by Greater Glider, with tree height in unimpacted areas bordering the RoW being a key variable. As such, the Project is likely to fragment an existing population of this species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** The Greater Glider has already been split into two genetically distinct subpopulations (*Petauroides volans* (southern & central subspecies) and *Petauroides minor* (northern subspecies)) which have clear geographical boundaries. The northern subspecies is distributed from around Townsville northwards to the Windsor Tablelands, whilst the southern & central subspecies occurs from around Proserpine, south through NSW and the ACT, to Wombat State Forest in central Victoria (DCCEEW, 2022). The Project is located well within the known distribution of the southern & central subspecies. Whilst the construction of the Project is likely to cause fragmentation of Greater Glider habitat, it is unlikely to isolate areas of habitat to the extent that it will 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, 2022). 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 an overarching pest management strategy and 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. Thus, impacts to suitable habitat are unlikely to result in invasive species that are harmful to Greater Glider becoming established in Greater Glider habitat.
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 that could cause the Greater Glider 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, 2022), 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 buried infrastructure and exposed vents/drains so that during the construction and operational phases of the Project, bushfire risks are mitigated. Despite this however, the Project will require the removal of 473.0 ha of potentially suitable habitat for the Greater Glider, which could interfere with the recovery of this 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** Habitat mapping based on RE associations (without accounting for tree size and hollow availability) is likely to overestimate the extent of suitable habitat in the Study area. However, it is clear that the Dogwood and Punchbowl Creek systems are likely to contain ecologically significant locations for the local Greater Glider population which will be disrupted as a result of the Project. Considering that the construction of the Project will require the removal of 473.0 ha of potentially suitable habitat for the Greater Glider, 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 Greater Glider.	

4.5.2 Impacts on habitat for vulnerable fauna species

4.5.2.1 Brigalow Woodland Snail, *Adclarkia cameroni*

Development of the SGP North will result in the direct loss of 2.5 ha of potentially suitable habitat associated with the major creek systems through the central part of the Study area. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Brigalow Woodland Snail has been provided in **Table 4.5**. Suitable habitat mapping for this species can be found in **Figure 3.8**.

Table 4.5 Significant Residual Impact Assessment for the Vulnerable 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 local population?	**Possible** While not previously recorded, the presence of records approximately 5 km to the south-west indicates that this species is likely to occur in the Study area. The Project will result in the loss of 2.5 ha of potentially suitable habitat for this species associated with Dogwood, Punchbowl and Bottle Tree Creeks. If present, these crossings would be expected to result in the loss of any snail population within the Project. However, given that this is potential habitat, and no population of Brigalow Woodland Snail has been confirmed, it is unlikely that the Project will lead to a long-term decrease in the size of a local population of this species.
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 (ALA, 2015). Whilst the Project is located along the northernmost boundary of this species' distribution, no individuals have been recorded within the Study area. Considering that a reduction in the extent of occurrence for a species would require the removal of an actual peripheral record, it is considered unlikely that the Project will reduce the extent of occurrence of the Brigalow Woodland Snail.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to fragment an existing population?	**Possible** As this species is not highly mobile, it is assumed that known records represent an isolated sub-population of the Brigalow Woodland Snail, as it is very unlikely there is movement between these records. While the loss of potentially suitable habitat for this species is limited in extent, it is concentrated in the area around Dogwood, Punchbowl and Bottle Tree Creeks. Establishment of a 40 m RoW through Dogwood and Punchbowl Creeks would result in the permanent removal of overstorey vegetation and suitable microhabitat from the riparian corridor, potentially rendering it unsuitable as habitat for this species. Dispersal from any upstream populations would still be possible during higher rainfall events that could result in individuals being washed downstream however, it is possible that the Project could reduce connectivity or fragment an existing population.
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, 2016). 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. Establishment of a 40 m RoW through Dogwood and Punchbowl Creeks would result in the permanent removal of overstorey vegetation and suitable microhabitat from the riparian corridor, potentially rendering it unsuitable as habitat for this species. However, dispersal from any upstream populations would still be possible during higher rainfall events that could result in individuals being washed downstream meaning that genetically distinct populations are unlikely to form.
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, 2016). There are no significant barriers to these species and all are likely to be already established within the Study area, with Buffel grass noted as a key component in the ground layer for RE 11.3.4 (EcoSmart, 2017). To minimise the spread of this species, and to help manage other invasive species listed under the *Biosecurity Act 2014*, Arrow have developed a Weed Management Plan (WMP) that has general vehicle hygiene requirements that will be followed during the construction and operational phases of the Project. Thus, impacts to suitable habitat are unlikely to result in invasive species that are harmful to Brigalow Woodland Snail becoming established in Brigalow Woodland Snail habitat.

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 Brigalow Woodland Snail populations to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Unlikely** The Conservation Advice for the Brigalow Woodland Snail (TSSC, 2016), lists preventing clearing of brigalow habitat within the species' 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. The Project requires the removal of 2.5 ha of riparian eucalypt woodland habitat for the Brigalow Woodland Snail. No brigalow habitat will be impacted and it is considered unlikely that the Project would 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** If a population of Brigalow Woodland Snail is present in the area around Dogwood, Punchbowl or Bottle Tree Creeks, it is possible that establishment of the overall RoW for the Project over creek crossings could disrupt ecologically significant habitat for this species.
It is considered **possible** that the Project will have a significant residual impact on the Brigalow Woodland Snail.	

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

Development of the SGP North will result in the direct loss of 7.9 ha of clearing within habitat containing potential shelter and foraging resources for the Glossy Black-cockatoo. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Glossy Black-cockatoo has been provided in **Table 4.6**. Suitable habitat mapping for this species can be found in **Figure 3.6.**

Table 4.6 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** There is one record of this species on Girrahween Station, approximately 300 m west of the proposed Field Compression Station (FCS). In general, areas of RE 11.7.4 north of the Warrego Highway contains less abundant *Allocasuarina littoralis* with habitat south of the Warrego Highway considered to contain more abundant foraging resources for Glossy Black-cockatoo (EcoSmart, 2023). As such, this record has been buffered to indicate the area of potential habitat with other areas of this RE excluded as 'core habitat' for this species.

SRI Criteria	Project Response
	Glossy Black-cockatoos are highly dispersive and any individuals using the Study area are likely to occupy a far greater range. It is therefore unlikely that any population would rely heavily on the Study area for the entirety of its resource needs. As such, the loss of 7.9 ha of potentially suitable habitat is unlikely to 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 (ALA, 2015). Given that the Project is located well within the known distribution of the Glossy Black-cockatoo, it is considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** While the Glossy Black-cockatoo is susceptible to habitat fragmentation (DCCEEW, 2022), being highly mobile, this species may travel considerable distances to isolated fragments in search of food. Given the highly vegetated nature of the surrounding area and adjoining State Forests, it is unlikely that the loss of 7.9 ha of potential habitat would result in a significant impact on connectivity for this species. Thus, impacts to suitable habitat are unlikely to create a barrier to movement for the species to fragment an existing population of Glossy Black-cockatoo.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Glossy Black-cockatoo (south-eastern) is one of three recognised subspecies (along with the Kangaroo Island and northern subspecies). Within the south-eastern subspecies, though there was previously thought to be a separate Riverina population in western NSW, the subspecies is now considered to be a single main population (DCCEEW, 2022). The high mobility of this bird species suggests that fragmentation as a result of the Project is unlikely to provide a significant barrier to species movement. Thus, impacts to suitable habitat are unlikely to create a barrier to movement for the species to result in genetically distinct populations of Glossy Black-cockatoo 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** Locally, fragmentation and the removal of hollow-bearing trees may increase predation of nestlings or alternatively result in higher competition for hollows by 'edge' species such as the Common Brushtail Possum (DCCEEW, 2022). However, the Project is not expected to introduce new invasive species to the Study area. Invasive weeds are a threat to Glossy Black-cockatoo due to their increased bushfire risk (DCCEEW, 2022). The Project is expected to provide improvement to bushfire risk in the Study area through the inclusion of a bushfire mitigation strategies. Thus, impacts to suitable habitat are considered unlikely to result in invasive species harmful to Glossy Black-cockatoo becoming established in Glossy Black-cockatoo habitat.
Are impacts to suitable habitat likely to introduce disease that may cause	**Unlikely** Psittacine Beak and Feather Disease (PBFD) is a potentially fatal disease caused by psittacine circovirus, typically transferred between adults, nestlings and contaminated

SRI Criteria	Project Response
the population to decline?	nest hollows. Although south-eastern 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, the small total area (7.9 ha) of habitat to be impacted by the Project is unlikely to result in a significant loss of hollows, or to impinge on connectivity with surrounding habitat and hollows. Thus, impacts to suitable habitat are unlikely to introduce disease that may cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Unlikely** 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. 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 buried infrastructure and exposed vents/drains so that during the construction and operational phases of the Project, bushfire risks are mitigated. The removal of 7.9 ha of potential foraging resources for the Glossy Black-cockatoo, is unlikely to 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?	**Likely** 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*). They prefer Narrow-leaved Ironbark (*Eucalyptus crebra*) for nesting hollows (DCCEEW, 2022). Impacted areas represent a potential foraging resource and the removal of hollow-bearing trees could result in the loss of nesting sites within the Study area. Considering that the construction of the Project will require the removal of 7.9 ha of potentially suitable habitat for the Glossy Black-cockatoo, 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 Glossy Black-cockatoo.	

4.5.2.3 Diamond Firetail, *Stagonopleura guttata*

Development of the SGP North will result in the direct loss of 467.3 ha of clearing within habitat containing potential shelter and foraging resources for the Diamond Firetail. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Diamond Firetail has been provided in **Table 4.7**. Suitable habitat mapping for this species can be found in **Figure 3.6**.

Table 4.7 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** There are scattered (undated) records in the SGP North area and surrounds however, these have low spatial accuracy and the species has not been detected in the broader SGP despite extensive survey effort. If a population is present, it is likely to be relatively low density, and an abundance of suitable habitat will remain unaffected. Given the availability of habitat surrounding the Study area, the direct loss of 467.3 ha of potentially suitable habitat for the Diamond Firetail is unlikely to 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 (ALA, 2015). Given that the Project is located well within the known distribution of the Diamond Firetail, it is considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** While the Diamond Firetail is susceptible to habitat fragmentation and appears to be sedentary (DCCEEW, 2023), populations are known to move locally and, as birds, are capable of flight in long lines between shrubs and to/from the ground for feeding. Given the highly vegetated nature of the surrounding area and adjoining State Forests, it is unlikely that the loss of 467.3 ha of potential habitat would result in a significant impact on connectivity for this species. Thus, impacts to suitable habitat are unlikely to create a barrier to movement for the species to fragment an existing population of Diamond Firetail.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Diamond Firetail groups typically separate into small breeding colonies between August and January and build their nests into the base of birds-of-prey nests or the prickly foliage of shrubs (DCCEEW, 2023). The potential habitat loss of 467.3 ha is unlikely to restrict the movement of a population or restrict access to nesting resources to the extent that genetically distinct populations would form.
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** Listed threats for Diamond Firetail include exotic annual grasses (e.g. African Lovegrass *Eragrostis curvula*) as a major threat, increased territorial competition by Noisy Miners (*Manorina melanocephala*) as a moderate threat and, predation by Pied Currawong (*Strepera graculina*) and habitat degradation by Rabbits (*Oryctolagus cuniculus*) as minor threats (DCCEEW, 2023). Noisy Miners usually benefit from landscape scale clearing and fragmentation of open woodland vegetation with limited shrubby understory (DCCEEW, 2023). Pied Currawongs are also considered edge-specialist predators that benefit from increased fragmentation and edge effects in Diamond Firetail habitat. However, neither species is considered likely to gain competitive advantage or increase predation as a result of Project development.

SRI Criteria	Project Response
	Rabbits have been observed in the Project surrounds (within 2-10 km of the Project footprint to the north, east and west). Pest management during construction, clearing and operation of the project is expected to ensure above ground harbours and significant increases in soft ground are avoided. Thus, an increase in suitable habitat for rabbits is not expected as a result of the Project. Thus, impacts to suitable habitat are unlikely to result in invasive species that are harmful to Diamond Firetail becoming established in Diamond Firetail habitat.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** Conservation Advice does not list any diseases amongst the threats for Diamond Firetail (DCCEEW, 2023). Thus, impacts to suitable habitat are unlikely to introduce disease that may cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Possible** The Conservation Advice for Diamond Firetail (DCCEEW, 2023) lists retaining and protecting suitable habitat from clearing, fragmentation and disturbance, reducing grazing intensity and removing weed species as priority conservation and recovery objectives. Development of the Project will result in the removal of 467.3 ha of potentially suitable habitat for the Diamond Firetail, which could interfere with the recovery of this species if indeed it is present.
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 majority of the Study area represents potential foraging and roosting habitat for Diamond Firetail, though there are no confirmed, dated and spatially accurate records confirming its presence. However, removal of 467.3 ha is likely to impact on ecologically significant locations for this species if it is, in fact, present.
It is considered **possible** that the Project will have a significant residual impact on the Diamond Firetail.	

4.5.2.4 Yellow-bellied Glider (southern subspecies) (*Petaurus australis australis*)

Development of the SGP North will result in the direct loss of 473.0 ha of potentially suitable habitat for the Yellow-bellied Glider. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Yellow-bellied Glider has been provided in **Table 4.8**. Suitable habitat mapping for this species can be found in **Figure 3.7b.**

Table 4.8 Significant Residual Impact Assessment for the Vulnerable Yellow-bellied Glider

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Possible** The Yellow-bellied Glider is well represented in Gurulmundi State Forest to the west and Barakula State Forest to the east however, it is yet to be detected in the broader SGP area and has never been recorded from the Study area. As outlined in **Section 3.2.3.6**, nearly 70% of all records within 50 km area associated with REs 11.7.6 and 11.10.1, the latter of which has not been ground-truthed for the Study area. There

SRI Criteria	Project Response
	is approximately 150 ha of RE 11.7.6 mapped for the Study area which is concentrated on the eastern boundary of PL492 and on Dogwood Creek downstream of Myall Park Hookswood Road. Only 2.1 ha of this RE (or 1.4% of the extent within the Study area) is impacted by the Project. This impact is associated with a single well pad, two extra work areas (EWAs) and a 20-metre wide ROW in the east of PL492. The remaining 470.9 ha of impact is associated with REs that are thought to contain foraging resources for Yellow-bellied Glider based on the RE descriptions containing known tree associations. Yellow-Bellied Gliders are known to be sensitive to fragmentation and, given the history of clearing and land disturbance, it is likely that a significant proportion of this area does not contain trees of sufficient size (>50 cm dbh) to provide shelter for this hollow-dependent species. However, there are areas (particularly around Dogwood, Punchbowl and Bottle Tree Creeks) which contain trees mature enough to support Greater Glider, which means substantial hollows are likely to be present. The overall impact (473 ha) is cumulative and represents smaller areas of clearing across the Study area. As such, only a small proportion of vegetation will be removed in any one section of the corridor, with surrounding suitable habitat retained. Despite this, the overall reduction in potentially suitable habitat is significant and could lead to a decrease in the size of a local population of Yellow-bellied Glider, if one is present.
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 (ALA, 2015). Given that the Project is located well within the known distribution of the Yellow-bellied Glider, it is considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Possible** Yellow-bellied Gliders are known to be sensitive to habitat fragmentation (DAWE, 2022b). With an estimated average glide ratio of 2.0 and a low dispersal capability beyond their gliding distance, any RoWs >40 m wide is likely to provide a fragmenting effect wherever tree heights do not exceed 25 metres. Even when tall trees are present, the removal of this natural connectivity is likely to affect movement within the Study area. The fragmentation impacts of the combined north-south ROW with the Girrahween to Bellevue (G2B) pipeline are considered in the Biodiversity Assessment Report for that Project however, it is worth noting that this ROW (which has a combined width of 47 m, refer **Section 4.1.3.2**) would be expected to represent a barrier to east-west movement by Yellow-bellied Gliders, with tree height in unimpacted areas bordering the RoW being a key variable. Other areas where ROWs exceed 25 m in width also have the potential to fragment local populations of Yellow-bellied Glider, if present.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** The Yellow-bellied Glider has already been split into two genetically distinct subpopulations (*Petaurus australis australis* (south-eastern subspecies) and *Petaurus australis brevirostrum* (northern subspecies)) which have clear geographical boundaries. The northern subspecies occurs in eucalypt forest in the Atherton region in

SRI Criteria	Project Response
	Queensland, whilst the south-eastern subspecies occurs south-eastern Queensland to far south-eastern South Australia (DAWE, 2022b). The Project is located well within the known distribution of the south-eastern subspecies. While the Project may create barriers to localised movement for any population of Yellow-bellied Glider, it is unlikely to result in complete habitat isolation or the formation of genetically distinct populations of this species.
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 Yellow-bellied Glider (DAWE, 2022b). Both species are established within the Study area. To help manage pest species across the Project, Arrow have developed an overarching pest management strategy and 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. Thus, impacts to suitable habitat are unlikely to result in invasive species that are harmful to Yellow-bellied Glider becoming established in Yellow-bellied glider habitat.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** Conservation advice does not list any diseases amongst the threats for Yellow-bellied Glider (DAWE, 2022b). Thus, impacts to suitable habitat are unlikely to introduce disease that may cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Possible** General, widespread fragmentation of Yellow-bellied Glider habitat is listed as the primary cause of population decline (DAWE, 2022b) as this species has a strong preference for very large tracts of contiguous remnant habitat. As there is significant clearing to the east, west and south of the Study area and some linear clearing to the north, it is probably that the area already has reduced habitat value for Yellow-bellied Glider. Overall however, it is possible that the removal of 473 ha of potential habitat could interfere with the recovery of the species, if it is present in the Study area.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Possible** Habitat mapping based on RE associations (without accounting for tree size and hollow availability) is likely to overestimate the extent of suitable habitat in the Study area. However, if a population of Yellow-bellied Glider is present it is possible that the Project would result in the disruption of breeding and foraging habitat for this species.
It is considered **possible** that the Project will have a significant residual impact on Yellow-bellied Glider.	

4.5.2.5 Corben's Long-eared Bat, *Nyctophilus corbeni*

The Project will result in the direct loss of 468.6 ha of potentially suitable habitat for Corben's Long-eared Bat. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for Corben's Long-eared Bat has been provided in **Table 4.9**. The distribution of potentially suitable habitat for this species is presented in **Figure 3.7a**.

Table 4.9 Significant Residual Impact Assessment for the Vulnerable Corben's Long-eared Bat

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Likely** There are three (3) records for Corben's Long-eared Bat in the Study area, all of which are associated with RE 11.5.1 north of Myall Park Hookswood Road. Most species of *Nyctophilus* are thought to be sedentary and the slow, manoeuvrable flight that characterises this genus is not considered conducive to long distance flights. Foraging is generally undertaken within several kilometres of their roosting site (TSSC, 2015). As such, these records indicate the presence of a local population that is likely to use the Study area. The Project footprint contains ironbark woodlands and stands of *Callitris* and Bull Oak (*Allocasuarina luehmannii)* that are likely to provide foraging resources and roosting habitat (in the form of tree hollows and exfoliating bark). While this clearing is not concentrated in a single location and an abundance of suitable habitat will remain in adjoining areas, the loss of these resources from 468.8 ha of potentially suitable habitat is likely to lead to a long-term decrease in the size of the 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 (ALA, 2015). Given that the Project is located well within the known distribution of Corben's Long-eared Bat, it is considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Likely** Corben's Long-eared Bat is considered to be 'clutter-adapted' and forest-dependent, foraging at low height, close to vegetation and around tree trunks (Law et al, 2016). Habitat fragmentation is considered a primary factor contributing to the population decline of the species throughout its range. While individual bats are theoretically capable of negotiating low levels of fragmentation, their preference for larger tracts of vegetation is well-established (EcoSmart, 2023) and it is likely that would avoid areas with limited cover. As such, the Project has the potential to fragment existing populations of Corben's Long-eared Bat.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** While the Project will result in the creation of a potential barrier to east-west movement for this species through the Study area, it will not completely isolate any local population of Corben's Long-eared Bat. As such, the Project is unlikely to result in a genetically distinct population 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	**Unlikely** Predation by introduced species, such as the feral cat (*Felis catus*) and red fox (*Vulpes vulpes*), has not been observed for Corben's Long-eared Bat and therefore the risk to the species is unknown (TSSC, 2015). To help manage pest species across the Project, Arrow have developed an overarching pest management strategy and 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.

SRI Criteria	Project Response
endangered or vulnerable species' habitat?	It is considered unlikely that the Project will result in the establishment of invasive flora and fauna species in the Project site.
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 process for Corben's Long-eared Bat. Thus, impacts to suitable habitat are unlikely to introduce disease that may cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The Conservation Advice for Corben's Long-eared Bat (TSSC, 2015) lists habitat loss and fragmentation, fire, reduction in hollow availability and predation by feral animals as threats to the species. To help manage pest species across the Project, Arrow have developed an overarching pest management strategy and 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. Despite this however, the Project will require the removal of 468.6 ha of potentially suitable habitat for the Corben's Long-eared Bat, 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?	**Likely** Impacted areas represent a potential foraging resource and the hollow trees could result in the loss of roosting sites within the Study area. As development of the Project will require the removal of 468.6 ha of potentially suitable habitat for the Corben's Long-eared Bat, 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 Corben's Long-eared Bat.	

4.5.3 Impacts on habitat for Special Least Concern species

The Project will result in the direct loss of 10.7 ha of potentially suitable habitat for Short-beaked Echidna. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for Short-beaked Echidna has been provided in **Table 4.10**. The distribution of potentially suitable habitat for this species is presented in **Figure 3.7b**.

Table 4.10 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** There is one record for the Short-beaked Echidna adjoining Hookswood Road (PL492) from 2009, and the Study area contains an abundance of suitable habitat. As this species is widespread, this record has been buffered by 1 km to derive the area of impacted habitat as set out for Special Least Concern species in the *Method for mapping matters of state environmental significance, Version 7* (DESI, 2024).

SRI Criteria	Project Response
	Echidnas are known to occupy and forage within home ranges of up to 50 ha in size (BHA, 2024), and all habitats within the Study area are potentially suitable for this species. Given the abundance of available habitat, the loss of 10.7 ha is unlikely to lead to a long-term decrease in the local echidna 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 (ALA, 2015). Given that the Project is located well within the known distribution of the Short-beaked Echidna, it is considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to result in fragmentation of an existing population?	**Unlikely** Short-beaked Echidnas are known to be sensitive to habitat loss, especially the loss of fallen logs, tree stumps and understory vegetation, they can occupy home ranges of up to 50 ha and are capable of traversing across open areas (BHA, 2024). Development of the Project will result in 10.7 ha of habitat being disturbed. Whilst the removal of this habitat will technically lead to some local fragmentation of available habitat, Short-beaked Echidnas are more than capable of traversing cleared areas. Whilst the construction of this linear Project will lead to some fine scale habitat fragmentation, it is considered unlikely that these impacts will 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 is currently only one Short-beaked Echidna species recognised across the Australian mainland. Considering that the construction of the Project will require the removal of only 10.7 ha habitat, and that this species is known to occupy home ranges up to 50 ha in size, this habitat fragmentation is considered unlikely to result in the formation of genetically distinct populations.
Are impacts to suitable habitat likely to result in disruption to ecologically significant locations (breeding, feeding or nesting sites) or a species?	**Unlikely** Echidnas forage over large areas up to 50 ha and it is unlikely that any one location would be considered ecologically significant. The primary resource that has the potential to be disturbed by the Project are echidna burrows. Impacts on breeding habitat for echidna will be managed under Arrow's High-Risk Species Management Program approved under the NC Act, which restricts Impacted areas represent a potential foraging and breeding sites within the Study area. However, the species is capable utilising habitats surrounding the Study area. Whilst the construction of the Project will require the removal of 10.7 ha of potentially suitable habitat for the Short-beaked Echidna, it is unlikely that the Project will disrupt 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

Pursuant to Schedule F, Table 1 of the SGP North EA, activities in Category C ESAs that are 'essential habitat' are limited to low impact petroleum activities only (i.e. no ground disturbance). The following impacts on essential habitat trigger a requirement to amend the EA as currently formulated:

- 8.6 ha of disturbance of mapped essential habitat for Koala (endangered) comprising two well pads, gathering RoW and extra work areas; and
- 16.0 ha of disturbance of mapped essential habitat for the Corben's Long-eared Bat (vulnerable) comprising pipeline RoW, a quarry, access tracks and extra work areas.

5.0 Summary of proposed amendments

Impacts associated with the development of the SGP North require amendments to the SGP North EA, specifically:

- the inclusion of or authorisations through 'despite clauses' to authorise impacts to ESAs where the petroleum activities proposed are inconsistent with *Schedule F, Table 1 – Authorised petroleum activities in Environmentally Sensitive Areas and their protection zones*; and
- amendments to *Schedule F, Table 3 – Significant residual impacts to prescribed environmental matters* where the impact areas proposed exceed the authorised limits in the SGP North EA.

Details of the proposed amendments are set out below, with the proposed conditions set out in the proposed SGP North EA amendments of the EA amendment supporting information report.

5.1 Environmentally Sensitive Areas

There are no proposed impacts in Category B ESAs. The assessment of impacts on Category C ESAs is provided in **Table 5.1**.

It is proposed to authorise impacts to ESAs via *Schedule F, Table 2 – Maximum significant disturbance in ESAs*. This provides flexibility to comply with the maximum footprint within ESAs as not all infrastructure locations or CCAs have been finalised. However, an overview of the proposed intersection of infrastructure within ESAs is provided in **Table 5.2** to assist with identifying where specific authorisation is required to undertake particular types of activities in ESAs despite the restrictions imposed by *Schedule F, Table 1-Authorised petroleum activities in environmentally sensitive areas and their protection zones* ('despite clauses').

Despite clauses are required for any works involving ground disturbance in areas where only low impact petroleum activities are permitted; and non-essential petroleum activities in areas where only essential petroleum activities are permitted. Non-essential petroleum activities proposed within ESAs for the SGP North include:

- extra work areas, such as those required to accommodate well pads on sloping topography;
- communication tower;
- proposed quarry;
- FCS;
- WTS;
- pipe yard and laydown areas; and
- a construction camp.

The proposed conditions to authorise impacts is provided in the supporting information documents 'Proposed SGP North EA amendments'.

Table 5.1 Proposed disturbance in Category C ESAs by trigger at tenure scale

CATEGORY C ESA BY TRIGGER	IMPACT AREA BY TENEMENT	MAXIMUM FOOTPRINT
Ground disturbance in a Category C ESA that is an Of Concern RE	PL305 – 1.1 ha PL491 – <0.1 ha PL492 – 1.4 ha	2.5 ha
Ground disturbance in a Category C ESA that is mapped 'Essential Habitat'	PL305 – 8.8 ha PL491 – 7.2 ha PL492 – 8.6 ha	24.6 ha
Ground disturbance in a Category C ESA that is Protected Wildlife Habitat that is Category A, B or C on the RVMM	PL305 – 167.9 ha PL491 – 51.0 ha PL492 – 218.5 ha	437.4 ha

Table 5.2 Proposed Activities Affecting Category B and Category C ESAs

ESA Type	Detail	Allowable activities	Proposed activities
Category C			
Of concern RE	RE 11.3.2	Low impact petroleum activities only	RoW – 0.2 ha Access tracks – 0.2 ha **Total disturbance requiring authorisation – 0.4 ha**
	RE 11.3.4	Low impact petroleum activities only	RoW – 1.0 ha Access tracks – <0.1 ha Extra work areas – <0.1 ha **Total disturbance requiring authorisation – 1.0 ha**
	RE 11.3.25	Low impact petroleum activities only	RoW – 0.6 ha Access tracks – 0.1 ha Extra work areas – 0.3 ha **Total disturbance requiring authorisation – 1.0 ha**
Essential habitat for endangered wildlife	Koala	Low impact petroleum activities only	**Total disturbance requiring authorisation – 8.6 ha**
Essential habitat for vulnerable wildlife	South-eastern Long-eared Bat	Low impact petroleum activities only	**Total disturbance requiring authorisation – 16.0 ha**
Protected wildlife habitat		Low impact petroleum activities only	437.4 ha
Cumulative unauthorised disturbance in Category C ESA			**Despite - 23.2 ha**

ESA Type	Detail	Allowable activities	Proposed activities
Category B PPZ			
Endangered RE	PPZ (within 200 m)	Essential petroleum activities only	Well pad - <0.1 ha No amendment required
Category B SPZ			
Endangered RE	PPZ (within 200 m)	Essential petroleum activities only	Well pad – 1.0 ha RoW – 0.4 ha No amendment required
Category C PPZ			
Essential habitat for endangered or vulnerable wildlife and Of concern REs	PPZ (within 200 m)	Essential petroleum activities only	RoW – 69.3 ha Track – 12.4 ha Drill pad – 22.0 FCS – 2.8 ha WTS – 1.1 ha Quarry – 8.0 ha Pipe yard – 1.7 ha Extra work area – 1.5 ha Camp – 1.5 ha Communication tower - <0.1 ha Survey corridor – 0.1 ha **Total disturbance – 122.5 ha** **Despite – 18.8 ha**

5.1.1 Maximum disturbance limits for ESAs

It is proposed that *Schedule F, Table 2 – Maximum significant disturbance* is updated to reflect the limits shown in **Table 5.3** based on the proposed infrastructure layout. At the time of the application, the inclusion of Protected Wildlife Habitat (as defined under the EO Act, refer **Section 1.3.3**) as a Category C ESA is the subject of discussion between the CSG industry and the DESI. As such, **Table 5.2** includes areas of mapped essential habitat shown on the published essential habitat map only.

By contrast, the values given in **Table 5.1** incorporate impacts to Protected Wildlife Habitat that is a Category A, B or C area shown on the Regulated Vegetation Management Map (RVMM) for a species of wildlife listed as critically endangered, endangered, vulnerable under the NC Act (thereby reflecting DESI's position with regard to 'essential habitat' constituting an area that contains both wildlife habitat and Category A, B or C RVM mapped areas).

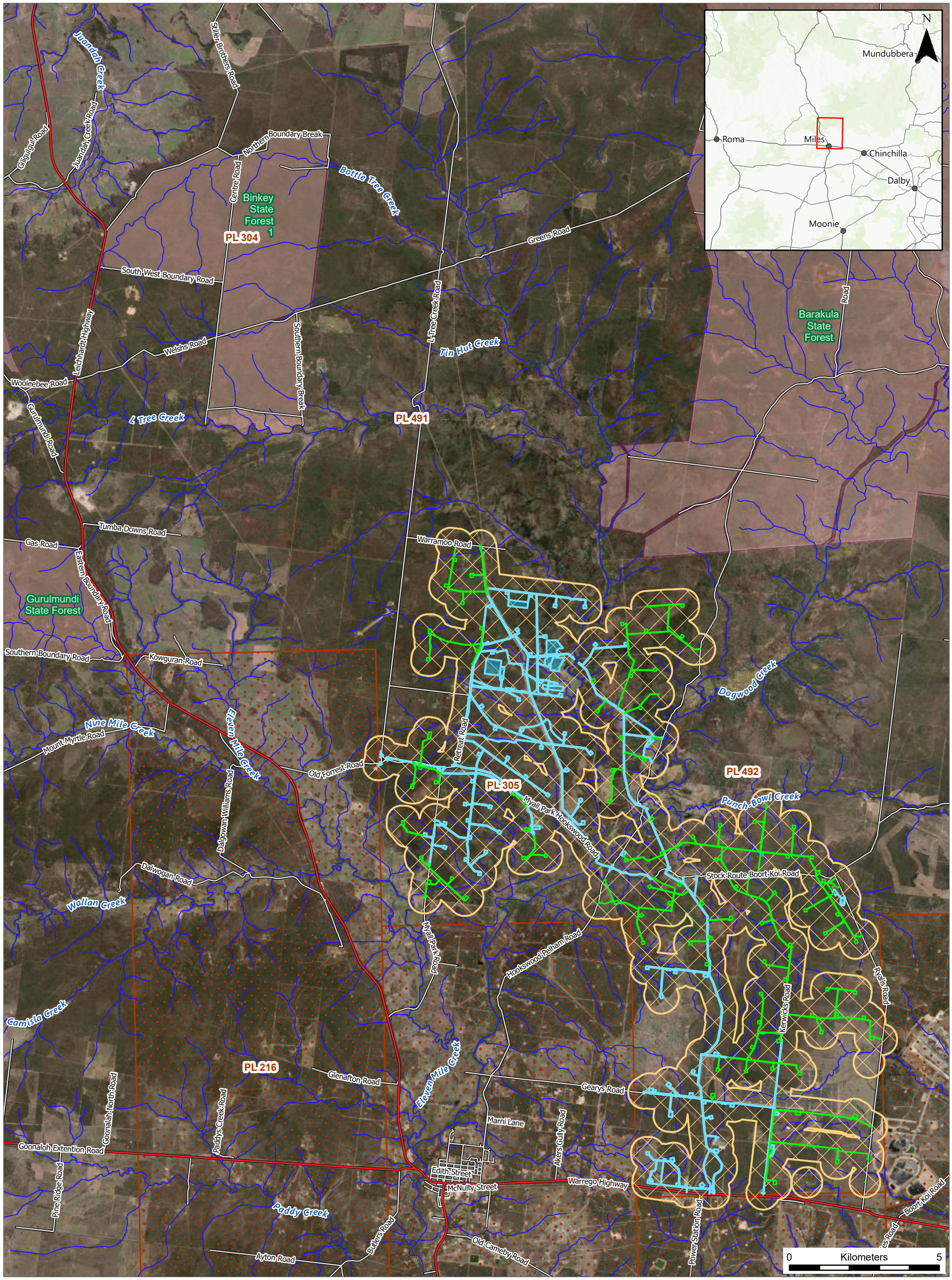
Table 5.3 Revised *Schedule F, Table 2 – Maximum significant disturbance*

Activity(ies)	Maximum footprint
Ground disturbance for petroleum activities	4090.0 ha (Actual Stage 1 impact = 771.9 ha)
Ground disturbance within a Category B Environmentally Sensitive Area	9.1 ha (Actual Stage 1 impact=0 ha)
Ground disturbance within a Category C Environmentally Sensitive Area	464.5 ha

It is acknowledged that the impacts on Category C ESAs (464.5 ha) reported in **Table 5.3** are inconsistent with the PEMs values reported in **Table 5.4** (561.8 ha). This is because the impacts identified in **Table 5.4** utilise validated and ground-truthed vegetation mapping rather than mapped regulated vegetation that is Category A, B or C RVM as noted by the department's expectations regarding impacts on Category C ESA – Essential Habitat.

5.2 Prescribed Environmental Matters

It is proposed to authorise impacts to the identified PEMs values via amendments to *Schedule F, Table 3 – Significant residual impacts to prescribed environmental matters* as set out in **Table 5.4**. The impacts for the SGP North Stage 1 activities have been divided into impacts that will occur in the first two years of the SGP North gasfield development and impacts that will occur later. The impacts in the first two years have been identified in this report as 'Offsets 1' as shown in **Figure 5.1** and have also been included in **Table 5.4**. It should be noted that the impacts assessed in this report and the SRIs have been undertaken for the total impacts of the SGP North Stage 1 development.



SGP North Offset Phases

SURAT GAS PROJECT NORTH

- Highway
- Main Road
- Local Road
- Watercourse
- Area of Interest

Project Area Offset Phases:

- SGP North Offsets 1
- SGP North Offsets 2
- SGP North (Petroleum Lease - Granted)
- Petroleum Lease (Granted)
- State forest

Attexo

REVIEWED: KR **DRAWN:** JT **SCALE (A3):** 1:120,000 **DATE:** 9/07/2024 **DWG No:** ARR-002_040[E] **FIGURE 5.1**

GDA2020 MGA Zone 56

Data Source:Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

C:\Users\JoshuaTomarchio\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\07_SGP_North_EA_Amendment\07_EA_Amendment\07_EA_Amendment - Rev D (June 2024).aprx

Table 5.4 Proposed amendments to *Schedule F, Table 3 – Significant residual impacts to prescribed environmental matters*

Prescribed Environmental Matter	SGP North Stage 1 - Offsets 1	SGP North Stage 1 - Offsets 2	SGP North Stage 1 - Total proposed impact	Existing approved 'Maximum extent of impact'	Amendment required
Endangered regional ecosystem					
11.4.3	No impact	No impact	No impact	MNES[1]	Not required
11.9.5	No impact	No impact	No impact	MNES[1]	Not required
Of concern regional ecosystem					
11.3.2	0.4 ha	No impact	0.4 ha	5 ha	Not required
11.3.4	1.0 ha	No impact	1.0 ha	20 ha	Not 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 11.3.2 (17a)	0.2 ha	No impact	0.2 ha	1 ha	Not required
RE 11.3.4 (16c)	0.5 ha	No impact	0.5 ha	7 ha	Not required
RE 11.3.14 (18a)	No impact	No impact	No impact	6 ha	Not required
RE 11.3.25 (16a)	0.4 ha	0.5 ha	0.9 ha	12 ha	Not required
RE 11.5.1 (18b)	1.8 ha	1.8 ha	3.6 ha	20 ha	Not required
RE 11.5.4 (18b)	No impact	No impact	No impact	3 ha	Not required
RE 11.5.20 (13d)	0.2 ha	No impact	0.2 ha	1 ha	Not required
RE 11.5.21 (18a)	No impact	No impact	No impact	12 ha	Not required
RE 11.7.2 (24a)	0.2 ha	No impact	0.2 ha	-	0.2 ha
RE 11.7.4 (12a)	0.6 ha	0.8 ha	1.4 ha	8 ha	Not required
RE 11.7.5 (29b)	<0.1 ha	0.1 ha	0.1 ha	1 ha	Not required
RE 11.7.6 (10a)	No impact	0.3 ha	0.3 ha	5 ha	Not required
RE 11.7.7 (12a)	1.1 ha	1.5 ha	2.6 ha	10 ha	Not required
Essential habitat (not in an urban area) for vulnerable wildlife					
Nyctophilus corbeni (South-eastern Long-eared Bat)	16.0 ha	No impact	16.0 ha	MNES[1]	16.0 ha

Prescribed Environmental Matter	SGP North Stage 1 - Offsets 1	SGP North Stage 1 - Offsets 2	SGP North Stage 1 - Total proposed impact	Existing approved 'Maximum extent of impact'	Amendment required
Essential habitat (not in an urban area) for endangered wildlife					
Phascolarctos cinereus (Koala)	No impact	8.6 ha	8.6 ha	-	8.6 ha
Connectivity areas					
Connectivity areas	302.1 ha	198.3 ha	500.4 ha	5.8 ha	500.4 ha
Wetlands and watercourses					
A wetland in a wetland protection area shown on the map of referable wetlands	NA	NA	NA	NA	NA
A wetland of high ecological significance shown on the Map of referable wetlands	NA	NA	NA	NA	NA
Designated precincts in a strategic environmental area					
Designated precinct in a strategic environmental area	NA	NA	NA	NA	NA
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.	No impact	No impact	No impact	-	No impact
An area not shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife.	No impact	No impact	No impact	-	No impact
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'	NA	NA	NA	MNES[1]	NA

Prescribed Environmental Matter	SGP North Stage 1 - Offsets 1	SGP North Stage 1 - Offsets 2	SGP North Stage 1 - Total proposed impact	Existing approved 'Maximum extent of impact'	Amendment required
Habitat for an animal that is endangered wildlife					
Phascolarctos cinereus, Koala	325.5 ha	236.3 ha	561.8 ha	-	561.8 ha
Petauroides volans volans, Greater Glider	269.3 ha	203.7 ha	473.0 ha	-	473.0 ha
Habitat for an animal that is vulnerable wildlife					
Adclarkia cameroni, Brigalow Woodland Snail	1.9 ha	0.6 ha	2.5 ha	-	2.5 ha
Calyptorhynchus lathami lathami, Glossy Black-cockatoo	7.9 ha	No impact	7.9 ha	-	7.9 ha
Stagonopleura guttata, Diamond Firetail	263.6 ha	203.7	467.3 ha	-	467.3 ha
Nyctophilus corbeni, South-eastern Long-eared Bat	267.4 ha	201.2	468.6 ha	MNES[1]	Not required
Petaurus australis australis, Yellow-bellied Glider (south-eastern)	269.3 ha	203.7 ha	473.0 ha	-	473.0 ha
Habitat for an animal that is special least concern wildlife					
Tachyglossus aculeatus, Short-beaked Echidna	No impact	10.7 ha	10.7 ha	35.4 ha	Not required
Protected areas					
National park	NA	NA	NA	NA	NA
Regional park	NA	NA	NA	NA	NA
Nature refuge	NA	NA	NA	NA	NA
Highly protected zones of State marine parks					
Conservation park zone	NA	NA	NA	NA	NA
Marine national park zone	NA	NA	NA	NA	NA
Preservation zone	NA	NA	NA	NA	NA
Other zones	NA	NA	NA	NA	NA

Prescribed Environmental Matter	SGP North Stage 1 - Offsets 1	SGP North Stage 1 - Offsets 2	SGP North Stage 1 - Total proposed impact	Existing approved 'Maximum extent of impact'	Amendment required
Fish habitat areas					
A declared fish habitat area	NA	NA	NA	NA	NA
Waterway providing for fish passage					
Fish passage (not in an urban area)	1.9 ha	1.5 ha	3.4 ha	18.5 ha	Not required
Marine plants					
Marine plant (not in an urban area)	NA	NA	NA	NA	NA
Legally secured offset area					
Legally secured offset area	NA	NA	NA	NA	NA

[1] Impact managed under EPBC approval 2010/5344

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Appendix A

EPBC Approval 2010/5344

Approval

Surat Gas Expansion Project (EPBC 2010/5344)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

person to whom the approval is granted	Arrow Energy Pty Ltd
proponent's ABN	ABN: 73 078 521 936
proposed action	To expand coal seam gas operations in the Surat Basin, Queensland, as described in the referral received under the EPBC Act on 2 February 2010; and as described in the Surat Gas Project Environmental Impact Statement (March 2012) and Supplementary Report to the Environmental Impact Statement (June 2013).
decision	To approve the proposed action for each of the following controlling provisions: • Listed threatened species and communities (sections 18 and 18A) • Listed migratory species (sections 20 and 20A) • A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
Conditions of approval	This approval is subject to the conditions specified below.
expiry date of approval	This approval has effect until **31 December 2080**.

Decision-maker	Greg Hunt
name and position	The Hon Greg Hunt MP Minister for the Environment
signature	
date of decision	19:12:2013

Conditions of approval

1. The **Minister** may determine that a plan, strategy or program approved by the Queensland Government satisfies a plan required under these conditions.

Disturbance Limits

2. For the purpose of the action, the **approval holder** must not take any action outside the **project area**.
3. The action is limited to a maximum of 6,500 coal seam gas production wells and associated infrastructure.
4. The **approval holder** must not undertake hydraulic fracturing.
5. To protect **EPBC listed species** and **EPBC communities** within the **project area** the maximum disturbance limits in Table 1 apply to the project. The **approval holder** must not exceed these disturbance limits.

Table 1: Whole of project maximum disturbance limits

Terrestrial species	**Maximum disturbance (hectares) to core habitat**
Curly-bark Wattle, *Acacia curranii*	1210
Hando's Wattle, *Acacia handonis*	1210
Belson's Panic, *Homopholis belsonii*	140
Lobed Blue Grass, *Bothriochloa biloba*	305
Kogan Waxflower, *Philotheca sporadica*	480
Prostanthera sp Dunmore	380
Small-leaved Denhamia, *Denhamia parvifolia*	50
Calytrix gurulmundensis	1210
Ooline, *Cadellia pentastylis*	No disturbance
Finger Panic Grass, *Digitaria porrecta*	174
Austral Toadflax, *Thesium australe*	160
Acacia lauta	990
Cobar Greenhood Orchid, *Pterostylis cobarensis*	2 170
Xerothamnella herbacea	110
Hawkweed, *Picris evae*	120
Austral Cornflower, *Rhaponticum australe*	160
Eucalyptus virens	170
King Blue-grass, *Dichanthium queenslandicum*	160
Queensland White-gum, *Eucalyptus argophloia*	10
Macrozamia machinii	No disturbance
South-eastern Long-eared Bat, *Nyctophilus corbeni*	4 080
Dunmall's Snake, *Furina dunmalli*	4 400
Five-clawed Worm-skink, *Anomalopus mackayi*	560
Squatter Pigeon (Southern), *Geophaps scripta scripta*	3261

Regent Honeyeater, *Anthochaera phrygia*	20
Collared Delma, *Delma torquata*	90
Yakka Skink, *Egernia rugosa*	310
Australian Painted Snipe, *Rostratula australis*	5
EPBC Communities	**Maximum disturbance (hectares)**
Brigalow (*Acacia harpophylla* dominant and co-dominant)	106
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	8
Weeping Myall Woodlands	1
Natural Grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	No disturbance
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	No disturbance
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	No disturbance

6. To protect **EPBC listed species and communities** within the **project area** the maximum disturbance limits in Table 2 apply to **Stage 1**. The **approval holder** must not exceed these disturbance limits.

Table 2: Maximum disturbance limits for Stage 1

Terrestrial species	**Maximum disturbance (hectares) to core habitat**
South-eastern Long-eared Bat, *Nyctophilus corbeni*	167
Dunmall's Snake, *Furina dunmalli*	66
Five-clawed Worm-skink, *Anomalopus mackayi*	2
Squatter Pigeon (Southern), *Geophaps scripta scripta*	203
Regent Honeyeater, *Anthochaera phrygia*	1
Collared Delma, *Delma torquata*	11
Yakka Skink, *Egernia rugosa*	19
EPBC Communities	**Maximum disturbance (hectares)**
Brigalow (*Acacia harpophylla* dominant and co-dominant)	39
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	8

EPBC Species Impact Management and Offset Plan

EPBC Species Impact Management and Offset Plan – Stage 1

7. An EPBC Species Impact Management and Offset Plan for **Stage 1** must be submitted for approval of the **Minister** at least 3 months prior to **commencement**, and must include:

    (a) measures to report the methodology and results of **pre-clearance surveys,** and quantification of actual impacts, in the annual reporting required by condition 28. **Pre-clearance surveys** must be undertaken in accordance with the **Department's survey guidelines** in effect at the time of the survey or other survey methodology approved by the **Department** in writing;

(b) a map of the location of each **EPBC listed threatened species** and its habitat or **EPBC community** in relation to infrastructure and proposed disturbance for **Stage 1**;

(c) potential threats and **impacts** to **EPBC listed species** and **EPBC communities** from **Stage 1**;

(d) a description of the measures that will be taken to avoid, mitigate and manage **impacts** to the **EPBC listed species** and its habitat, including to the **Murray Cod** and **Fitzroy River Turtle,** or an **EPBC community**;

(e) measures to report to the **Department** on the occurrence and circumstances of **EPBC listed species** deaths as a result of the action and actions taken to reduce the likelihood of any such circumstance reoccurring;

(f) a monitoring program to determine the success of mitigation and management measures and inform the next Stage of the EPBC Species Impact Management and Offset Plan to ensure adaptive management for the duration of the project approval;

(g) a discussion of relevant **conservation advice**, **recovery plans** and **threat abatement plans** and how the EPBC Species Impact Management and Offset Plan - **Stage 1** is consistent with these documents;

(h) details of the following minimum offset areas for **Stage 1** including, for each area, the location, tenure, site description and map of environmental values:

i. 112 hectares for Brigalow (*Acacia harpophylla* dominant and co-dominant);

ii. 30 hectares Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;

iii. 80 hectares for Yakka Skink, *Egernia rugosa*;.

iv. 42 hectares for Collared Delma, *Delma torquata*;

v. 230 hectares for Dunmall's Snake, *Furina dunmalli*;

vi. 545 hectares for Squatter Pigeon (Southern), *Geophaps scripta scripta*;

vii. 6.5 hectares for Five-clawed Worm-skink, *Anomalopus mackayi*;

viii. 4 hectares for Regent Honeyeater, *Anthochaera phrygia*; and

ix. 765 hectares for South-eastern Long-eared Bat, *Nyctophilus corbeni*.

(i) a process for any significant **impact** to an **EPBC listed species** or **EPBC community** for **Stage 1**, where the species or community is not identified in Table 2, to be offset in accordance with the **EPBC Act Offsets Policy**;

(j) an offset area management plan for each offset area, which sets out management measures that will be implemented to improve the offset site for the respective **EPBC species** and/or **EPBC community**; and

(k) a timeline for when actions identified in the EPBC Species Impact Management and Offset Plan will be implemented and for legally securing offsets including, for each area, the proposed legal mechanism for securing the offset. Offsets for **Stage 1** must be legally secured prior to **commencement** of **Stage 2**.

8. The EPBC Species Impact Management and Offset Plan for **Stage 1** must be peer reviewed by a **suitably qualified ecologist** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the EPBC Species Impact Management and Offset Plan for **Stage 1** and a statement from the **suitably qualified ecologist** stating that they carried out the peer review and endorse the findings of the peer review.

9. The **approval holder** must not **commence** the action until the EPBC Species Impact Management and Offset Plan for **Stage 1** has been approved by the **Minister** in writing.

EPBC Species Impact Management and Offset Plan – Stages 2 to 4

10. The **approval holder** must update the EPBC Species Impact Management and Offset Plan for the next **development stage** (i.e. **Stage 2, Stage 3** and **Stage 4**) and submit for approval of the **Minister** at least 3 months prior to **commencement** of each **development stage**. Each updated plan must include:

    (a) the information required for the EPBC Species Impact Management and Offset Plan in conditions 7 (a) to (g) and conditions 7 (j) and 7 (k) for the respective **development stage**;

    (b) where **impacts** are unavoidable, an offset strategy to compensate for residual **impacts** to each **EPBC species** or **EPBC community** for that **development stage** in accordance with the **EPBC Act Offsets Policy**. The offset strategy must:

        i. demonstrate how the offset builds on offsets secured as part of the EPBC Species Impact Management and Offset Plan – **Stage 1** and any other **development stage** and, where possible, will contribute to a larger strategic offset for whole of project **impacts**;

        ii. identify land (including a map, site description and shapefile) that has or will be acquired and how it has been or will be legally secured;

        iii. include a detailed discussion of the quality, condition, site context and environmental values of the impact and offset site relevant to the **EPBC species** or **EPBC community** being offset;

        iv. include a description of potential risks to successful implementation of the offset, including a description of contingency measures that would be implemented to mitigate against these risks; and

        v. discuss connectivity of the offset area with other habitats and biodiversity corridors.

    (c) a reconciliation of **impacts** against whole of project disturbance limits. To incentivise avoidance, the **approval holder** is only required to offset realised **impacts**. Where the full **impact** from **Stage 1, Stage 2** or **Stage 3** that has been offset is not realised, the balance of the offset can be transferred to a future offset liability for a future **development stage** for this project.

11. The updated EPBC Species Impact Management and Offset Plan for each **development stage** must be peer reviewed by a **suitably qualified ecologist** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the EPBC Species Impact Management and Offset Plan for each **development stage** and a statement from the **suitably qualified ecologist** stating that they carried out the peer review and endorse the findings of the peer review.

12. The **approval holder** must not **commence Stage 2, Stage 3** or **Stage 4** until the EPBC Species Impact Management and Offset Plan for that **development stage** has been approved by the **Minister** in **writing**. The approved EPBC Species Impact Management and Offset Plan for each **development stage** must be implemented.

Note 1: The Minister may determine that a plan, strategy or program approved by the Queensland Government satisfies the requirements for the EPBC Species Impact Management and Offset Plan under these conditions.

Note 2: Offsets for some species may be accommodated within ecological communities or overlap State approval requirements or other species habitat requirements, as long as they meet the requirements of these conditions of approval in respect of each individual species being offset.

Coal Seam Gas Water Monitoring and Management Plan

Stage 1 CSG Water Monitoring and Management Plan

13. Prior to **commencement**, the proponent must submit a Stage 1 Coal Seam Gas Water Monitoring and Management Plan (Stage 1 CSG WMMP) for the approval of the **Minister,** who may seek the advice of an **expert panel**. The Stage 1 CSG WMMP must include:

    (a) an analysis of the results of the most recent **OGIA model** (built or endorsed by **OGIA**), relevant to all of the project's tenement areas;

    (b) a fit for purpose numerical simulation to assess potential impacts on water resources arising from the action in the project area, subsequent surface water-groundwater interactions in the Condamine Alluvium and impacts to dependent ecosystems;

    (c) an assessment of potential **impacts** from the action on non-spring based groundwater dependent ecosystems through potential changes to surface-groundwater connectivity and interactions with the sub-surface expression of groundwater;

    (d) an assessment of predicted project wide groundwater drawdown levels and pressures from the action, together with confidence levels;

    (e) parameters and a sampling regime to establish baseline data for surface and groundwater resources that may be impacted by the action, including: surface water quality and quantity in the **project area**, and upstream and downstream of potential impact areas; groundwater quality, levels and pressures for areas that may be **impacted** by the project; and for determining connectivity between surface water and groundwater that may be **impacted** by the project;

    (f) a best practice baseline monitoring network that will enable the identification of spatial and temporal changes to surface water and groundwater. This must include a proposal for aquifer connectivity studies and monitoring of relevant aquifers to determine hydraulic connectivity (including potential groundwater dependence of Long Swamp and Lake Broadwater) and must also enable monitoring of all aquatic ecosystems that may be **impacted** by the action;

    (g) a program to monitor subsidence **impacts** from the action, including trigger thresholds and reporting of monitoring results in annual reporting required by condition 28. If trigger thresholds are exceeded, the **approval holder** must develop and implement an action plan to address impacts within 90 calendar days of a trigger threshold being exceeded;

    (h) provisions to make monitoring results publicly available on the **approval holder's** website to facilitate a greater understanding of cumulative **impacts**;

    (i) a discussion on how the **approval holder** is contributing to the **Joint Industry Plan,** including its periodic review. The **approval holder** must contribute to the **Joint Industry Plan** and comply with any part of the **Joint Industry Plan**, or future iterations of the **Joint Industry Plan**, that applies to the **approval holder**;

    (j) a groundwater early warning monitoring system, including:

        i. groundwater drawdown limits for all consolidated aquifers potentially impacted by the action, excluding the Walloon Coal Measures;

        ii. for the Condamine Alluvium, appropriate triggers and groundwater limits and a rationale for their selection;

        iii. early warning indicators and trigger thresholds, including for Lake Broadwater, Long Swamp and other groundwater dependent ecosystems that may potentially be impacted by the action, including

those that may occur outside the **project area** and may be impacted by the action; and

iv. investigation, management and mitigation actions, including substitution and/or groundwater repressurisation, for both early warning indicators and trigger thresholds to address flux impacts on the Condamine Alluvium.

(k) early warning indicators and trigger thresholds, including corrective actions for both early warning indicators and trigger thresholds, for aquatic ecology and aquatic ecosystems;

(l) a CSG water management strategy for produced salt/brine, which discusses how co-produced water and brine will be managed for the action, including in the context of other coal seam gas activities in the Surat Basin;

(m) an analysis of how the **approval holder** will utilise beneficial use and/or groundwater repressurisation techniques to manage produced CSG water from the action, and how any potential adverse **impacts** associated with groundwater repressurisation will be managed;

(n) a discharge strategy, consistent with the recommendations and requirements of the Department of the Environment and Heritage Protection in its **Assessment Report** (pages 94 to 95 and pages 254 to 255) and that includes scenarios where discharge may be required, the quality of discharge water (including water treated by reverse osmosis), the number and location of monitoring sites (including upstream and downstream sites), frequency of monitoring and how the data from monitoring will be analysed and reported, including recommendations on any changes or remedial actions that would be required;

(o) a flood risk assessment for processing facilities and any raw co-produced water and brine dams, which addresses flood risks to the environment from the action in the case of a 1:1000 ARI event. The risk assessment should estimate the consequences if major project infrastructure was subject to such an event, including release of brine and chemicals into the environment;

(p) a cumulative **impact** assessment based on the outputs of the **OGIA model** which integrates groundwater model outputs with known and potential groundwater dependent ecosystems and presents the outputs in map form. Contribute to investigations coordinated through the OGIA to assess hydrological and ecological characteristics of **impacted** groundwater dependent ecosystems;

(q) details of performance measures; annual reporting to the **Department**; and publication of reports on the internet; and

(r) an explanation of how the Stage 1 CSG WMMP will contribute to work undertaken by other CSG proponents in the Surat Basin to understand cumulative **impacts**, including at the local and regional scale, and maximise environmental benefit.

14. The Stage 1 CSG WMMP must be peer reviewed by a **suitably qualified water resources expert/s** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the Stage 1 CSG WMMP and a statement from the **suitably qualified water resources expert/s** stating that they carried out the peer review and endorse the findings of the Stage 1 CSG WMMP.

15. The **approval holder** must not exceed the groundwater drawdown or groundwater limits for each aquifer specified in the Stage 1 CSG WMMP.

16. Unless otherwise agreed in writing by the **Minister**, the **approval holder** must not **commence** the action until the Stage 1 CSG WMMP is approved in writing by the **Minister**. The approved Stage 1 CSG WMMP must be implemented.

Note 3: to ensure efficiency the approval holder may prepare and align the Stage 1 WMMP with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Stage 2 CSG Water Monitoring and Management Plan

17. Prior to **Stage 2** the **approval holder** must submit a Stage 2 Coal Seam Gas Water Monitoring and Management Plan (Stage 2 CSG WMMP) to the **Minister** for approval, who may seek the advice of an **expert panel.** The Stage 2 CSG WMMP must:

    (a) include all matters in the Stage 1 CSG WMMP, and discuss how the Stage 1 CSG WMMP is informing adaptive management for the Stage 2 CSG WMMP;

    (b) include any updated modelling for the project, including in respect of the **OGIA model** or any updates to the **OGIA model** by **OGIA**;

    (c) include an explanation of how the **approval holder** will contribute to the **Condamine Interconnectivity Research Project**. The Stage 2 CSG WMMP must present the findings of the Condamine Interconnectivity Research project and any modelling done by the **OGIA** to validate predicted drawdown and a review of trigger thresholds and corrective actions for the action;

    (d) report on the potential for flow reversal from the Condamine Alluvium to underlying aquifers, based on data obtained during the Stage 1 CSG WMMP;

    (e) review and update the monitoring network in Stage 1 WMMP to reflect changes in understanding of **impacts** to water resources, including from baseline monitoring and relevant research;

    (f) identify any predicted changes in stream connectivity due to groundwater drawdown from the action and assess potential impacts to groundwater dependent ecosystems due to any predicted changes in stream connectivity, including to water quality, quantity and ecology;

    (g) address any uncertainty in the groundwater-dependency of ecosystems and springs with supporting evidence from field-based investigations for any groundwater-dependent ecosystems and springs confirmed in the **OGIA model**;

    (h) provide details of an ongoing monitoring plan that:

        i. sets out the frequency of monitoring and rationale for the frequency;

        ii. includes continued collection of baseline data for each monitoring site over the life of the project;

        iii. outlines the approach to be taken to analyse the results including the methods to determine trends to indicate potential **impacts**; and

        iv. builds on the groundwater early warning system required at condition 13 (j) and sets out early warning indicators and trigger thresholds and limits for groundwater and surface water.

    (i) include a risk based exceedance response plan that details the actions the **approval holder** will take and the timeframes in which those actions will be undertaken if: early warning indicators and trigger threshold values contained in the Stage 2 CSG WMMP are exceeded, or there are any emergency discharges.

18. The Stage 2 CSG WMMP must be peer reviewed by a **suitably qualified water resources expert/s** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the Stage 2 CSG WMMP and a statement from the **suitably qualified water resources expert/s** stating that they carried out the peer review and endorse the findings of the Stage 2 CSG WMMP.

19. The **approval holder** must not exceed the groundwater drawdown or groundwater limits specified in the Stage 2 CSG WMMP.

20. The **Minister** may direct in writing that the **approval holder** cease water/gas extraction and/or water discharge or use if an early warning indicator, trigger threshold or limit is exceeded, and if the **Minister** is not satisfied that the action proposed or taken by the proponent will remedy the situation. The **Minister** may direct the proponent to implement alternative action at the expense of the proponent.

Note 4: The proponent will be provided with a reasonable opportunity to comment on any such direction before it is required to be implemented.

21. Unless otherwise agreed by the **Minister** in writing, the Stage 2 CSG WMMP must be approved in writing by the **Minister** prior to first extraction of gas. The approved Stage 2 CSG WMMP must be implemented. The Stage 1 CSG WMMP will apply until the commencement of the approved Stage 2 CSG WMMP.

Note 5: to ensure efficiency the approval holder may prepare and align the Stage 2 WMMP with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Revision of the Stage 2 CSG WMMP

22. To ensure an adaptive management approach, the proponent must submit periodic revisions of the Stage 2 CSG WMMP for approval by the **Minister** in writing, who may seek the advice of an **expert panel**. Revisions must be submitted at least 3 months prior to planned **commencement** of each new **development stage** for the project. The revised CSG WMMP must take into account outcomes of the ongoing monitoring program in the Stage 2 CSG WMMP, groundwater model updates and any bioregional assessments.

23. If the **OGIA model** ceases to exist, then the **approval holder** must submit an alternate model to be used for the purpose of these conditions that replaces the **OGIA model** as referred to in these conditions. The alternate model must be approved by the **Minister** in writing before the next relevant stage of the CSG WMMP is submitted to the **Minister** for approval.

24. The **approval holder** must not **commence Stage 3** or **Stage 4** until a revised Stage 2 CSG WMMP is approved in writing by the **Minister** for that **development stage.** The approved revised Stage 2 CSG WMMP must be implemented.

25. The **Minister** may, by written request to the **approval holder**, require the Stage 1 or Stage 2 CSG WMMP to be revised, including to address expert advice. Any request must be acted on by the **approval holder** within the timeframe specified in the request.

Note 6: The Minister may throughout the life of the project life seek advice from experts, or an expert panel. As a consequence specific matters identified through such advice may need to be addressed in the CSG WMMP Plan. Where such advice is sought the approval holder would be provided with opportunity to submit information and respond to the specific matters identified, in order to ensure the CSG WMMP Plan is based on the best available information. Review requirements will facilitate adaptive management, align with Queensland Government approval requirements, and account for potential cumulative impacts as new scientific information becomes available over the life of the project.

General

26. Within 20 business days after the **commencement** of the action, the **approval holder** must advise the **Department** in writing of the actual date of **commencement.**

27. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans, reports or strategies required by this approval, and make them available upon request to the **Department**. The annual report (condition 28) must state all confirmed cases of non-compliance along with details of any remedial actions. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act,** or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.

28. Within three months of every 12 month anniversary of the **commencement** of the action, the **approval holder** must publish a report on its website for the life of the approval outlining how they have been compliant with the conditions of this approval over the previous 12 months, including implementation of any management plans as specified in the conditions. The **approval holder** must also report against disturbance limits. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published.

29. The **approval holder** must notify the **Department** in writing of potential non-compliance with any condition of this approval as soon as practical and within no later than ten business days of becoming aware of the potential non-compliance. The notice provided to the **Department** under this condition must specify:

    a) the condition which the **approval holder** has potentially breached;

    b) the nature of the potential non-compliance;

    c) when and how the **approval holder** became aware of the non-compliance;

    d) how the non-compliance will affect the approved action;

    e) how the non-compliance will affect the anticipated **impacts** of the approved action, in particular how the non-compliance will affect the **impacts** on the matters of national environmental significance;

    f) the measures the approval holder will take to address the **impacts** of the non-compliance on the matters of national environmental significance and rectify the non-compliance; and

    g) the time by when the approval holder will rectify the non-compliance.

30. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister.**

31. If the **approval holder** wishes to carry out any activity other than in accordance with the management plans as specified in the conditions, the **approval holder** must submit to the **Department** for the **Minister's** written approval a revised version of that management plan. The approval holder must not **commence** the varied activity until the **Minister** has approved the varied management plan. The **Minister** will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan, that management plan must be implemented in place of the management plan originally approved.

32. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species, listed migratory species or water resources to do so, the **Minister**

may request that the **approval holder** make specified revisions to the management plans specified in the conditions and submit the revised management plan for the **Minister's** written approval. The **approval holder** must comply with any such request within the timeframe specified by the **Minister**. The revised approved management plan must be implemented. Unless the **Minister** has approved the revised management plan, then the person taking the action must continue to implement the management plan originally approved, as specified in the conditions.

33. If, at any time after five years from the date of this approval, the **approval holder** has not **commenced** the action, then the **approval holder** must not **commence** the action without the written agreement of the **Minister.**

34. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved and remain available on that website for the life of the approval.

Definitions

Approval holder: means the person to whom the approval is granted.

Assessment Report: means the Queensland Department of Environment and Heritage Protection's report under the *Environmental Protection and Biodiversity Conservation Act 1994* for the action.

Commenced/commencement: means any physical disturbance, including clearance of native vegetation, new road work and the establishment of well sites to develop the gas field project area. Commencement does not include:

a) minor physical disturbance necessary to undertake pre-clearance surveys or establish monitoring programs or geotechnical investigations; or

b) activities that are critical to commencement that are associated with mobilisation of plant and equipment, materials, machinery and personnel prior to the start of development only if such activities will have no adverse impact on matters of national environmental significance, and only if the proponent has notified the Department in writing before an activity is undertaken.

Core habitat: means core habitat known and core habitat possible as defined in the rules for habitat mapping for each individual species in the *Supplementary Report to the Surat Gas Project EIS (March 2012), Attachment 1 – Matters of National Environmental Significance.*

Conservation advice: means an approved conservation advice under the EPBC Act for an EPBC Act listed species or community.

Core habitat known: means habitat where a spatially accurate confirmed record of a particular species exists (e.g. Herbrecs or survey record). Core habitat known is attributed to the particular habitat polygon in which it occurs, based on either regional ecosystem (RE) mapping provided by the Queensland Department of Environment and Heritage Protection (or successor agency) or high resolution habitat mapping developed for a specific purpose. Core habitat known also means a 1 km buffer around all spatially accurate (< 400 metres accuracy) species records.

Condamine Interconnectivity Research Project: means the Condamine Interconnectivity Research Project being undertaken by the Queensland Office of Groundwater Impact Assessment as part of the implementation of the Surat Underground Water Impact Report (UWIR), which was prepared by the Queensland Water Commission (QWC) in 2012.

Core habitat possible: means an area where previous records of a particular species are not known to occur within a given area or habitat, although specific habitat features are present which are known to be favoured by the species and the habitat occurs within the species known geographic range.

Department: means the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999*.

Department's survey guidelines: means:
Matters of National Environmental Significance, Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999 - http://www.environment.gov.au/epbc/publications/nes-guidelines.html.

Survey Guidelines for Australia's Threatened Frogs, Threatened Birds, Threatened Fish, Threatened Mammals, Threatened Reptiles and Threatened Bats: http://www.environment.gov.au/epbc/guidelines-policies.html.

Development stage: means Stage 1, Stage 2, Stage 3 or Stage 4 of project development, as defined in these definitions.

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

EPBC Act Offsets Policy: means the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (October 2012) including the Offsets Assessment Guide.

EPBC community: means an endangered ecological community listed under the EPBC Act.

EPBC listed threatened species: means a threatened flora or fauna species listed under the EPBC Act.

Expert panel: means an expert panel appointed by the Minister.

Fitzroy River Turtle: means the Fitzroy River Turtle, *Rheodytes leukops*, listed as vulnerable under the EPBC Act.

General habitat: means where a species has not been recorded in a given location and habitat accounts for some of the features favoured by a particular species. The habitat occurs on the margins of a species known geographic range. Otherwise, the habitat is suitable for the species

Impact: has the definition assigned to it in section 527E of the EPBC Act.

Joint Industry Plan: means the *Joint Industry Plan for an Early Warning System for the Monitoring and Protection of EPBC Springs* established with other coal seam gas proponents operating within the Surat Cumulative Management Area.

Minister: means the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Murray Cod: means the Murray Cod, *Maccullochella peelii*, listed as vulnerable under the EPBC Act.

OGIA: means the Office of Groundwater Impact Assessment or its successor body,

OGIA model: means the groundwater model developed by the Office of Groundwater Impact Assessment, or its successor body, for the Surat Cumulative Management Area.

Pre-clearance surveys: means surveys that are undertaken for EPBC species and EPBC communities for all areas of the project area that may be disturbed by project activities.

Project area: means the area identified as the project area in Attachment A.

Recovery plan: means an approved recovery plan under the EPBC Act for an EPBC listed species or EPBC community.

Stage 1: means year 1 to 3 (inclusive) of the action, starting at the date of commencement.

Stage 2: means year 4 to 11 (inclusive) of the action.

Stage 3: means year 12 to 20 (inclusive) of the action

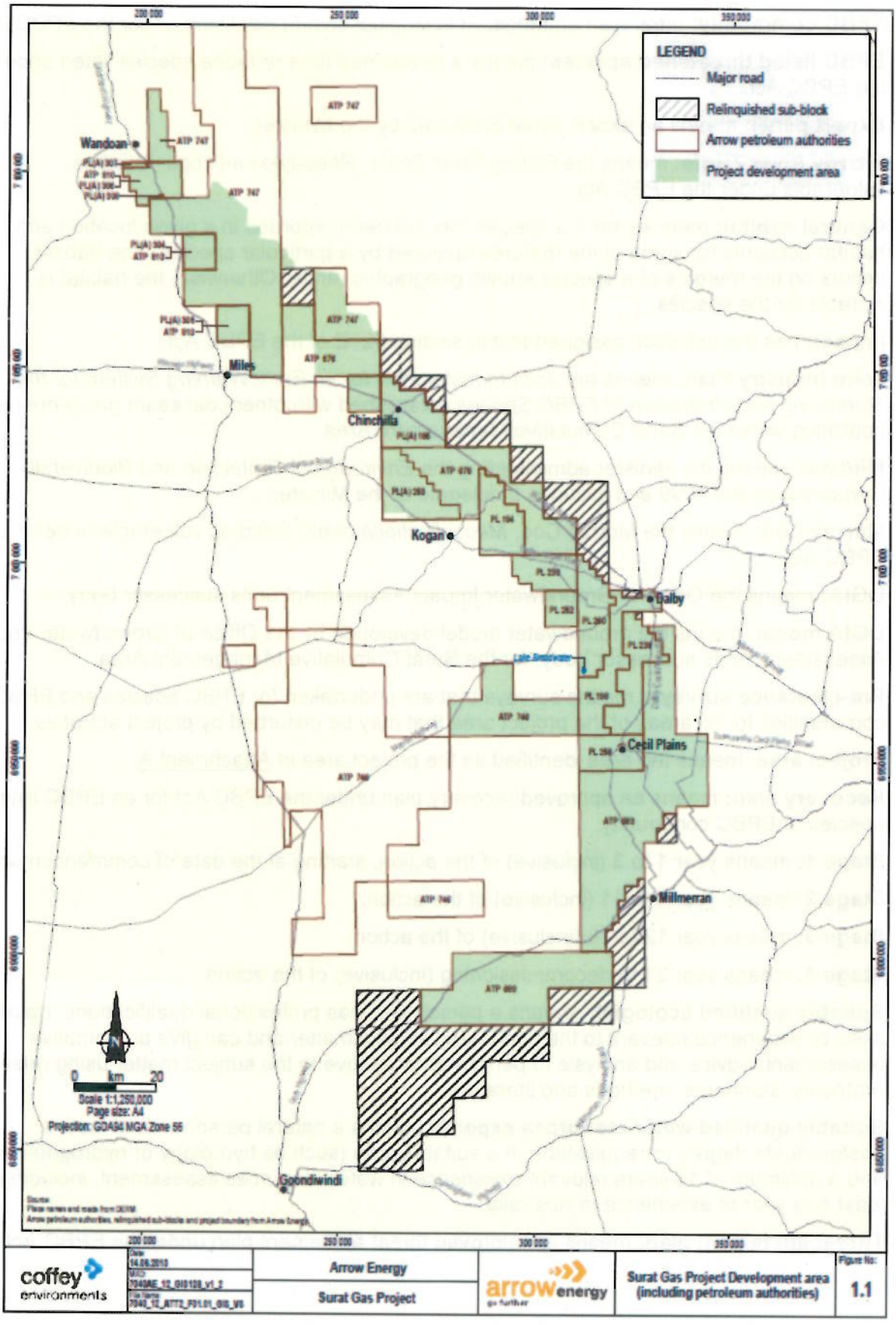
Stage 4: means year 21 to decommissioning (inclusive) of the action.

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

Suitably qualified water resources expert/s: means a natural person with at least a postgraduate degree (or equivalent) in a suitable area (such as hydrology or hydrogeology) and a minimum of 10 years relevant experience in water resources assessment, including at least one year of experience in Australia.

Threat abatement plan: means an approved threat abatement plan under the EPBC Act.

ATTACHMENT A



Appendix B

SGP North Environmental Authority (EA0001399)

Permit

Environmental Protection Act 1994

Environmental authority EA0001399

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

Environmental authority number: EA0001399

Environmental authority takes effect on 1 October 2021. This is the take effect date.

Environmental authority holder(s)

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

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Ancillary 62 - Resource recovery and transfer facility operation - 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	PL1044
Schedule 3 - 03 - A petroleum activity that is likely to have a significant impact on a category A or B Environmentally Sensitive Area	PL1044
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL1044
Schedule 3 - 08 - A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL1044
Schedule 3 - 03 - A petroleum activity that is likely to have a significant impact on a category A or B Environmentally Sensitive Area	PL304

ABN 46 640 294 485

Queensland Government

Environmentally relevant activity/activities	Location(s)
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL304
Schedule 3 - 08 - A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL304
Ancillary 62 - Resource recovery and transfer facility operation - 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	PL304
Ancillary 62 - Resource recovery and transfer facility operation - 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	PL305
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL305
Schedule 3 - 08 - A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL305
Schedule 3 - 03 - A petroleum activity that is likely to have a significant impact on a category A or B Environmentally Sensitive Area	PL305
Schedule 3 - 03 - A petroleum activity that is likely to have a significant impact on a category A or B Environmentally Sensitive Area	PL491
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Schedule 3 - 03 - A petroleum activity that is likely to have a significant impact on a category A or B Environmentally Sensitive Area	PL492
Ancillary 62 - Resource recovery and transfer facility operation - 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	PL492
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL494
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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:

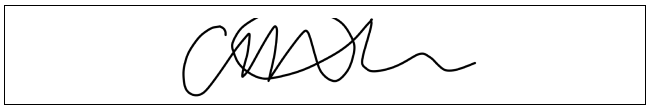
a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority - on the nominated day; or
b) if the authority states a day or an event for it to take effect-on the stated day or 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 *Planning Act 2016* 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.

The anniversary day of this environmental authority is the same day each year as the original take effect date unless you apply to change the anniversary day. The payment of the annual fee will be due each year on this day.

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.



Signature

1 October 2021

Date

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

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Privacy statement

Pursuant to section 540 of the EP Act, the Department is required to maintain a register of certain documents and information authorised under the EP Act. A copy of this document will be kept on the public register. The register is available for inspection by members of the public who are able take extracts, or copies of the documents from the register. Documents that are required to be kept on the register are published in their entirety, unless alteration is required by the EP Act. There is no general discretion allowing the Department to withhold documents or information required to be kept on the public register. For more information on the Department's public register, search 'public register' at www.qld.gov.au. For queries about privacy matters please email privacy@des.qld.gov.au or telephone 13 74 68.

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)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access state controlled roads), the Department of Resources (to clear vegetation), and the Department of Agriculture and Fisheries (to clear marine plants or to obtain a quarry material allocation).

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Schedule A – General

(A1) This environmental authority authorises the carrying out of the following resource activity(ies):

a) The petroleum activities[1] listed in **Schedule A, Table 1 – Authorised petroleum activities** to the extent they are carried out in accordance with the activity's corresponding scale and intensity (or both, where applicable); and

b) Incidental activities that are not otherwise specified relevant activities.

Schedule A, Table 1 – Authorised petroleum activities

Activity(ies)	Total scale of petroleum activities / infrastructure	Intensity / maximum size
Coal seam gas production	588 gas production wells: PL304 – 95 wells PL305 – 86 wells PL491 – 192 wells PL492 – 151 wells PL494 – 27 wells PL1044 - 37 wells	1.1 ha per well
Petroleum pipeline	PL304 – 90 km PL305 – 90 km PL491 – 200 km PL492 – 190 km PL494 – 30 km PL1044 – 50 km	650 km of pipeline
Petroleum activities carried out on a site containing a regulated structure[2] (high or significant consequence category dam)	PL304 – Kedron Dam PL305 – Castledean Dam PL1044 – Punchbowl Dam	Kedron Dam – 20 ha Castledean Dam – 14 ha Punchbowl Dam – 35 ha

[1] The petroleum activities are authorised petroleum activities for the purposes of the *Petroleum and Gas (production and Safety) Act 2004* and *the Petroleum Act 1923*.

[2] Words underlined are currently defined in **Schedule K – Definitions** or the *Environmental Protection Act 1994* and/or its subordinate legislation.

(A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

(General 7 PESCD3[3]) All monitoring must be undertaken by a suitably qualified person.

(General 8) If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.

(General 9) All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.

(General 10) Notwithstanding condition (General 9), where there are no NATA accredited laboratories for a specific analyte or substance, then duplicate samples must be sent to at least two separate laboratories for independent testing or evaluation.

(General 11) Monitoring and sampling[4] must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:

(a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – *Environmental Protection (Water) Policy 2009*
(b) for groundwater, *Groundwater Sampling and Analysis – A Field Guide* (2009:27 GeoCat #6890.1)
(c) for noise, the Environmental Protection Regulation 2008
(d) for air, the *Queensland Air Quality Sampling Manual* and/or Australian Standards under 3580 *Methods for sampling and analysis of ambient air*, as appropriate for the relevant measurement
(e) for soil, the *Guidelines for Surveying Soil and Land Resources, 2nd edition* (McKenzie *et al.* 2008), and/or the *Australian Soil and Land Survey Handbook, 3rd edition* (National Committee on Soil and Terrain, 2009)
(f) for dust, Australian Standard AS3580.

[3] Conditions that include 'SC' are an existing approved and published standard condition.

[4] Where monitoring and/or sampling cannot safely be undertaken due to an exceptional circumstance (such as a flood event) preventing a timeframe being met, safe access shall be re-established as soon as practicable and the monitoring and/or sampling shall be subsequently undertaken as soon as possible.

Notification

(General 12) In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:

(a) any unauthorised significant disturbance to land
(b) potential or actual loss of structural or hydraulic integrity of a dam
(c) when the level of the contents of any regulated dam reaches the mandatory reporting level
(d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
(e) likely or actual loss of well integrity
(f) when the seepage trigger action response procedure required under condition (Water 14(g)) is or should be implemented
(g) unauthorised releases of any volume of prescribed contaminants to waters
(h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
    i. 200 L of hydrocarbons; or

ii. 200 L of stimulation additives; or
iii. 500 L of stimulation fluids; or
iv. 1 000 L of brine; or
v. 5 000 L of untreated coal seam gas water; or
vi. 5 000 L of raw sewage; or
vii. 10 000 L of treated sewage effluent.

(i) the use of restricted stimulation fluids

(j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use

(k) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

Financial Assurance

(General 13 Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

(General 14) Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

(General 15) If the amount of financial assurance held by the administering authority has been discounted and either the nominated period of financial assurance has ended, or an event or change in circumstance has resulted in the holder of the environmental authority no longer being able to meet one or more of the mandatory pre-requisites or applicable discount criteria, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance as soon as practicable.

Contingency procedures for emergency environmental incidents

(General 16) Petroleum activities involving significant disturbance to land cannot commence until the development of written contingency procedures for emergency environmental incidents which include, but are not necessarily limited to:

a) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity.
b) consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity.
c) response procedures to be implemented to prevent or minimise the risks of environmental harm occurring.
d) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused.
e) procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land.
f) training of staff to enable them to effectively respond.
g) procedures to notify the administering authority, local government and any potentially impacted landholder.

(General 17 PESCC 4) All plant and equipment must be maintained and operated in their proper and effective condition.

(General 18) The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:

a) regulated dams and low consequence dams
b) exploration, appraisal and development wells
c) water treatment facilities
d) brine encapsulation facilities
e) landfill cells
f) sewage treatment facilities
g) specifically authorised discharge points to air and waters
h) any chemical storage facility associated with the environmentally relevant activity of chemical storage
i) field compressor stations
j) central compressor stations
k) gas processing facilities; and
l) pipeline compressor stations.

(General 19) Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Erosion and sediment control

(General 20) For activities involving significant disturbance to land, control measures that are commensurate to the site specific risk of erosion, and risk of sediment release to waters must be implemented to:
a) allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities
b) minimise soil erosion resulting from wind, rain, and flowing water
c) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water
d) minimise work-related soil erosion and sediment runoff; and
e) minimise negative impacts to land or properties adjacent to the activities (including roads).

Complaints

(General 21) Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.

Documentation

(General 22) A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that:
a) relevant material, including current published guidelines (where available) have been considered in the written document

b) the content of the written document is accurate and true; and

c) the document meets the requirements of the relevant conditions of the environmental authority.

(General 23) All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.

(General 24) All documents required to be developed under this environmental authority must be kept for five years.

(General 25) All documents required to be prepared, held or kept under this environmental authority must be provided to the administering authority upon written request within the requested timeframe.

(General 26) A record of all complaints must be kept including the date, complainant's details, source, reason for the complaint, description of investigations and actions undertaken in resolving the complaint.

Schedule B – Waste Management

General Waste Management

(Waste 1 PESCC 24) 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.

(Waste 2) Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised to be disposed of or used on site under this environmental authority.

(Waste 3) Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material or drilling fluids stored in sumps, must be contained in either:

a) an above ground container; or
b) a structure which contains the wetting front.

(Waste 4) Green waste may be used on-site for either rehabilitation or sediment and erosion control, or both.

(Waste 5) Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.

Pipeline wastewater

(Waste 6) Pipeline waste water, may be released to land provided that it:

a) can be demonstrated it meets the acceptable standards for release to land; and
b) is released in a way that does not result in visible scouring or erosion or pooling or run-off or vegetation die-off.

Authorised uses of produced water for petroleum activities

(Waste 7) Produced water may be re-used in:

a) drilling and well hole activities; or
b) stimulation activities.

(Waste 8) 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 dust; and
b) the application:
    i. does not cause on-site ponding or runoff
    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.

(Waste 9) Produced water may be used for construction purposes provided the use:

(a) does not result in negative impacts on the composition and 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.

(Waste 10) If there is any indication that any of the circumstances in condition (Waste 8)(b)(i) to (Waste 8(b)(iv)) or (Waste 9)(a) to (Waste 9(d)) is occurring the use must cease immediately and the affected area must be remediated without delay.

Use of produced water for irrigation activities

(Waste C1) Irrigation of produced water is authorised providing it ensures:

(a) that soil structure, stability and productive capacity can be maintained or improved
(b) toxic effects to crops do not result; and
(c) yields and produce quality are maintained or improved.

(Waste C2) Irrigation of produced water is authorised providing a written report is provided to the chief executive which:

(a) certifies that the outcomes in condition (Waste C1) will be achieved
(b) states water quality criteria, which has been determined in accordance with the assessment procedures outlined in **Schedule B, Table 1 — Assessment procedures for water quality criteria**
(c) includes a water monitoring program to monitor that the outcomes listed in condition (Waste C1) are being achieved.

Schedule B, Table 1 — Assessment procedures for water quality criteria

Water quality criteria	Assessment procedure
electrical conductivity sodium adsorption ratio pH	Salinity Management Handbook, with reference to Chapter 11; and/or Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapter 4 and Volume 3 Chapter 9. The assessment should consider: • soil properties within the root zone to be irrigated (e.g. clay content, cation exchange capacity, exchangeable sodium percentage) • water quality of the proposed resource (e.g. salinity, sodicity) • climate conditions (e.g. rainfall) • leaching fractions • average root zone salinity (calculated) • crop salt tolerance (e.g. impact threshold and yield decline) • management practices and objectives (e.g. irrigation application rate, amelioration techniques) • broader landscape issues (e.g. land use, depth to groundwater) • any additional modelling and tests undertaken to support the varied water quality parameters.
heavy metals	Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapters 3 and 4 and Volume 3 Chapter 9.

Water quality criteria	Assessment procedure
	The assessment should aim to derive site specific trigger values (e.g. cumulative contaminant loading limit) based on the methodology provided in the above mentioned procedure.

(Waste 11) 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.

(Waste 12) The release of treated sewage effluent or greywater authorised in condition (Waste 11) must:

(a) be to a fenced and signed contaminant release area(s)
(b) not result in pooling or run-off or aerosols or spray drift or vegetation die-off
(c) be to a contaminant release area(s) that is kept vegetated with groundcover, that is:
    i. not a pest species
    ii. kept in a viable state for transpiration and nutrient uptake; and
    iii. grazed or harvested and removed from the contaminant release area as needed, but not less than every three months.

Residual drilling material

(Waste 15) If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.

(Waste 16) Residual drilling material can only be disposed of on-site:

(a) by mix-bury-cover method if the residual drilling material meets the approved quality criteria; or
(b) if it is certified by a suitably qualified third party as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.

(Waste 17) Records must be kept to demonstrate compliance with condition (Waste 15) and (Waste 16).

Schedule C – Protecting Acoustic Values

(Noise 1) Notwithstanding condition (General 21), emission of noise from the petroleum activity(ies) at levels less than those specified in **Schedule C, Table 1 — Noise nuisance limits** are not considered to be environmental nuisance.

Schedule C, Table 1 — Noise nuisance limits

Time period	Time of Day	Metric	Short term noise event[1] (dBA)	Medium term noise event[1] (dBA)	Long term noise event[1] (dBA)
6:00am — 7:00am	Morning	$L_{Aeq,adj,15\ min}$	40	38	35
7:00am — 6:00pm	Day	$L_{Aeq,adj,15\ min}$	45	43	40
6:00pm — 10:00pm	Evening	$L_{Aeq,adj,15\ min}$	40	38	35
10:00pm — 6:00am	Night	$L_{Aeq,adj,15\ min}$	28	28	28
		Max $L_{pA,\ 15\ mins}$	55	55	55
Drilling activities undertaken from 10:00 pm – 7:00 am[2]		$L_{Aeq,\ adj,\ 15\ min}$	28 (measured indoors) 33 (measured outdoors)		

[1] The noise limits in Table 1 have been set based on the following deemed background noise levels (L_{ABG}):

6:00am—7:00 am: 30 dBA
7:00am—6:00 pm: 35 dBA
6:00pm—10:00 pm: 30 dBA
10:00pm—6:00 am: 25 dBA

[2] *Drilling activities undertaken from 10:00 pm – 7:00 am* must be temporary and mobile in nature, and must not contribute to long-term background noise creep.

(Noise 2) If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in **Schedule C, Table 2 — Adjustments to be added to noise levels at sensitive receptors** are to be added to the measured noise level(s) to derive $L_{Aeq,\ adj,\ 15\ min}$.

Schedule C, Table 2 — Adjustments to be added to noise levels at sensitive receptors

Noise characteristic	Adjustment to noise
Tonal characteristic is just audible	+ 2 dBA
Tonal characteristic is clearly audible	+ 5 dBA
Impulsive characteristic is just audible	+ 2 dBA
Impulsive characteristic is clearly audible	+ 5 dBA

(Noise 3) Notwithstanding condition (Noise 1), emission of any low frequency noise must not exceed either (Noise 3(a)) and (Noise 3(b)), or (Noise 3(c)) and (Noise 3(d)) in the event of a valid complaint about low frequency noise being made to the administering authority:

(a) 60 dB(C) measured outside the sensitive receptor; and
(b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
(c) 50 dB(Z) measured inside the sensitive receptor; and

(d) the difference between the internal A-weighted and Z-weighted (Max $L_{pZ, 15\ min}$) noise levels is no greater than 15 dB.

Schedule D – Protecting Air Values

Venting and Flaring

(Air 1) 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 complies with all of (Air 1(a)) and (Air 1(b)) and (Air 1(c)), or with (Air 1(d)):

(a) an automatic ignition system is used, and
(b) a flame is visible at all times while the waste gas is being flared, and
(c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or
(d) it uses an enclosed flare.

Schedule E – Protecting Land Values

General

(Land 1) Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.

Top soil management

(Land 2) Top soil must be managed in a manner that preserves its biological and chemical properties.

Land management

(Land 3) Land that has been significantly disturbed by the petroleum activities must be managed to ensure that mass movement, gully erosion, rill erosion, sheet erosion and tunnel erosion do not occur on that land.

Acid sulfate soils

(Land 4) Acid sulfate soils must be treated and managed in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.

Chemical storage

(Land 5) Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipeline operation and maintenance

(Land 6) Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the APIA Code of Environmental Practice: Onshore Pipelines (2013 or more recent editions).

Pipeline reinstatement and revegetation

(Land 7 PPSCE 17) Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.

(Land 8) Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.

(Land 9) Backfilled, reinstated and revegetated pipeline trenches and right of ways 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; and
(d) vegetated with groundcover which includes suitable native species of vegetation for the location and not a pest species, and which is established and growing.

Schedule F – Protecting Biodiversity Values

Confirming biodiversity values

(Biodiversity 1) Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground biodiversity values of the native vegetation communities at that location must be undertaken by a suitably qualified person.

(Biodiversity 2) A suitably qualified person must develop and certify a methodology so that condition (Biodiversity 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.

(Biodiversity 3) For conditions (Biodiversity 4) to (Biodiversity 9), where mapped biodiversity values differ from those confirmed under conditions (Biodiversity 1) and (Biodiversity 2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity value.

Planning for land disturbance

(Biodiversity 4) 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.

Planning for land disturbance – linear infrastructure

(Biodiversity 5) Linear infrastructure construction corridors must:

(a) maximise co-location

(b) be minimised in width to the greatest practicable extent; and

(c) for linear infrastructure that is an essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40m in total width.

(Biodiversity 8) Where petroleum activities are to be carried out in environmentally sensitive areas or their protection zones, the petroleum activities must be carried out in accordance with **Schedule F, Table 1 — Authorised petroleum activities in environmentally sensitive areas and their protection zones**.

Schedule F, Table 1 — Authorised petroleum activities in environmentally sensitive areas and their protection zones

Environmentally Sensitive Area (ESA)	**Within the ESA**	**Primary protection zone of the ESA**	**Secondary protection zone of the ESA**
Category A ESAs	No petroleum activities permitted.	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.
Category B ESAs that are other than 'endangered' regional ecosystems	Only low impact petroleum activities permitted.		Only essential petroleum activities permitted.
Category B ESAs that are 'endangered' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	Only essential petroleum activities permitted.
Category C ESAs that are 'nature refuges' or 'koala habitat'	Only low impact petroleum activities permitted.		-
Category C ESAs that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	-
Category C ESAs that are 'regional parks' (previously known as 'resources reserves')	Only essential petroleum activities permitted.		-
Category C ESAs that are 'state forests' or 'timber reserves'	Only essential petroleum activities permitted.	Petroleum activities permitted.	-
Areas of vegetation that are 'critically limited'	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	-

(Biodiversity 8a) Despite condition (Biodiversity 8), the total scale and maximum footprint of significant disturbance specified in **Schedule F, Table 2 – Maximum significant disturbance** are authorised to be undertaken at the location and within the footprint prescribed in **Schedule F, Table 2 – Maximum significant disturbance.**

Schedule F, Table 2 – Maximum significant disturbance

Activity(ies)	Total scale	Maximum footprint
Ground disturbance for petroleum activities	PL304 – 530 ha PL305 – 600 ha PL491 – 1,240 ha PL492 – 1,250 ha PL494 – 150 ha PL1044 – 320 ha	4,090.0 ha
Ground disturbance within a Category B Environmentally Sensitive Area	PL491 – 2 ha PL492 – 2 ha PL494 – 5 ha PL1044 – 0.1 ha	9.1 ha
Ground disturbance within a Category C Environmentally Sensitive Area	PL304 – 250 ha PL305 – 5 ha PL491 – 65 ha PL492 – 55 ha PL494 – 1 ha PL1044 – 0.1 ha	376.1 ha

(Biodiversity 9) 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 (Biodiversity 4), (Biodiversity 5) and (Biodiversity 8)

(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.

Planning for land disturbance – linear infrastructure

(Biodiversity 10) 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 **Schedule F, Table 3 —Significant residual impacts to prescribed environmental matters**

Schedule F, Table 3 — Significant residual impacts to prescribed environmental matters

Prescribed environmental matter	**Location of impact**	**Maximum extent of impact**	**Maximum extent of impact – Stage 1** (Years 1 – 5 inclusive)	**Maximum extent of impact – Stage 2** (Years 6 – 10 inclusive)	**Maximum extent of impact – Stage 3** (Years 11 – 15 inclusive)	**Maximum extent of impact – Stage 4** (Years 16 – 20 inclusive)
Regulated vegetation						
Endangered regional ecosystem						
RE 11.4.3	PLA492	MNES[1, 2]	MNES[1, 2]	TBC[3]	TBC[3]	TBC[3]
RE 11.9.5	PLA494	MNES[1, 2]	MNES[1, 2]	TBC[3]	TBC[3]	TBC[3]
Of concern regional ecosystem (not within an urban area)						
RE 11.3.2	PLA305	5 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.3.4	PLA304, PLA491, PLA492	20 ha	7 ha	TBC[3]	TBC[3]	TBC[3]
Regional ecosystems (not within an urban area) that intersect a wetland on the vegetation management wetlands map	N/A	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
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 11.3.2 (17a)	PLA305	1 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.3.4 (16c)	PLA305	7 ha	3 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.3.14 (18a)	PLA304, PLA491, PLA492	6 ha	0.5 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.3.25 (16a)	PLA305, PLA491, PLA492, PLA1044	12 ha	1.5 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.5.1 (18b)	PLA305, PLA491, PLA492, PLA1044	20 ha	6 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.5.4 (18b)	PLA304	3 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.5.20 (13d)	PLA492	1 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.5.21 (18a)	PLA304, PLA305, PLA491, PLA492	12 ha	0 ha	TBC[3]	TBC[3]	TBC[3]

Prescribed environmental matter	**Location of impact**	**Maximum extent of impact**	**Maximum extent of impact – Stage 1** (Years 1 – 5 inclusive)	**Maximum extent of impact – Stage 2** (Years 6 – 10 inclusive)	**Maximum extent of impact – Stage 3** (Years 11 – 15 inclusive)	**Maximum extent of impact – Stage 4** (Years 16 – 20 inclusive)
RE 11.7.4 (12a)	PLA304, PLA305, PLA491, PLA492	8 ha	1.5 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.7.5 (29b)	PLA492	1 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.7.6 (10a)	PLA304, PLA305, PLA491, PLA492	5 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
RE 11.7.7 (12a)	PLA305, PLA491, PLA492	10 ha	2 ha	TBC[3]	TBC[3]	TBC[3]
Essential habitat (not in an urban area) for endangered wildlife	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Essential habitat (not in an urban area) for vulnerable wildlife						
Phascolarctos cinereus (Koala)	PLA492	MNES[1, 2]	MNES[1, 2]	TBC[3]	TBC[3]	TBC[3]
Nyctophilus corbeni (South-eastern Long-eared Bat)	PLA491	MNES[1, 2]	MNES[1, 2]	TBC[3]	TBC[3]	TBC[3]
Connectivity areas						
Connectivity area that is a regional ecosystem (not in urban area)						
PLA 494	PLA494	2.2 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
PLA1044	PLA1044	3.6 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Wetlands and watercourses						
A wetland in a wetland protection area shown on the Map of referable wetlands (HES wetlands in GBR)	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
A wetland of high ecological significance shown on the Map	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]

Prescribed environmental matter	**Location of impact**	**Maximum extent of impact**	**Maximum extent of impact – Stage 1** (Years 1 – 5 inclusive)	**Maximum extent of impact – Stage 2** (Years 6 – 10 inclusive)	**Maximum extent of impact – Stage 3** (Years 11 – 15 inclusive)	**Maximum extent of impact – Stage 4** (Years 16 – 20 inclusive)
of referable wetlands						
Designated precincts in strategic environmental areas						
Designated precinct in a strategic environmental areas – *insert reference*	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
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	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
An area not shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
A non-juvenile koala habitat tree located in an area shown as a bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat in the 'Map of Assessable Development	NA	MNES[1, 2]	MNES[1, 2]	TBC[3]	TBC[3]	TBC[3]

Prescribed environmental matter	**Location of impact**	**Maximum extent of impact**	**Maximum extent of impact – Stage 1** (Years 1 – 5 inclusive)	**Maximum extent of impact – Stage 2** (Years 6 – 10 inclusive)	**Maximum extent of impact – Stage 3** (Years 11 – 15 inclusive)	**Maximum extent of impact – Stage 4** (Years 16 – 20 inclusive)
Area Koala Habitat Values'						
Habitat for an animal that is endangered wildlife	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Habitat for an animal that is vulnerable wildlife	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Habitat for an animal that is special least concern wildlife						
Tachyglossus aculeatus (Short-beaked Echidna)	PLA304, PLA492	35.4 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Protected areas						
National park	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Regional park	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Nature refuge	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Highly protected zones of State marine parks						
Conservation park zone	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Marine national park zone	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Preservation zone	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Other zones	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Fish habitat areas						
A declared fish habitat area	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Waterway providing for fish passage						
Fish passage (not in an urban area)	PLA304, PLA305, PLA1044	18.5 ha	2.5 ha	TBC[2]	TBC[2]	TBC[2]
Marine plants						
Marine plant (not in an urban area)	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]
Legally secured offset area						
Legally secured offset area	NA	0 ha	0 ha	TBC[3]	TBC[3]	TBC[3]

[1] Matter(s) of National Environmental Significance (MNES) have been prescribed and will be offset in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Species

Impact Management and Offset Plans, specifically the EPBC approval for the Surat Gas Project Environment Impact Statement (EPBC Approval 2010/5344, Tables 1 and 2).

[2] No significant residual impacts to prescribed environmental matters are authorised under this environmental authority unless they are covered within EPBC Approval 2010/5344.

[3] Stages 2 through 4 are to be confirmed in accordance with condition (Biodiversity 16).

(Biodiversity 11) Records demonstrating that each impact to a prescribed environmental matter not listed in **Schedule F, Table 3 —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 appropriately qualified person; and
(b) kept for the life of the environmental authority.

(Biodiversity 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 **Schedule F, Table 3 — Significant residual impacts to prescribed environmental matters**, unless a lesser extent of the impact has been approved in accordance with condition (Biodiversity 15).

(Biodiversity 13) The significant residual impacts to a prescribed environmental matter authorised in condition (Biodiversity 10) for which an environmental offset is required by condition (Biodiversity 12) may be carried out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.

(Biodiversity 14) Prior to the commencement of each stage, a report completed by an appropriately qualified person, that includes an analysis of the following must be provided to the administering authority:

(a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and
(b) for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.

(Biodiversity 15) The report required by condition (Biodiversity 14) must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.

(Biodiversity 16) A notice of election for the staged environmental offset referred to in condition (Biodiversity 15), if applicable, must be provided to the administering authority no less than three months before the proposed commencement of that stage, unless a lesser timeframe has been agreed to by the administering authority.

(Biodiversity 17) Within six months from the completion of the final stage of the project, a report completed by an appropriately qualified person, that includes the following matters must be provided to the administering authority:

(a) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and
(b) if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.

Schedule G – Protecting Water Values

Contaminant Release

(Water 1) Contaminants must not be directly or indirectly released to any waters.

Authorised impacts to wetlands

(Water 2) The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a wetland.

Authorised activities in waters

(Water 3) Petroleum activities must not occur in or within 200m of a:

(a) wetland of high ecological significance
(b) Great Artesian Basin Spring
(c) subterranean cave GDE.

(Water 4) Only construction or maintenance of linear infrastructure is permitted in or within any wetland of other environmental value or in a watercourse.

(Water 5a) The construction or maintenance of linear infrastructure in a wetland of other environmental value must not result in the:

(a) clearing of riparian vegetation outside of the minimum area practicable to carry out the works; or
(b) ingress of saline water into freshwater aquifers; or
(c) draining or filling of the wetland beyond the minimum area practicable to carry out the works.

(Water 5b) After the construction or maintenance works for linear infrastructure in a wetland of other environmental value are completed, the linear infrastructure must not:

(a) drain or fill the wetland
(b) prohibit the flow of surface water in or out of the wetland
(c) lower or raise the water table and hydrostatic pressure outside the bounds of natural variability that existed before the activities commenced
(d) result in ongoing negative impacts to water quality
(e) result in bank instability; or
(f) result in fauna ceasing to use adjacent areas for habitat, feeding, roosting or nesting.

(Water 6) The construction or maintenance of linear infrastructure activities in a watercourse must be conducted in the following preferential order:

(a) firstly, in times where there is no water present
(b) secondly, in times of no flow
(c) thirdly, in times of flow, providing a bankfull situation is not expected and that flow is maintained.

(Water 7) The construction or maintenance of linear infrastructure authorised under condition (Water 4) must comply with the water quality limits as specified in **Schedule G, Table 1 — Release limits for construction or maintenance of linear infrastructure**.

Schedule G, Table 1 — Release limits for construction or maintenance of linear infrastructure

Water quality parameters	Units	Water quality limits
Turbidity	Nephelometric Turbidity Units (NTU)	For a wetland of other environmental value, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within 50m downstream of the construction or maintenance activity.
		For a wetland of other environmental value, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.
Hydrocarbons	-	For a wetland of other environmental value, or watercourse, no visible sheen or slick

(Water 8) Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (Water 7).

Register of activities in wetlands and watercourses

(Water 9) A register must be kept of all linear infrastructure construction and maintenance activities in a wetland of other environmental value and watercourses, which must include:

(a) location of the activity (e.g. GPS coordinates (GDA94) and watercourse name)
(b) estimated flow rate of surface water at the time of the activity
(c) duration of works, and
(d) results of impact monitoring carried out under condition (Water 8).

Activities in river improvement areas

(Water 10) Measures must be taken to minimise negative impacts to, or reversal of, any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Activities in floodplains

(Water 11) Petroleum activity(ies) on floodplains must be carried out in a way that does not:

(a) concentrate flood flows in a way that will or may cause or threaten a negative environmental impact; or
(b) divert flood flows from natural drainage paths and alter flow distribution; or
(c) increase the local duration of floods; or
(d) increase the risk of detaining flood flows.

Seepage monitoring program

(Water 12) A seepage monitoring program must be developed by a suitably qualified person which is commensurate with the site-specific risks of contaminant seepage from containment facilities, and which requires and plans for detection of any seepage of contaminants to groundwater as a result of storing contaminants by 15 November 2018.

(Water 13) The seepage monitoring program required by condition (Water 12) must include but not necessarily be limited to:

(a) identification of the containment facilities for which seepage will be monitored
(b) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities
(c) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities
(d) installation of background seepage monitoring bores where groundwater quality will not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts
(e) installation of seepage monitoring bores that:
    i. are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact)
    ii. provide for the early detection of negative impacts prior to reaching groundwater dependent ecosystems, landholder's active groundwater bores, or water supply bores
    iii. provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)
(f) monitoring of groundwater at each background and seepage monitoring bores for the trigger parameters identified in condition (Water 13(b)) at a frequency determined by a suitably qualified person and:
    i. at least once every two years where baseline data has been established; or
    ii. at least every six months for two years to establish baseline data for any impact to groundwaters, after which time monitoring may continue at the frequency according to condition (Water 13(f)(i).
(g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (Water 13(b)) and (Water 13(c)) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination
(h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and
(i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

Seepage monitoring bore drill logs

(Water 14) A bore drill log must be completed for each seepage monitoring bore in condition (Water 13) which must include:

(a) bore identification reference and geographical coordinate location
(b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details
(c) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible trigger parameters
(d) lithological data, preferably a stratigraphic interpretation to identify the important features including the identification of any aquifers; and

(e) target formation of the bore.

Schedule H – Rehabilitation

Rehabilitation planning

(Rehabilitation 1) A Rehabilitation Plan must be developed by a suitably qualified person and must include the:

(a) rehabilitation goals; and

(b) procedures to be undertaken for rehabilitation that will:

i. achieve the requirements of conditions (Rehabilitation 2) to (Rehabilitation 8), inclusive; and

ii. provide for appropriate monitoring and maintenance.

(Rehabilitation 2) Significantly disturbed areas that are no longer required for the on-going petroleum activities must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:

(a) contaminated land resulting from petroleum activities is remediated and rehabilitated

(b) the areas are:

i. non-polluting

ii. a stable landform

iii. re-profiled to contours consistent with the surrounding landform

(c) surface drainage lines are re-established, consistent with natural flow patterns and self-sustaining;

(d) top soil is reinstated; and

(e) either:

i. groundcover, that includes suitable native species of vegetation for the location and not pest species, is growing; or

ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final rehabilitation acceptance criteria

(Rehabilitation 3) All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

(a) greater than or equal to 70% of native ground cover species richness

(b) greater than or equal to the total per cent of ground cover

(c) less than or equal to the per cent species richness of declared plant pest species; and

(d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

Final rehabilitation acceptance criteria in environmentally sensitive areas

(Rehabilitation 4) Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre-disturbance biodiversity values assessment (required by conditions (Biodiversity 1) and (Biodiversity 2)) must be met:

(a) greater than or equal to 70% of native ground cover species richness
(b) greater than or equal to the total per cent ground cover
(c) less than or equal to the per cent species richness of declared plant pest species
(d) greater than or equal to 50% of organic litter cover
(e) greater than or equal to 50% of total density of coarse woody material; and
(f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Continuing conditions

(Rehabilitation 5) Conditions (Rehabilitation 2), (Rehabilitation 3) and (Rehabilitation 4) continue to apply after this environmental authority has ended or ceased to have effect.

Rehabilitation reporting for relinquishment of part of an authority to prospect area under the *Petroleum and Gas (Production and Safety) Act 2004*

Remaining dams

(Rehabilitation 8) Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Schedule I – Well construction, maintenance and stimulation activities

Drilling activities

(Well activities 1) Oil based or synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).

(Well activities 2) Drilling activities must not result in the connection of the target gas producing formation and another aquifer.

(Well activities 3) Practices and procedures must be in place to detect, as soon as practicable, any fractures that:

a) have or may result in the connection of a target formation and another aquifer as a result of drilling activities; or

b) cause the connection of a target gas producing formation and another aquifer.

Schedule J – Structures

(J1) The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* at the following times:

(a) prior to the design and construction of the structure, if it is not an existing structure; or
(b) prior to any change in its purpose or the nature of its stored contents.

(J2) A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

(J3) Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.

Notification of affected persons

(J4) All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure

(a) for existing structures that are regulated structures, within 10 business days of this condition taking effect;
(b) prior to the operation of the new regulated structure; and
(c) if the emergency action plan is amended, within 5 business days of it being amended.

Operation of a regulated structure

(J5) For existing structures that are regulated structures:

(a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and
(b) there must be a current operational plan for the existing structures.

(J6) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Design storage allowance

(J7) The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

(J8) By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).

(J9) The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

(J10) The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

(J11) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

(J12) At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

(J13) The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933*).

(J14) The holder must within 20 business days of receipt of the annual inspection report, provide to the administering authority:

(a) The recommendations section of the annual inspection report; and
(b) If applicable, any actions being taken in response to those recommendations; and
(c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

(J15) The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Register of Regulated Structures

(J16) A Register of Regulated Structures must be established and maintained by the holder for each regulated structure.

(J17) The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.

(J18) All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.

(J19) The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.

Schedule K – Definitions

Word or term	Definition
acceptable standards for release to land	means wastewater of the following quality as determined by monitoring results or by characterisation: (a) electrical conductivity (EC) not exceeding 3000µS/cm (b) sodium adsorption ratio (SAR) not exceeding 8 (c) pH between 6.0 and 9.0 (d) heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10—Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality (e) does not contain biocides.
acid sulfate soil(s)	means a soil or soil horizon which contains sulfides or an acid soil horizon affected by oxidation of sulfides.
adjacent land use(s)	means the ecosystem function adjacent to an area of significant disturbance, or where there is no ecosystem function, the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.
administering authority	means: (a) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the *Environmental Protection Act 1994*—the local government; or (b) for all other matters—the Chief Executive of the Department of Environment and Heritage Protection; or (c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.
Affected person	is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life or property can be put at risk due to dwellings or workplaces being in the path of a dam break flood.
alternative arrangement	means a written agreement about the way in which a particular environmental 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, vegetation community attributes 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.
Annual exceedance probability or AEP	the probability that at least one event in excess of a particular magnitude will occur in any given year.
Annual inspection report	means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan); a) against recommendations contained in previous annual inspections reports; b) against recognised dam safety deficiency indicators;

<table>
<tr><th>Word or term</th><th>Definition</th></tr>
<tr><td></td><td>c) for changes in circumstances potentially leading to a change in consequence category;
d) for conformance with the conditions of this authority;
e) for conformance with the ‘as constructed’ drawings;
f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems);
g) for evidence of conformance with the current operational plan.</td></tr>
<tr><td>annual return period</td><td>means the most current 12-month period between two anniversary dates.</td></tr>
<tr><td>appraisal well</td><td>means a petroleum well to test the potential of one (1) or more natural underground reservoirs for producing or storing petroleum. For clarity, an appraisal well does not include an exploration well.</td></tr>
<tr><td>appropriately qualified person / suitably qualified person</td><td>means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.</td></tr>
<tr><td>approved quality criteria</td><td>for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards:

Part A In all cases:
<table>
<tr><th>Parameter</th><th>Maximum concentration</th></tr>
<tr><td>pH</td><td>6 – 10.5 (range)</td></tr>
<tr><td>Electrical Conductivity</td><td>20 dS/m (20,000 µS/cm)</td></tr>
<tr><td>Chloride*</td><td>8000 mg/L</td></tr>
</table>
*Chloride analysis is only required if an additive containing chloride was used in the drilling process
The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing.

Part B If any of the following metals are a component of the drilling fluids, then for that metal:
<table>
<tr><th>Parameter</th><th>Maximum concentration</th></tr>
<tr><td>Arsenic</td><td>20 mg/kg</td></tr>
<tr><td>Selenium</td><td>5 mg/kg</td></tr>
<tr><td>Boron</td><td>100 mg/kg</td></tr>
<tr><td>Cadmium</td><td>3 mg/kg</td></tr>
<tr><td>Chromium (total)</td><td>400 mg/kg</td></tr>
<tr><td>Copper</td><td>100 mg/kg</td></tr>
<tr><td>Lead</td><td>600 mg/kg</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Word or term</th><th>Definition</th></tr>
<tr><td></td><td>The limits in Part B and Part C refer to the post soil/by-product mix.

Part C If a hydrocarbon sheen is visible, the following hydrocarbon fractions:
<table>
<tr><th>TPH</th><th>Maximum concentration</th></tr>
<tr><td>C6-C10</td><td>170 mg/kg</td></tr>
<tr><td>C10-C16</td><td>150 mg/kg</td></tr>
<tr><td>C16-C34</td><td>1300 mg/kg</td></tr>
<tr><td>C34-C40</td><td>5600 mg/kg</td></tr>
<tr><td>Total Polycyclic Aromatic Hydrocarbons (PAHs)</td><td>20 mg/kg</td></tr>
<tr><td>Phenols (halogenated)</td><td>1 mg/kg</td></tr>
<tr><td>Phenols (non-halogenated)</td><td>60 mg/kg</td></tr>
<tr><td>Monocyclic aromatic hydrocarbons
(Total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para and meta xylenes) and styrene)</td><td>7 mg/kg</td></tr>
<tr><td>Benzene</td><td>1 mg/kg</td></tr>
</table></td></tr>
<tr><td>areas of pre-existing disturbance</td><td>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.</td></tr>
<tr><td>Assessed or assessment</td><td>by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:

a) exactly what has been assessed and the precise nature of that determination;
b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.</td></tr>
<tr><td>associated water</td><td>means underground water taken or interfered with, if the taking or 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 within the water.</td></tr>
<tr><td>associated works</td><td>in relation to a dam, means:

(a) operations of any kind and all things constructed, erected or installed for that dam; and
(b) any land used for those operations.</td></tr>
<tr><td>Australian Standard 3580</td><td>means any of the following publications:</td></tr>
</table>

Word or term	Definition
	• AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter—Gravimetric method. • AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet—Gravimetric method • AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter— PM10 low volume sampler—Gravimetric sampler.
Authority	means an environmental authority or a development approval.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90% of the measurement time period T of not less than 15 minutes (or $L_{A\ 90,\ adj,\ 15\ mins}$), using Fast response.
bankfull	means the channel flow rate that exists when the water is at the elevation of the channel bank above which water begins to spill out onto the floodplain. The term describes the condition of the channel relative to its banks (e.g. overbank, in-bank, bankfull, low banks, high bank).
bed	of any waters, has the meaning in Schedule 12 of the Environmental Protection Regulation 2008 and— (a) includes an area covered, permanently or intermittently, by tidal or non-tidal waters; but (b) does not include land adjoining or adjacent to the bed that is from time to time covered by floodwater.
being or intended to be utilised by the landholder or overlapping tenure holder	for significantly disturbed land, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use of the land such that rehabilitation standards for revegetation by the holder of the environmental authority are not required. For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.
biodiversity values	for the purposes of this environmental authority, means environmentally sensitive areas, prescribed environmental matters and wetlands.
BTEX	means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.
Category A Environmentally Sensitive Area	means any area listed in Schedule 12, Section 1 of the Environmental Protection Regulation 2008.
Category B Environmentally Sensitive Area	means any area listed in Schedule 12, Section 2 of the Environmental Protection Regulation 2008.
Category C Environmentally Sensitive Area	means any of the following areas: • nature refuges as defined in the conservation agreement for that refuge under the Nature Conservation Act 1992 • koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006

Word or term	Definition
	• state forests or timber reserves as defined under the *Forestry Act 1959* • regional parks (previously known as resource reserves) under the *Nature Conservation Act 1992* • an area validated as 'essential habitat' from ground-truthing surveys in accordance with the *Vegetation Management Act 1999* for a species of wildlife listed as endangered or vulnerable under the *Nature Conservation Act 1992* • *'*of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.
Certify, certified, certifying or certification	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. In the guideline 'Structures which are dams or levees constructed as part of environmentally relevant activities' (ESR/2016/1937) – means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
clearing	has the meaning in the dictionary of the Vegetation Management Act 2000 and for vegetation— (a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but (b) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
Construction or constructed	in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.

Word or term	Definition
Consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
Consequence category	means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).
control measure	has the meaning in section 47 of the *Environmental Protection Regulation 2008* and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.
critically limited regional ecosystem	means the regional ecosystems defined and listed in Appendix 5 of the Queensland Biodiversity Offset Policy.
coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the *Environmental Protection Regulation 2008* as the higher equivalent person (EP) for the works calculated using each of the formulae found in the definition for EP.
dam(s)	means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.
Dam crest volume	means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).
Design plan	is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.
designated precinct	has the meaning in Part 5 section 15(3) of the Regional Planning Interests Regulation 2014 and means: • 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 are; or • if 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.
design storage allowance or DSA	means an available volume, estimated in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, published by the administering authority, as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.
Designer	for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.
Development approval	means a development approval under the *Planning Act 2016* (or under the repealed *Sustainable Planning Act 2009 or Integrated Planning Act 1997*) in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.
document	has the meaning in the *Acts Interpretation Act 1954* and means: • any paper or other material on which there is writing; and

Word or term	Definition
	• any paper or other material on which there are marks; and • figures, symbols or perforations having a meaning for a person qualified to interpret them; and • any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).
Ecologically dominant layer	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 the layer making the greatest contribution to the overall biomass of the site and the vegetation community (NLWRA 2001). This is also referred to as the ecologically dominant stratum or the predominant canopy in woody ecosystems.
ecosystem function	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.
Emergency action plan	means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to affected persons and the implementation of protection measures. The plan must require dam owners to annually review and update contact information where required.
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
environmental harm	has the meaning in section 14 of the *Environmental Protection Act 1994* and means any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance. Environmental harm may be caused by an activity— (a) whether the harm is a direct or indirect result of the activity; or (b) whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.
Environmental nuisance	has the meaning in section 15 of the *Environmental Protection Act 1994* and means unreasonable interference or likely interference with an environmental value caused by — (a) aerosols, fumes, light, noise, odour, particles or smoke; or (b) an unhealthy, offensive or unsightly condition because of contamination; or (c) another way prescribed by regulation.
Environmental offset	has the meaning in section 7 of the *Environmental Offsets Act 2014.*
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 2008* 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.

Word or term	Definition

essential petroleum activities	means activities that are essential to bringing the resource to the surface and are only the following:
	• low impact petroleum activities
	• geophysical, geotechnical, geological, topographic and cadastral surveys (including seismic, sample /test / geotechnical pits, core holes)
	• single well sites not exceeding 1.1 hectare disturbance and multi-well sites not exceeding 1.5 hectare disturbance
	• well sites with monitoring equipment (including monitoring bores):
	  o for single well sites, not exceeding 1.25 hectares disturbance
	  o for multi-well sites, not exceeding 1.75 hectares disturbance
	• well sites with monitoring equipment (including monitoring bores) and tanks (minimum 1 ML) for above ground fluid storage:
	  o for single well sites, not exceeding 1.5 hectares disturbance
	  o for multi-well sites, not exceeding 2.0 hectares disturbance
	• associated infrastructure located on a well site necessary for the construction and operations of wells:
	  o water pumps and generators
	  o flare pits
	  o chemical / fuel storages
	  o sumps for residual drilling material and drilling fluids
	  o tanks, or dams which are not significant or high consequence dams to contain wastewater (e.g. stimulation flow back waters, produced water)
	  o pipe laydown areas
	  o soil and vegetation stockpile areas
	  o a temporary camp associated with a drilling rig that may involve sewage treatment works that are no release works
	  o temporary administration sites and warehouses
	  o dust suppression activities using water that meets the quality and operational standards approved under the environmental authority
	• communication and power lines that are necessary for the undertaking of petroleum activities and that are located within well sites, well pads and pipeline right of ways without increasing the disturbance area of petroleum activities
	• On-site disposal of Residual Drilling Material
	• supporting access tracks
	• gathering / flow pipelines from a well head to the initial compression facility
	• activities necessary to achieve compliance with the conditions of the environmental authority in relation to another essential petroleum activity (e.g. sediment and erosion control measures, rehabilitation).

existing authority	has the meaning in section 94 of the *Environmental Offsets Act 2014*.

Word or term	Definition
Existing structure	means a structure that prior to 26 July 2018 meets any or both of the following, a structure: a) with a design that is in accordance with the ESR/2016/1933 version 5.00 *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* and that is considerably in progress; b) that is under considerable construction or that is constructed.
exploration well	means a petroleum well that is drilled to: • explore for the presence of petroleum or natural underground reservoirs suitable for storing petroleum; or • obtain stratigraphic information for the purpose of exploring for petroleum. For clarity, an exploration well does not include an appraisal or development well.
Extreme Storm Storage	means a storm storage allowance determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority.
flare pit	has the meaning in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, and means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.
flare precipitant	means waste fluids which result from the operation of a flare.
floodplains	has the meaning in the Water Act 2000 and means an area of reasonably flat land adjacent to a watercourse that— • is covered from time to time by floodwater overflowing from the watercourse; and • does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and • has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island of the watercourse.
flowable substance	means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.
fuel burning or combustion facility	means a permanent fuel burning or combustion equipment which in isolation, or combined in operation, or which are interconnected, is, or are capable of burning more than 500 kg of fuel in an hour.
GDA	means Geocentric Datum of Australia.
Great Artesian Basin (GAB) spring	means an area protected under the Environment Protection and Biodiversity Conservation Act 1999 because it is considered to be a Matter of National Environmental Significance and identified as a: • community of native species dependent on natural discharge of groundwater from the Great Artesian Basin; or • Great Artesian Basin spring; or • Great Artesian Basin discharge spring wetland. A GAB spring includes a spring vent, spring complex or watercourse spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows. *Note: The Australian Government's Protected Matters Search Tool should be used to get an indication of whether the area of interest may contain an MNES spring.*

Word or term	Definition
	Note: The GAB springs dataset can be requested from the Queensland Government Herbarium
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 pest species.
greywater	means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.
Groundwater dependent ecosystem (GDE)	means ecosystems which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as "unknown".
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.
Holder	means: a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or b) where this document is a development approval, any person who is the registered operator for that development approval.
hydraulic integrity	refers to the capacity of a dam to contain or safely pass flowable substances based on its design.
Hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
impulsive (for noise)	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
$L_{A\ 90,\ adj,\ 15\ mins}$	means the A-weighted sound pressure level, adjusted for tonal character that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response.
$L_{Aeq,\ adj,\ 15\ mins}$	means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within any 15 minute period has the same square sound pressure as a sound level that varies with time.
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 • ream bank instability • a process that results in declining water quality.
landholder's active groundwater bore	means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use. This term does not include monitoring bores owned by the administering authority of the *Water Act 2000*.
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.

Word or term	Definition
linear infrastructure	means powerlines, pipelines, flowlines, roads and access tracks.
liquid	means a substance which is flowing and offers no permanent resistance to changes of shape.
long term noise event	means a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not classified as high or significant as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*, published by the administering authority, as amended from time to time.
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.
Mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority.
Manual	means the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority, as amended from time to time.
Map of referable wetlands	has the meaning in Schedule 12 of the *Environmental Protection Regulation 2008* and means the 'Map of referable wetlands', a document approved by the chief executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D.
Max $L_{pA, 15\ min}$	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
Max $L_{pZ, 15\ min}$	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
maximum extent of impact	means the total, cumulative, residual extent and duration of impact to a prescribed environmental matter that will occur over a project's life after all reasonable avoidance and reasonable on-site mitigation measures have been, or will be, undertaken.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
methodology	means the science of method, especially dealing with the logical principles underlying the organisation of the various special sciences, and the conduct of scientific inquiry.

Word or term	Definition
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: • the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10–8m/s) or subsoil with a clay content of greater than 20%; and • the residual solids is mixed with subsoil in the sump and cover; and • the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and • a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and • topsoil is replaced.
Modification or modifying	see definition of 'construction'
month	has the meaning in the Acts Interpretation Act 1954 and means a calendar month and is a period starting at the beginning of any day of one (1) of the 12 named months and ending— • immediately before the beginning of the corresponding day of the next named month; or • if there is no such corresponding day—at the end of the next named month.
NATA accreditation	means accreditation by the National Association of Testing Authorities Australia.
notice of election	has the meaning in section 18(2) *Environmental Offsets Act 2014*.
Operational plan	includes: a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA); b) (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.
pipeline waste water	means hydrostatic testing water, flush water or water from low point drains.
pre-disturbed land use	means the function or use of the land as documented prior to significant disturbance occurring at that location.
Predominant species	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 species that contributes most to the overall above-ground biomass of a particular stratum.
Prescribed contaminants	has the meaning in section 440ZD of the *Environmental Protection Act 1994*.
Prescribed environmental matters	has the meaning in section 10 of the *Environmental Offsets Act 2014*, limited to the matters of State environmental significant listed in schedule 2 of the *Environmental Offsets Regulation 2014*.
primary protection zone	means an area within 200m from the boundary of any Category A, B or C ESA.
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.
protection zone	means the primary protection zone of any Category A, B or C ESA or the secondary protection zone of any Category A or B ESA.
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

Word or term	Definition
	Williams (1999). The Regional Ecosystem Description Database (Queensland Herbarium 2013) is maintained by Queensland Herbarium and contains the current descriptions of regional ecosystems.
Register of Regulated Structures	includes**:** a) Date of entry in the register; b) Name of the structure, its purpose and intended/actual contents; c) The consequence category of the dam as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*; d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam; e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings; f) For the regulated dam, other than in relation to any levees – i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area iii. Dam crest volume (megalitres); iv. Spillway crest level (metres AHD). v. Maximum operating level (metres AHD); vi. Storage rating table of stored volume versus level (metres AHD); vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD); viii. Mandatory reporting level (metres AHD); g) The design plan title and reference relevant to the dam; h) The date construction was certified as compliant with the design plan; i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan; j) Details of the composition and construction of any liner; k) The system for the detection of any leakage through the floor and sides of the dam; l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year; m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority; n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.
regulated dam	means any dam in the significant or high consequence category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, published by the administering authority, as amended from time to time.
Regulated structure	means any structure in the significant or high consequence category as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority. A regulated structure does not include: • 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; • a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities; • a flare pit.
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.

Word or term	Definition
reinstate or reinstatement	for pipelines, 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 Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines (2013).
reporting limit	means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as "less than" the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L–0.02 ug/L.
residual drilling material	means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.
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 site. For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.
Restricted stimulation fluids	has the meaning in section 206 of the *Environmental Protection Act 1994* and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation— (a) petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene (b) chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.
revegetation or revegetating or revegetate	means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.
Secondary protection zone	in relation to a Category A or Category B ESA means an area within 100 metres from the boundary of the primary protection zone.
secondary treated class A standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • 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, 100cfu per 100mL, maximum 1000cfu per 100mL.
secondary treated class B standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • 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 10 000cfu per 100mL.
secondary treated class C standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • total nitrogen as N, maximum 30mg/L

Word or term	Definition
	• 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, 10 000cfu per 100mL, maximum 100 000cfu 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 2008*.
sensitive receptor	is defined in Schedule 2 of the Environmental Protection (Noise) Policy 2008, and means an area or place where noise is measured.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven (7) days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significant residual impact	has the meaning in section 8 *Environmental Offsets Act 2014*.
Significantly disturbed or significant disturbance or significant disturbance to land or areas	has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if— (i) to a condition required under the relevant environmental authority; or (ii) if the environmental authority does not require the land to be rehabilitated to a particular condition—to the condition it was in immediately before the disturbance.
species richness	means the number of different species in a given area.
Spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the dam, normally under flood conditions or in anticipation of flood conditions.
stable	has the meaning in Schedule 5 of the *Environmental Protection Regulation 2008* and, for a site, means the rehabilitation and restoration of the site is enduring or permanent so that the site is unlikely to collapse, erode or subside.
statement of compliance	for a condition in an environmental authority has the meaning in section 208 of the Environmental Protection Act 1994 and is a condition that requires the holder to give the administering authority a statement of compliance about a document or work relating to a relevant activity. The condition must also state— a) the criteria (the compliance criteria) the document or work must comply with; and b) that the statement of compliance must state whether the document or work complies with the compliance criteria; and

Word or term	Definition
	c) the information (the supporting information) that must be provided to the administering authority to demonstrate compliance with the compliance criteria; and d) when the statement of compliance and supporting information must be given to the administering authority.
stimulation	means a technique used to increase the permeability of natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. It includes hydraulic fracturing / hydrofraccing, fracture acidizing and the use of proppant treatments. Explanatory note: This definition is restricted from that in *the Petroleum and Gas (Production and Safety) Act 2004* in order to only capture the types of stimulation activities that pose a risk to environmental values of water quality in aquifers.
stimulation fluid	means the fluid injected underground to increase permeability. For clarity, the term stimulation fluid only applies to fluid injected down well post-perforation.
stimulation impact zone	means a 100m maximum radial distance from the stimulation target location within a gas producing formation.
Strategic environmental area	has the meaning in section 11(1) of the *Regional Planning Interest Act 2014*.
structure	means a dam or levee.
subterranean cave GDE	• means an area identified as a subterranean cave in the mapping produced by the Queensland Government and identified in the Queensland Government Information System, as amended from time to time; and • means a cave ecosystem which requires access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain its communities of plants and animals, ecological processes and ecosystem services. Subterranean cave GDEs are caves dependent on the subterranean presence of groundwater. Subterranean cave GDEs have some degree of groundwater connectivity and are indicated by either high moisture levels or the presence of stygofauna, or both, referred to in the Queensland Government Wetlands Info mapping program, as amended from time to time. *Note: the Subterranean GDE (caves) dataset can be displayed through the Queensland Government Wetland Info mapping program.* *Note: the Subterranean GDE (caves) dataset can be obtained from the Queensland Government Information System.*
Suitably qualified and experienced person	in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, and has demonstrated competency and relevant experience: • for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design • for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.
suitably qualified person	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about

Word or term	Definition
	performance relevant to the subject matters using relevant protocols, standards, methods or literature.
suitably qualified third party	means a person who: a) has qualifications and experience relevant to performing the function including but not limited to: i. a bachelor's degree in science or engineering; and ii. 3 years' experience in undertaking soil contamination assessments; and b) is a member of at least one organisation prescribed in Schedule 8 of the Environmental Protection Regulation 2008; and c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.
sump	means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.
synthetic based drilling mud	means a mud where the base fluid is a synthetic oil, consisting of chemical compounds which are artificially made or synthesised by chemically modifying petroleum components or other raw materials rather than the whole crude oil.
System design plan	means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.
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.
total density of coarse woody material	means the total length of logs on the ground greater than or equal to 10cm diameter per hectare and number of logs on the ground greater than or equal to 10cm diameter per hectare.
transmissivity	means the rate of flow of water through a vertical strip of aquifer which is one unit wide and which extends the full saturated depth of the aquifer.
valid complaint	means all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.
void	means any constructed, open excavation in the ground.
waste and resource management hierarchy	has the meaning provided in section 9 of the *Waste Reduction and Recycling Act 2011* and is the following precepts, listed in the preferred order in which waste and resource management options should be considered— a) AVOID unnecessary resource consumption b) REDUCE waste generation and disposal c) RE-USE waste resources without further manufacturing d) RECYCLE waste resources to make the same or different products e) RECOVER waste resources, including the recovery of energy f) TREAT waste before disposal, including reducing the hazardous nature of waste g) DISPOSE of waste only if there is no viable alternative.
waste and resource management principles	has the meaning provided in section 4(2)(b) of the *Waste Reduction and Recycling Act 2011* and means the: a) polluter pays principle b) user pays principle c) proximity principle d) product stewardship principle.

Word or term	Definition
waste fluids	has the meaning in section 13 of the *Environmental Protection Act 1994* in conjunction with the common meaning of "fluid" which is "a substance which is capable of flowing and offers no permanent resistance to changes of shape". Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
watercourse	has the meaning in Schedule 4 of the *Environmental Protection Act 1994* and means: 1) a river, creek or stream in which water flows permanently or intermittently— a) in a natural channel, whether artificially improved or not; or b) in an artificial channel that has changed the course of the watercourse. 2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.
waters	includes 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.
Water year	means the 12-month period from 1 July to 30 June.
well integrity	the ability of a well to contain the substances flowing through it.
Wet season	means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.
wetland	for the purpose of this environmental authority, wetland means: • areas shown on the Map of referable wetlands which is a document approved by the chief executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D of the *Environmental Protection Regulation 2008*; and • areas defined under the Queensland Wetlands Program as permanent or periodic / intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six (6) metres, and possess one or more of the following attributes: o at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or o the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or o the substratum is not soil and is saturated with water, or covered by water at some time. The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a Great Artesian Basin Spring or a subterranean wetland that is a cave or aquifer.
wetland of high ecological significance	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'high ecological significance' or wetland of 'high ecological value' on the Map of referable wetlands.

Word or term	Definition
wetland of other environmental value	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'general environmental significance' or wetland of 'other environmental value' on the Map of referable wetlands.

END OF ENVIRONMENTAL AUTHORITY

Appendix C

Desktop searches

EPBC Act Protected Matters Report

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

Report created: 18-Mar-2024

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

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	60
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	57
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site	In feature area
Narran lake nature reserve	300 - 400km upstream from Ramsar site	In feature area
Riverland	1100 - 1200km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1300 - 1400km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In feature area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In feature area
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
PLANT			
Acacia curranii Curly-bark Wattle [3908]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Acacia handonis Hando's Wattle, Percy Grant Wattle [14928]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Acacia lauta Tara Wattle [4165]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calytrix gurulmundensis [24241]	Vulnerable	Species or species habitat known to occur within area	In feature area
Denhamia parvifolia Small-leaved Denhamia [18106]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat may occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus argophloia Queensland White Gum, Queensland Western White Gum, Lapunyah, Scrub Gum, White Gum [19748]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Eucalyptus virens [10181]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Homoranthus decumbens a shrub [55186]	Endangered	Species or species habitat known to occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Polianthion minutiflorum [82772]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhaponticum australe Austral Cornflower, Native Thistle [22647]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In buffer area only
Westringia parvifolia [4822]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xerothamnella herbacea [4146]	Endangered	Species or species habitat likely to occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Elseya albagula			
Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Furina dunmalli			
Dunmall's Snake [59254]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hemiaspis damelii			
Grey Snake [1179]	Endangered	Species or species habitat known to occur within area	In feature area
Rheodytes leukops			
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tympanocryptis condaminensis			
Condamine Earless Dragon [87888]	Endangered	Species or species habitat may occur within area	In buffer area only
SNAIL			
Adclarkia cameroni			
Brigalow Woodland Snail [83886]	Endangered	Species or species habitat known to occur within area	In feature area
Adclarkia dulacca			
Dulacca Woodland Snail [83885]	Endangered	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus			
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Chinchilla Rifle Range	Nature Refuge	QLD	In buffer area only
Stones Country	Resources Reserve	QLD	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Alfredson Block CSG Project, Qld	2017/7902		Post-Approval	In buffer area only
Atlas Stage 3 Gas Project	2022/09410		Assessment	In buffer area only
Atlas to Reedy Creek Pipeline	2023/09585		Assessment	In buffer area only
Brigalow Peaking Power Plant Project	2023/09692		Referral Decision	In buffer area only
Coal Seam Gas Field Development for Natural Gas Liquefaction Park, Curtis Island	2008/4059		Post-Approval	In buffer area only
Construction of the Central Surat Rail Project	2013/6729		Completed	In feature area
Development of Existing Coal Seam Gas Fields	2008/4398		Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Everleigh Solar Park Project	2022/09339		Post-Approval	In buffer area only
Hopeland Solar Farm Project	2023/09684		Assessment	In buffer area only
Surat Basin Coal Project, 25 km south of Wandoan, QLD	2017/8116		Completed	In buffer area only
The Range Project	2011/5860		Completed	In buffer area only
Controlled action				
Cameby Downs Coal Mine Expansion	2009/4966	Controlled Action	Completed	In feature area
Condabri South CSG Extension Development, Qld	2016/7805	Controlled Action	Completed	In buffer area only
Construct and operate 447km high pressure gas transmission pipeline	2009/4976	Controlled Action	Post-Approval	In feature area
Construction and operation of Nathan Dam and associated water delivery infrastructure	2008/4313	Controlled Action	Post-Approval	In feature area
Construction of a high pressure buried gas pipeline, Kogan to Gladstone, QLD	2009/5029	Controlled Action	Post-Approval	In feature area
Dulacca Renewable Energy Project, Dulacca QLD	2018/8368	Controlled Action	Post-Approval	In buffer area only
Expansion of Coal Seam Gas Fields	2009/4974	Controlled Action	Post-Approval	In feature area
Expansion Of Coal Seam Gas Operations	2010/5344	Controlled Action	Post-Approval	In feature area
Future Gas Supply Area Project	2012/6357	Controlled Action	Completed	In buffer area only
Glen Wilga Open-cut Coal Mine	2003/1173	Controlled Action	Completed	In buffer area only
Ironbark Coal Seam Gas Project	2011/6091	Controlled Action	Completed	In buffer area only
North Surat Coal Project- Collingwood	2012/6236	Controlled Action	Completed	In buffer area only
North Surat Coal Project- Taroom	2012/6237	Controlled Action	Completed	In buffer area only
Queensland Curtis LNG Project - Pipeline Network	2008/4399	Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Reedy Creek to Glebe Weir Pipeline Project	2011/6181	Controlled Action	Post-Approval	In buffer area only
Santos GLNG Gas Field Development Project, QLD	2012/6615	Controlled Action	Post-Approval	In buffer area only
Surat Gas Project off-tenure pipelines, Surat Basin, Qld	2018/8223	Controlled Action	Post-Approval	In buffer area only
Underground Coal Gasification and Liquefaction Project	2007/3541	Controlled Action	Completed	In buffer area only
Wandoan Coal Mine and Infrastructure Project	2008/4284	Controlled Action	Post-Approval	In buffer area only
Wandoan Coal Project - Coal Seam Methane Water Supply South	2008/4287	Controlled Action	Post-Approval	In feature area
Wandoan Coal Project Coal Seam Methane Water Supply West	2008/4283	Controlled Action	Completed	In buffer area only
Wandoan Coal Project Glebe Weir Raising	2008/4285	Controlled Action	Post-Approval	In buffer area only
Widening and overlay of Leichhardt Highway	2002/645	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Cameby Downs Coal Mine, construction, operation & decommissioning	2007/3465	Not Controlled Action	Completed	In feature area
Cameby Downs Continued Operations Project, Qld	2018/8304	Not Controlled Action	Completed	In feature area
Chances Plain Solar Farm Project	2019/8532	Not Controlled Action	Completed	In buffer area only
Chinchilla Weir Discharge and Pipeline Project	2011/6000	Not Controlled Action	Completed	In buffer area only
Construct and operate 112km long underground gas transmission pipeline	2008/4358	Not Controlled Action	Completed	In buffer area only
Delga Solar Farm, 1039 Gadsbys Road, Woleebee, Qld	2019/8411	Not Controlled Action	Completed	In buffer area only
Dulacca Solar Farm	2019/8607	Not Controlled Action	Completed	In buffer area only
Edenvale Solar Park	2020/8663	Not Controlled Action	Completed	In buffer area only
Elimatta Open Cut Coal Mine and Coal Processing Plant	2008/4130	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
High Voltage Transmission line Development	2007/3230	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Kogan - Braemar Transmission Line	2004/1850	Not Controlled Action	Completed	In buffer area only
Project Atlas CSG Project, between Wollumbilla and Wandoan, Qld	2018/8329	Not Controlled Action	Completed	In buffer area only
Proposed Coal Seam Gas Development & Associated Infrastructure	2008/4456	Not Controlled Action	Completed	In buffer area only
Surat Basin Railway	2008/3944	Not Controlled Action	Completed	In buffer area only
Surat Basin to Tarong Railway project	2003/1264	Not Controlled Action	Completed	In buffer area only
Warhook Solar Farm, near Miles, Qld	2019/8456	Not Controlled Action	Completed	In feature area
Warrego Highway Upgrade Program, Dalby to Miles overtaking lanes, Qld	2016/7802	Not Controlled Action	Completed	In buffer area only
Western Downs Green Power Hub, Hopeland, Qld	2018/8301	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Chinchilla Solar Farm	2017/7942	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Columboola Solar Farm, 9kms north-east of Miles, Queensland	2017/7962	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Construction and operation of gas pipeline	2005/2254	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Development of an underground longwall coal mine	2011/6129	Referral Decision	Completed	In buffer area only

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -26.5836
Longitude: 150.2904
Distance: 55
Email: matthew.whitehouse@attexo.com.au
Date submitted: Monday 18 Mar 2024 15:35:52
Date extracted: Monday 18 Mar 2024 15:40:03

The number of records retrieved = 45

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	13
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	22
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		V	V	2
animals	birds	Meliphagidae	*Grantiella picta*	painted honeyeater		V	V	5
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		1
animals	birds	Turnicidae	*Turnix melanogaster*	black-breasted button-quail		V	V	2
animals	insects	Lycaenidae	*Jalmenus eubulus*	pale imperial hairstreak		V		3
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	31
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	11
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	7
animals	mammals	Vespertilionidae	*Nyctophilus corbeni*	eastern long-eared bat		V	V	10
animals	reptiles	Boidae	*Aspidites ramsayi*	woma		NT		2
animals	reptiles	Diplodactylidae	*Strophurus taenicauda*	golden-tailed gecko		NT		148/3
animals	reptiles	Elapidae	*Furina dunmalli*	Dunmall's snake		V	V	1
animals	reptiles	Elapidae	*Hemiaspis damelii*	grey snake		E	E	7
animals	snails	Camaenidae	*Adclarkia cameroni*			V	E	2
animals	snails	Camaenidae	*Adclarkia dulacca*	Dulacca woodland snail		E	E	4
plants	land plants	Acanthaceae	*Xerothamnella herbacea*			E	E	2/1
plants	land plants	Asteraceae	*Rutidosis glandulosa*			NT		5/5
plants	land plants	Asteraceae	*Rutidosis lanata*			NT		44/42
plants	land plants	Celastraceae	*Apatophyllum teretifolium*			NT		1/1
plants	land plants	Celastraceae	*Denhamia parvifolia*			V	V	4/4
plants	land plants	Cyperaceae	*Fimbristylis vagans*			E		1/1
plants	land plants	Leguminosae	*Acacia barakulensis*			V		11/10
plants	land plants	Leguminosae	*Acacia curranii*	curly-bark wattle		V	V	4/4
plants	land plants	Leguminosae	*Acacia handonis*	Hando's wattle		V	V	16/14
plants	land plants	Leguminosae	*Acacia wardellii*			NT		25/17
plants	land plants	Myrtaceae	*Calytrix gurulmundensis*			V	V	15/12
plants	land plants	Myrtaceae	*Eucalyptus argophloia*	Queensland western white gum		CR	V	9/5
plants	land plants	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		6/6
plants	land plants	Myrtaceae	*Eucalyptus pachycalyx subsp. waajensis*			E		10/9
plants	land plants	Myrtaceae	*Eucalyptus sideroxylon subsp. improcera*			V		8/8
plants	land plants	Myrtaceae	*Homoranthus decumbens*			V	E	4/4
plants	land plants	Myrtaceae	*Homoranthus papillatus*	mouse bush		CR		1
plants	land plants	Myrtaceae	*Melaleuca groveana*			NT		3/3
plants	land plants	Myrtaceae	*Micromyrtus carinata*	Gurulmundi heath-myrtle		E		21/17
plants	land plants	Myrtaceae	*Micromyrtus patula*			E		3/3
plants	land plants	Orchidaceae	*Aphyllorchis anomala*			NT		1
plants	land plants	Poaceae	*Homopholis belsonii*	Belson's panic		E	V	10/10
plants	land plants	Rhamnaceae	*Cryptandra ciliata*			NT		4/4
plants	land plants	Rutaceae	*Philotheca sporadica*			NT	V	443/21
plants	land plants	Solanaceae	*Solanum stenopterum*			V		2/2
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	31/4

CODES

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

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

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

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

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -26.5434
Longitude: 150.2191
Distance: 55
Email: matthew.whitehouse@attexo.com.au
Date submitted: Monday 18 Mar 2024 15:35:31
Date extracted: Monday 18 Mar 2024 15:40:09

The number of records retrieved = 42

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	12
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	22
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		V	V	2
animals	birds	Meliphagidae	*Grantiella picta*	painted honeyeater		V	V	5
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		1
animals	insects	Lycaenidae	*Jalmenus eubulus*	pale imperial hairstreak		V		3
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	29
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	11
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	5
animals	mammals	Vespertilionidae	*Nyctophilus corbeni*	eastern long-eared bat		V	V	10
animals	reptiles	Boidae	*Aspidites ramsayi*	woma		NT		2
animals	reptiles	Diplodactylidae	*Strophurus taenicauda*	golden-tailed gecko		NT		145/3
animals	reptiles	Elapidae	*Furina dunmalli*	Dunmall's snake		V	V	1
animals	reptiles	Elapidae	*Hemiaspis damelii*	grey snake		E	E	7
animals	snails	Camaenidae	*Adclarkia cameroni*			V	E	2
animals	snails	Camaenidae	*Adclarkia dulacca*	Dulacca woodland snail		E	E	4
plants	land plants	Asteraceae	*Rutidosis glandulosa*			NT		5/5
plants	land plants	Asteraceae	*Rutidosis lanata*			NT		36/34
plants	land plants	Celastraceae	*Apatophyllum teretifolium*			NT		1/1
plants	land plants	Celastraceae	*Denhamia parvifolia*			V	V	1/1
plants	land plants	Leguminosae	*Acacia barakulensis*			V		11/10
plants	land plants	Leguminosae	*Acacia curranii*	curly-bark wattle		V	V	4/4
plants	land plants	Leguminosae	*Acacia handonis*	Hando's wattle		V	V	16/14
plants	land plants	Leguminosae	*Acacia wardellii*			NT		25/17
plants	land plants	Myrtaceae	*Calytrix gurulmundensis*			V	V	15/12
plants	land plants	Myrtaceae	*Eucalyptus argophloia*	Queensland western white gum		CR	V	7/3
plants	land plants	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		2/2
plants	land plants	Myrtaceae	*Eucalyptus pachycalyx subsp. waajensis*			E		10/9
plants	land plants	Myrtaceae	*Eucalyptus sideroxylon subsp. improcera*			V		8/8
plants	land plants	Myrtaceae	*Homoranthus decumbens*			V	E	4/4
plants	land plants	Myrtaceae	*Homoranthus papillatus*	mouse bush		CR		1
plants	land plants	Myrtaceae	*Melaleuca groveana*			NT		3/3
plants	land plants	Myrtaceae	*Micromyrtus carinata*	Gurulmundi heath-myrtle		E		21/17
plants	land plants	Myrtaceae	*Micromyrtus patula*			E		3/3
plants	land plants	Orchidaceae	*Aphyllorchis anomala*			NT		1
plants	land plants	Poaceae	*Homopholis belsonii*	Belson's panic		E	V	10/10
plants	land plants	Rhamnaceae	*Cryptandra ciliata*			NT		4/4
plants	land plants	Rutaceae	*Philotheca sporadica*			NT	V	14/2
plants	land plants	Solanaceae	*Solanum stenopterum*			V		2/2
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	38/11

CODES

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

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

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

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

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -26.5042
Longitude: 150.2276
Distance: 55
Email: matthew.whitehouse@attexo.com.au
Date submitted: Monday 18 Mar 2024 15:35:07
Date extracted: Monday 18 Mar 2024 15:40:13

The number of records retrieved = 42

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	12
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	22
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		V	V	2
animals	birds	Meliphagidae	*Grantiella picta*	painted honeyeater		V	V	5
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		1
animals	insects	Lycaenidae	*Jalmenus eubulus*	pale imperial hairstreak		V		3
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	31
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	11
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	5
animals	mammals	Vespertilionidae	*Nyctophilus corbeni*	eastern long-eared bat		V	V	10
animals	reptiles	Boidae	*Aspidites ramsayi*	woma		NT		2
animals	reptiles	Diplodactylidae	*Strophurus taenicauda*	golden-tailed gecko		NT		145/3
animals	reptiles	Elapidae	*Furina dunmalli*	Dunmall's snake		V	V	1
animals	reptiles	Elapidae	*Hemiaspis damelii*	grey snake		E	E	7
animals	snails	Camaenidae	*Adclarkia cameroni*			V	E	2
animals	snails	Camaenidae	*Adclarkia dulacca*	Dulacca woodland snail		E	E	4
plants	land plants	Asteraceae	*Rutidosis glandulosa*			NT		5/5
plants	land plants	Asteraceae	*Rutidosis lanata*			NT		31/29
plants	land plants	Celastraceae	*Apatophyllum teretifolium*			NT		1/1
plants	land plants	Celastraceae	*Denhamia parvifolia*			V	V	1/1
plants	land plants	Leguminosae	*Acacia barakulensis*			V		11/10
plants	land plants	Leguminosae	*Acacia curranii*	curly-bark wattle		V	V	4/4
plants	land plants	Leguminosae	*Acacia handonis*	Hando's wattle		V	V	16/14
plants	land plants	Leguminosae	*Acacia wardellii*			NT		19/13
plants	land plants	Myrtaceae	*Calytrix gurulmundensis*			V	V	15/12
plants	land plants	Myrtaceae	*Eucalyptus argophloia*	Queensland western white gum		CR	V	7/3
plants	land plants	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		2/2
plants	land plants	Myrtaceae	*Eucalyptus pachycalyx subsp. waajensis*			E		10/9
plants	land plants	Myrtaceae	*Eucalyptus sideroxylon subsp. improcera*			V		8/8
plants	land plants	Myrtaceae	*Homoranthus decumbens*			V	E	4/4
plants	land plants	Myrtaceae	*Homoranthus papillatus*	mouse bush		CR		1
plants	land plants	Myrtaceae	*Melaleuca groveana*			NT		3/3
plants	land plants	Myrtaceae	*Micromyrtus carinata*	Gurulmundi heath-myrtle		E		21/17
plants	land plants	Myrtaceae	*Micromyrtus patula*			E		3/3
plants	land plants	Orchidaceae	*Aphyllorchis anomala*			NT		1
plants	land plants	Poaceae	*Homopholis belsonii*	Belson's panic		E	V	10/10
plants	land plants	Rhamnaceae	*Cryptandra ciliata*			NT		4/4
plants	land plants	Rutaceae	*Philotheca sporadica*			NT	V	4/3
plants	land plants	Solanaceae	*Solanum stenopterum*			V		2/2
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	38/11

CODES

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

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

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -26.6332
Longitude: 150.2942
Distance: 55
Email: matthew.whitehouse@attexo.com.au
Date submitted: Monday 18 Mar 2024 15:37:13
Date extracted: Monday 18 Mar 2024 15:40:19

The number of records retrieved = 45

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	13
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	22
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		V	V	2
animals	birds	Meliphagidae	*Grantiella picta*	painted honeyeater		V	V	5
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		1
animals	birds	Turnicidae	*Turnix melanogaster*	black-breasted button-quail		V	V	2
animals	insects	Lycaenidae	*Jalmenus eubulus*	pale imperial hairstreak		V		3
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	27
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	10
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	7
animals	mammals	Vespertilionidae	*Nyctophilus corbeni*	eastern long-eared bat		V	V	10
animals	reptiles	Boidae	*Aspidites ramsayi*	woma		NT		2
animals	reptiles	Diplodactylidae	*Strophurus taenicauda*	golden-tailed gecko		NT		148/5
animals	reptiles	Elapidae	*Furina dunmalli*	Dunmall's snake		V	V	1
animals	reptiles	Elapidae	*Hemiaspis damelii*	grey snake		E	E	7
animals	snails	Camaenidae	*Adclarkia cameroni*			V	E	2
animals	snails	Camaenidae	*Adclarkia dulacca*	Dulacca woodland snail		E	E	4
plants	land plants	Acanthaceae	*Xerothamnella herbacea*			E	E	2/1
plants	land plants	Asteraceae	*Rutidosis glandulosa*			NT		6/6
plants	land plants	Asteraceae	*Rutidosis lanata*			NT		44/42
plants	land plants	Celastraceae	*Apatophyllum teretifolium*			NT		1/1
plants	land plants	Celastraceae	*Denhamia parvifolia*			V	V	4/4
plants	land plants	Cyperaceae	*Fimbristylis vagans*			E		1/1
plants	land plants	Leguminosae	*Acacia barakulensis*			V		10/9
plants	land plants	Leguminosae	*Acacia curranii*	curly-bark wattle		V	V	4/4
plants	land plants	Leguminosae	*Acacia handonis*	Hando's wattle		V	V	16/14
plants	land plants	Leguminosae	*Acacia wardellii*			NT		25/17
plants	land plants	Myrtaceae	*Calytrix gurulmundensis*			V	V	14/11
plants	land plants	Myrtaceae	*Eucalyptus argophloia*	Queensland western white gum		CR	V	9/5
plants	land plants	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		7/7
plants	land plants	Myrtaceae	*Eucalyptus pachycalyx subsp. waajensis*			E		10/9
plants	land plants	Myrtaceae	*Eucalyptus sideroxylon subsp. improcera*			V		8/8
plants	land plants	Myrtaceae	*Homoranthus decumbens*			V	E	4/4
plants	land plants	Myrtaceae	*Homoranthus papillatus*	mouse bush		CR		1
plants	land plants	Myrtaceae	*Melaleuca groveana*			NT		3/3
plants	land plants	Myrtaceae	*Micromyrtus carinata*	Gurulmundi heath-myrtle		E		21/17
plants	land plants	Myrtaceae	*Micromyrtus patula*			E		3/3
plants	land plants	Orchidaceae	*Aphyllorchis anomala*			NT		1
plants	land plants	Poaceae	*Homopholis belsonii*	Belson's panic		E	V	9/9
plants	land plants	Rhamnaceae	*Cryptandra ciliata*			NT		4/4
plants	land plants	Rutaceae	*Philotheca sporadica*			NT	V	1442/34
plants	land plants	Solanaceae	*Solanum stenopterum*			V		2/2
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	31/4

CODES

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This number is output as 999 if it equals or exceeds this value.

Appendix D

Likelihood of occurrence assessments

Listed Threatened Species

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Bird Species						
Australasian Bittern	*Botaurus poiciloptilus*	E	E	PMST	Occurs from southern Queensland to Tasmania and south eastern South Australia. In NSW this species has been recorded along the coast as well as inland wetlands and rivers (NPWS, 1999). The Australasian Bittern occurs in estuarine and freshwater wetlands with tall dense vegetation, including sedges, spike rushes, reeds and bulrush. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water Feeds mostly at night upon frogs, yabbies, spiders, insects, snails, small fish and mice (TSSC, 2019).	**Unlikely to Occur. Not Required (MNES).** Only scattered marginal habitat for this species is present within the Study area.
Australian Painted Snipe	*Rostratula australis*	E, Ma	E	PMST	Inhabits well-vegetated shallows and margins of wetlands, dams, sewage ponds and other water courses; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub and open timber. Occurs mostly in south-eastern Australia but dispersive in response to rainfall. The species has a broad range of distribution throughout Australia but has a close association with brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins (DSEWPC, 2013).	**Possibly Occurring**. The nearest reliable records for this species are from Lake Broadwater Conservation Park, approximately 110 km to the south-east. There are closer records however, the spatial accuracy of these records is poor. Suitable habitat in the Study area is restricted to freshwater wetlands (RE 11.3.27f) associated with alluvial areas around Dogwood, Punchbowl and Bottle Tree Creeks however, the species would only be expected to occur as a rare visitor to the SGP away from the area around Lake Broadwater and Long Swamp.
Black-breasted Button-quail	*Turnix melanogaster*	V	V	PMST, WildNet	Inhabits leaf-litter in drier rainforests, vine thickets; scrubby woodlands of eucalypts, she-oaks, bottle-brushes, brush box, Brigalow and other Acacias; thickets of lantana on rainforest fringes, hoop pine plantations; grain stubbles. Its distribution is patchy in southeast QLD to northern NSW (TSSC, 2016b).	**Unlikely to Occur. Impacts approved under EPBC 2010/5344.** The closest records are associated with RE 11.9.5 (Brigalow with vine thicket understorey) from north-eastern parts of Barakula State Forest (59 km to the north-east of the Study area). There are no

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
						suitable vine thicket habitats in the Study area.
Black-faced Monarch	*Monarcha melanopsis*	Mi, Ma	-	PMST	The Black-faced Monarch is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no nearby historical records.
Blue-winged Parrot	*Neophema chrysostoma*	V, Ma	V	PMST	The Blue-winged parrot breeds on mainland Australia south of the Great Dividing Range in southern VIC from Port Albert in Gippsland west to Nelson, and sometimes in the far south-east of SA, and north-western, central and eastern parts of TAS. This species inhabits a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. This species can also be seen in altered environments such as airfields, gold-courses and paddocks. Pairs of small parties of Blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs (SPRAT, 2023).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no nearby historical records.
Brown Treecreeper (south-eastern)	*Climacteris picumnus victoriae*	V	V	PMST	The Brown Treecreeper is endemic to south-eastern Australia from the Grampians in western VIC, through central NSW to the Bunya Mountains in QLD, and from the coast to the inland slopes of the Great Dividing Range. This species occupies dry open eucalypt forests and woodlands. This subspecies mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understory, sometimes with one or more shrub species (SPRAT, 2023).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no nearby historical records. The SGP is likely within the Brown Treecreeper hybrid zone (Schodde and Mason, 1999) suggesting any Brown Treecreepers that are present cannot be assigned to subspecies.
Common Greenshank	*Tringa nebularia*	E, Mi, Ma	-	PMST	In Queensland, the species is widespread in the Gulf country and eastern Gulf of Carpentaria (SPRAT, 2010). Found in mudflats, estuaries, saltmarshes, margins of lakes, wetlands, claypans, fresh and salines, commercial saltfields, sewage ponds (Pizzey and Knight 1999).	**Unlikely to Occur. Not Required (MNES).** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Common Sandpiper	*Actitis hypoleucos*	Mi, Ma	-	PMST	Shallow, pebbly, muddy or sandy edges of rivers and streams, coastal to far inland; dams, lakes, sewage ponds; margins of tidal rivers; waterways in mangroves or saltmarsh; mudflats; rocky or sandy	**Unlikely to Occur.** No suitable habitat is present within the Study

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					beaches; causeways, riverside lawns, drains and street gutters (Pizzey and Knight 1999).	area and no nearby historical observations have been identified.
Curlew Sandpiper	*Calidris ferruginea*	CE, Mi, Ma	CR	PMST	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (Pizzey and Knight 1999). They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They generally roost on bare dry shingle, shell or sand beaches, sandpits and islets in or around coastal or near-coastal lagoons and other wetlands (SPRAT 2015).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Diamond Firetail	*Stagonopleura guttata*	V	V	PMST, WildNet	Diamond Firetails occur on the south-east mainland of Australia from south-east QLD to Eyre Peninsula, SA and about 300 km inland from the sea. This species occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. They tend to prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover (DCCEEW, 2023).	**Known to Occur. MNES but listed after EPBC 2010/5344 approved** Suitable habitat is present within the Project and historical records from 2019 have been identified nearby. Other historical records have been recorded within the Study area but no dates were provided.
Fork-tailed Swift	*Apus pacificus*	Mi, Ma	-	PMST	Almost exclusively aerial species, flying from less than 1m to at least 300m above the ground. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh .	**Likely to Occur.** Species was recorded during surveys for the broader SGP. Suitable habitat is abundant across the Study area.
Grey Falcon	*Falco hypoleucos*	V	V	PMST	They Grey Falcon's habitat includes lightly treed inland plains; gibber deserts, sand ridges, pastoral lands, timbered watercourses; seldom in driest deserts. Resident or nomadic visitor to inland parts of all mainland states (Pizzey and Knight 1999).	**Unlikely to Occur.** This species typically occurs in drier, more open habitats than those present in the Study area. There are four undated records within 50 km of the SGP and one old (>20 years) record from Lake Broadwater are likely to represent

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
						misidentifications or a very occasional vagrant. The species is rarely recorded within the Brigalow Belt and should be regarded as transient.
Latham's Snipe	*Gallinago hardwickii*	V, Mi, Ma	-	PMST	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern SA. It occurs in permanent and ephemeral wetlands up to 2000m ASL, where they usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). They can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (SPRAT, 2023).	**Possibly Occurring.** Limited suitable habitat is present within the Study area, and an older historical record is located within 4 km of the Project.
Oriental Cuckoo	*Cuculus optatus*	Mi	-	PMST	Within Australia, this species uses a range of vegetated habitats such as monsoon rainforests, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (DoE, 2015; Menkhorst et al,. 2017). This cuckoo species feeds arboreal, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground, but requires shrubs or trees from which it sallies and returns to consume prey items. Caterpillars have been noted as a preferred food source. Oriental Cuckoos tend to forage individually and have only been recorded foraging in pairs when infestations of caterpillars occur (DoE, 2015).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no nearby historical records.
Painted Honeyeater	*Grantiella picta*	V	V	PMST, WildNet	Habitat includes mistletoes in eucalypt forests, box-ironbark-yellow gum woodlands, paperbarks, casuarinas, mulgas/acacias. Rare migrant/nomad with range extending across eastern Australia. This species diet consists of mistletoe fruits, but also includes nectar and arthropods, especially in the non-breeding season (DoE, 2015).	**Likely to occur. MNES but listed after EPBC 2010/5344 approved.** Suitable habitat is present within the Study area and historical records have been identified within 5km of the Study area.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Pectoral Sandpiper	*Calidris melanotos*	Mi, Ma	-	PMST	This species if found in shallow fresh waters, often with low grass and other herbage; swamp margins, flooded pastures, sewage ponds; occasionally tidal areas and saltmarshes (Pizzey and Knight 1999).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Powerful Owl	*Ninox strenua*	-	V	WildNet	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range, from south-east QLD to SA. They are found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understories, especially along watercourses. They will sometimes be found in open areas near forests such as farmland, parks, and suburban areas (www.birdsinbackyards.net).	**Possibly Occurring**. Suitable habitat is present within the Study area and historical records have been identified within the vicinity.
Red Goshawk	*Erythrotriorchis radiatus*	E	E	PMST	The Red Goshawk is endemic to Australia where it is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia from western Kimberly to north-eastern NSW, and occasionally on continental islands. It has probably always occurred in central Australia, where three widely-spaced, recent confirmed sightings corroborate earlier, previously doubted records, however no breeding has been recorded in central Australia. This species occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Riverine forests are also used frequently. Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the red goshawk requires for prey (SPRAT, 2023).	**Unlikely to Occur.** There are two records in the vicinity of Lake Broadwater, and additional 9 records within 50 km of the broader SGP centred around Chinchilla and Oakey. All records are old (>40 years) and the species is rarely recorded in the Brigalow Belt, and is now thought to have been extirpated from this part of Queensland. Impacts on this species considered as part of assessment for EPBC 2010/5344.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Rufous Fantail	*Rhipidura rufifrons*	Mi, Ma	-	PMST	The Rufous Fantail is migatory, being virtually absent from south-east Australia in winter. Departure from breeding areas in the south-east is usually March to early April, though sometimes as early as February. A few birds remain in all months, but most spend the winter in coastal lowlands and off-shore islands in south-east Queensland, north to Cape York Peninsula and the Torres Strait and Papua New Guinea. The return to the breeding grounds occurs August to December, with south passage through Queensland mainly from October to November. In east and south-east Australia, this species inhabits mainly wet sclerophyll forests, subtropical and temperate rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum, Yellow Box, ironbarks or stringybarks often with a shrubby or heathy understorey (SPRAT Profile).	**Possibly Occurring**. There are numerous recent records for this species within eucalypt woodland habitats in Barakula State Forest and to the west, the nearest of which is 8 km west of the Study area. Similar communities in the Study area may represent habitat for this species while on passage however, this is not core wet temperate habitat for this species.
Satin Flycatcher	*Myiagra cyanoleuca*	Mi, Ma	-	PMST	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (SPRAT, 2010).	**Possibly Occurring.** Species was recorded during surveys for the broader SGP. Suitable habitat is present within the Study area, but nearby observations are 10 km away.
Sharp-tailed Sandpiper	*Calidris acuminata*	V, Mi, Ma	-	PMST	The sharp-tailed sandpiper breeds in northern Siberia but migrates south to winter in Australia and New Zealand. In the non-breeding season they can be found in tidal mudflats, saltmarshes, mangroves; shallow fresh, brackish or saline inland wetlands; floodwaters, irrigated pastures and crops; sewage ponds and saltfields (Pizzey and Knight 1999).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
South-eastern Glossy Black-Cockatoo	*Calyptorhynchus lathami lathami*	V	V	PMST, WildNet	The southern Glossy Black-cockatoo has a widespread distribution, ranging from Gympie to the south-east QLD border, inland to Augathella and Tambo. The distribution of this species continues south into NSW spreading inland to the central western plains and also occurs in the eastern coastal Gippsland region of VIC. This species prefers woodland areas dominated by she-oak (Allocasuarina) or open sclerophyll forests and woodland with a stratum of Allocasuarina beneath Eucalyptus, Corymbia or Angophora. Glossy black-cockatoos have also been observed in mixed Allocasaurina, Casuarina, cypress	**Known to Occur (MNES but listed after EPBC 2010/5344 approved).** A single record from 2013 was identified within the Study area. This subspecies was not considered during assessments across the SGP, but the parent species was. Suitable habitat present within the Study area.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					Callitris and brigalow (Acacia harpophylla) woodland assemblages (Hourigan, 2012).	
Southern Whiteface	*Aphelocephala leucopsis*	V	V	PMST	The 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. There is a broad hybrid zone between the two subspecies extending north from the western edge of the Nullarbor Plain. This species lives in a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. This species is considered to be sedentary, however, atlas records indicate that individuals may more into wetter areas outside of their normal range during drought years (SPRAT, 2023).	**Unlikely to Occur (MNES, but listed after EPBC 2010/5344 approved)** Whilst suitable habitat is present within the Study area, no nearby historical observations have been identified.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Squatter Pigeon (southern)	*Geophaps scripta scripta*	V	V	PMST, WildNet	The known distribution of the Squatter Pigeon 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. Their habitat is generally defined as open-forests to sparse, open woodlands and scrub that are mostly dominated by Eucalypts, Corymbia, Acacia or Callitris species. The habitat is generally remnant, regrowth or partly modified vegetation communities and within 3 km of water bodies or courses. Foraging occurs on well-drained, gravelly or loamy soils which support the open-forest to woodland communities with patchy, tussock-grassy understories (SPRAT, 2015).	**Known to Occur, vagrant.** A pair of Squatter Pigeons was observed on a stock route in the Study area in 2012. This species has been periodically recorded within 50 km, most recently from Nudley State Forest in 2022 (approx. 70 km to the east). Remnant habitats in the Study area are generally too heavily wooded to be considered high amenity, though it may occur in non-remnant habitats throughout. Despite suitable habitat being present, this species is likely to be vagrant, with individuals not representing a resident or seasonal population. Impacts on habitat for this species are approved under EPBC 2010/5344.
Star Finch (eastern)	*Neochmia ruficauda ruficauda*	E	E	PMST	Distribution is poorly known but it only occurs in central Queensland. It resides mainly in grasslands and grassy woodlands that are located close to body of fresh water. It also occurs in cleared or suburban areas such as along rode sides in towns (SPRAT 2017).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Swift Parrot	*Lathamus discolor*	CE, Ma	E	PMST	The Swift Parrot is endemic to south-eastern Australia, breeding in Tasmania and migrating to the Australian mainland. It inhabits eucalypt forests and woodlands, plantations and banksias; street trees, parks and gardens (Pizzey and Knight 1999).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
White-throated Needletail	*Hirundapus caudacutus*	V, Mi, Ma	V	PMST, WildNet	Almost exclusively aerial from heights of less than 1m up to more than 1000m above the ground. Most often recorded above wooded areas, including open forest and rainforest and also are commonly recorded over heathland and coastal cliffs (SPRAT, 2010).	**Known to Occur.** Two records of this species have been confirmed within the Study area (most recently 2013) and suitable habitat is also abundant.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Yellow Wagtail	*Motacilla flava*	Mi, Ma	-	PMST	Regular summer migrant to coastal Australia, especially Darwin to Broome, but also north-eastern Queensland from November to April. Found in short grass and bare ground, swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land and town lands (Pizzey and Knight 1999).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, no nearby historical observations have been identified.
Fish Species						
Murray Cod	*Maccullochella peelii*	V	V	PMST	The Murray Cod was historically distributed throughout the Murray-Darling Basin, which extends from southern QLD, through NSW, the ACT and VIC to SA, with the exception of the upper reaches of some tributaries. This species still occurs in most parts of this natural distribution but to approximately 1000 m above sea level. The species' estimated extent of occurrence, based on areas with an average river width of 50 m, is 660 km2. This species utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW, to slow-flowing, turbid lowland rivers and billabongs (SPRAT, 2023).	**Possibly Occurring.** Limited suitable habitat is present within the Study area and nearby historical records have been identified.
Silver Perch	*Bidyanus bidyanus*	CE	-	PMST	The Silver perch are endemic to the Murray-Darling system (including all states and sub-basins). This species formerly utilised a diversity of habitats within the Murray-Darling system and are commonly described as a lowland species that are not found in the cooler upper reaches of rivers. However, numerous reliable accounts exist of Silver Perth penetrating to Cooma (~800 m ASL) on the Murrumbidgee River in large-scale upstream migrants in summer in the early and mid 1900s. This species is consistently reported by anglers and researches to show a general preference for fast-flowing water, including rapids and races, and more open sections of river, throughout the Murray-Darling Basin (SPRAT, 2023).	**Possibly Occurring.** Limited suitable habitat is present within the Study area and nearby historical records have been identified.
Invertebrate Species						
Brigalow Woodland Snail	*Adclarkia cameroni*	E	V	PMST, WildNet	The Brigalow woodland snail is endemic to south-east QLD, where is occurs in a small number of remnant and scattered Acacia harpophylla (brigalow) and eucalypt woodland patches (such as road verges and riparian corridors) on the Condamine River floodplain, especially in the area around Dalby and Chinchilla (Conservation Advice, 2020).	**Likely to Occur.** Suitable habitat is present within the Study area, and historical records have been identified within 5 km (ALA, 2011).

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Dulacca Woodland Snail	*Adclarkia dulacca*	E	E	PMST, WildNet	Publicly available records suggest the Dulacca Woodland Snail is restricted to the southern Brigalow Belt between Miles, Dulacca, Wandoan and Meandarra, though recent work has found the species west to the Yuleba area and east to the Chinchilla area (Eddie 2023). It has been recorded from Gurulmundi State Forest to the north-west and at one location to the 16 km east of the Study area near Barakula State Forest in 2012. It has also been recorded at 2 locations on the Condamine River ("Sherwood"; ALA 2010). The species has been located in a variety of habitats including vine thicket and Brigalow woodand with rock outcrops and Lancewood, Ironbark and E. woollsiana on ridges with and without rock (TSSC, 2016b). It shelters in moist microhabitats under wood, rocks and other debris, as well as under bark at the base of trees. It has been found persisting in Brigalow regrowth but only where there is abundant suitable microhabitat (e.g. logs, dense leaf litter). This species can also shelter under loose bark at the base of trees (SPRAT, 2023). Eggs are laid in suitable microhabitat locations during summer rains.	**Likely to Occur.** While there are no suitable areas of Brigalow habitat present within the Study area, there is habitat nearby. The nearest historical record for this species is located approximately 12.5 km to the east of the Study area (Arrow database, 2012).
Pale Imperial Hairstreak	*Jalmenus eubulus*	-	V	WildNet	*Jalmenus eubulus* is associated with Brigalow (Acacia harpophylla) dominated forests and woodland stands from central QLD to northern NSW. The larvae are monophagous, feeding on Brigalow leaves and are attended by small black ants (NSW OEH, 2024).	**Possibly Occurring.** Species has been recorded within the broader SGP. Suitable habitat is present within the Study area and historical records have been identified with 16km of the Study area.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Mammal Species						
Corben's Long-eared Bat	*Nyctophilus corbeni*	V	V	PMST, WildNet	In QLD and NSW the South-eastern Long-eared Bat inhabits a variety of vegetation types but it is distinctly more common in Box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern QLD. This species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches, suggesting its home range is probably large. It appears that old-growth vegetation is a critical habitat component in the VIC distribution. This species has also been found to be much more abundant in habitats that have a distinct tree canopy and a dense, cluttered understory layer (TSSC, 2015).	**Known to Occur.** This species was recorded from one (1) location on Girrahween Station during Project surveys in 2013 and two locations south of Myall Park Hookswood Road. There are also a number of records for *Nyctophilus* sp. from passive acoustic detection sites. Suitable habitat is present throughout. Impacts on habitat for this species approved under EPBC 2010/5344.
Ghost Bat	*Macroderma gigas*	V	E	PMST	Ghost bats occur in a wide range of habitats from rainforest, monsoon and vine scrub, to open woodlands in arid areas. These habitats are used for foraging, while root habitat is more specific. Favoured roosting sites of the ghost bat are undisturbed caves or mineshafts which have several openings. Ghost bats occur in tropical regions in Queensland, and along the ventral and northern coast, from Rockhampton north to Cape York (TSSC, 2016c).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Greater Glider (southern and central)	*Petauroides volans volans*	E	E	PMST, WildNet	The southern and central Greater Glider occurs in eastern Australia, where it has a broad distribution from around Proserpine in QLD, south through NSW and the ACT, to Wombat State Forest in central VIC. This species is 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 abundance hollows. It is likely that only a proportion of forest in potential habitat areas is suitable for the species, as the structural attributes of the forest overstorey and forage quality it relies on vary considerably across the landscape (DCCEEW, 2022).	**Known to Occur.** Greater Glider has been recorded from five (5) locations in the Study area during surveys for the SGP Supplementary EIS, associated with Dogwood and Punchbowl Creeks and their tributaries.
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	-	PMST	The Grey-headed Flying-fox occurs in a range of habitats including subtropical and temperate rainforests, dry and wet sclerophyll forests, Banksia woodland, heaths and Melaleuca swamps (TSSC, 2001).	**Unlikely to Occur.** Whilst limited suitable habitat is present within the Study area, no nearby camps

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
						containing this species have been identified.
Koala	*Phascolarctos cinereus*	E	E	PMST, WildNet	The Koala is endemic to Australia. The biological species range extends from north-eastern QLD to the south-east corner of SA. Koalas naturally inhabit a range of temperate, subtropical and tropical forests, woodland and semi-arid community's dominated by Eucalyptus species. Their habitat can broadly be defined as any forest or woodland containing species that are a known Koala food tree, or shrubland with emergent food trees (DAWE, 2022a).	**Known to Occur.** This species has been recorded from two locations in the Study area, the most recent from 2016. There are also older records (1987) to the south of the amendment area. There is an abundance of suitable habitat.
Large-eared Pied Bat	*Chalinolobus dwyeri*	E	E	PMST	It is found in a variety of dryer habitats, including the dry sclerophyll forests and woodlands to the east and west of the Great Dividing Range. Daytime roosts include caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. In caves it often selects positions close to the cave entrance where individuals huddle together. It is believed to forage for small flying insects below the forest canopy. Its distribution of mostly limited to NSW with a few records in SE Queensland (Strahan, 2002).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
Northern Quoll	*Dasyurus hallucatus*	E	-	PMST	The northern quoll occurs across much of northern Australia, from south-eastern Queensland to the south-west Kimberley, with a disjunct population in the Pilbara. In the Northern Territory it is restricted to the Top End. The species occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforest, sandy lowlands and beaches, shrubland, grasslands and desert. The habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal (SPRAT 2012).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Short-Beaked Echidna	*Tachyglossus aculeatus*	-	SLC	WildNet	The Short-beaked Echidna lives in forest and woodlands, heath, grasslands and arid environments. It is found throughout Australia, including Tasmania. Although it is found all over Australia, it is not as common in Sydney as it once was (www.australianmuseum.net.au).	**Known to Occur.** This species has been recorded from a single location in the Study area (WildNet, 2009) on a stock route south of Punchbowl Creek. There is an abundance of suitable habitat.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	E	E	PMST	The Spotted-tailed Quoll occurs along the east coast of Australia from south east Queensland to South Australia and Tasmania. The Spotted-tailed Quoll has been recorded in a wide range of habitat types including dry and moist sclerophyll forests and woodlands, rainforest, coastal heathland, and riparian forest. This species been occasionally sighted in treeless areas, rocky outcrops and grazing lands (NPWS, 1999; NPWS, 2000; Strahan, 2008). The Spotted-tailed Quoll shelters and dens in small caves, fallen logs with large hollows and tree hollows and may utilise numerous dens within its home range which has been estimated to be between 800 ha to 20 km2 (NPWS, 2000; NPWS in prep, 1999). The Spotted-tailed Quoll is partly arboreal and feeds upon a variety of prey species including birds, rodents, lizards, small wallabies, and even insects. The Spotted-tailed Quoll is also known to scavenge and feed upon carrion, road kills including wild dogs, and litter (Strahan 1998; NPWS 2000).	**Unlikely to Occur.** Being forest-dependent, this species is restricted to contiguous forested area, such as Barakula State Forest. The current status of this species in the Brigalow Belt is uncertain; most records are >40 years old with the exception of a single confirmed sighting of an injured animal near Tara and a record from 2022 on the Warrego Highway near Dalby. There is a single recent (1997) record to the south of the amendment area however, the spatial uncertainty (54 km) means this record is unreliable.
Yellow-bellied Glider (south-eastern)	*Petaurus australis australis*	V	V	PMST, WildNet	The Yellow-bellied Glider is found in tall mature Eucalypt Forest and they feed on a range of sources including winter-flowering Eucalypts which provide nectar and pollen. They also feed upon the sap of Eucalypts in which they chew V-shaped incisions to collect the sap. Yellow-bellied Gliders den in large tree hollows (NPWS, 2000).	**Likely to Occur.** The species is well represented in Barakula and Gurulmundi State Forests and there are large contiguous areas of forest, particularly in the north of the Study area. It is yet to be detected in the broader SGP area but is considered likely to occur.
Reptile Species						
Adorned Delma, Collared Delma	*Delma torquata*	V	V	PMST	Under rocks and in soil cracks on heavy, stony and lightly timbered soils near Kenmore, Brookfield and Mt Crosby. Endemic to South-east Queensland. Also found in numerous disturbed habitats throughout Southeast Queensland (Cogger 2000).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
Condamine Earless Dragon	*Tympanocryptis condaminensis*	E	-	PMST	The Condamine Earless Dragon occurs in the eastern Darling Downs region of south-east QLD, in the Brigalow Belt Sough IBRA bioregion. It occurs on the Condamine River floodplain in an area bounded by the Pirrinuan/Jimbour area in the northwest, Millmerran in the southwest, Clifton in the southeast and Toowoomba in the northeast. This species occurs in an area on black-cracking clays that is intensively cropped.	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					Almost all records of this species have been made on one private property, along narrow road reserves or in headlands (thin, less than 10m wide strips of grassland on paddock verges). Vegetation where this species has been observed is cropped (on private property), and remnant native grassland and exotic grassland. The species has been found in cotton, sorghum, maize and sunflower crops. it is known to forage in stubble field and may benefit in areas where no-till farming is employed (SPRAT Profile).	
Dunmall's Snake	*Furina dunmalli*	V	V	PMST, WildNet	The distribution of the Dunmall's Snake extends from near the QLD border through the Brigalow Belt South and Nandewar bioregions, as far south as Ashford in NSW. In QLD this species occurs primarily in the Brigalow Belt region in the south-eastern interior of QLD. Records indicate sites at elevations between 200-500 m above sea level. The snake is very rare of secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park. It has been found in a broad range of habitats including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow; and other various Blue Spotted Gum, Ironbark, White Cypress and Bulloak open forests and woodland associations on sandstone derived soils (SPRAT).	**Possibly Occurring.** Suitable habitat is present within the Study area and scattered records have been identified in the areas surrounding the broader SGP.
Fitzroy River Turtle	*Rheodytes leukops*	V	V	PMST	The Fitzroy River Turtle is found in rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity, and are often associated with Ribbonweed (Vallisneria sp.) beds. Also has an affinity for well-oxygenated riffle zones, moving into deeper pools as the riffle zones cease to flow (SPRAT 2009).	**Unlikely to Occur.** Whilst limited suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
Five-clawed Worm-skink	*Anomalopus mackayi*	V	E	PMST	The distribution of the Five-clawed Worm Skink is patchy in north-eastern NSE and south-eastern QLD. In south-eastern QLD the species is known from the upper Condamine River Floodplain from Warwick in the south to the Jimbour region in the north and bordered by the western edge of the Granite Belt. This species occurs in Bluegrass and/or Mitchell Grass dominated grasslands or mixed grasslands dominated by	**Unlikely to Occur.** This species has never been recorded west of the Condamine River, with the nearest record 102 km to the south-east. Impacts on habitat 560 ha of habitat for this species for the broader SGP

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					other grass species, but still categorised as Re 11.3.21. In south-east QLD, the species may also occur in River Red Gum/Queensland Blue Gum/Coolibah/Poplar Box grassy woodland/open forest communities. The species is not likely to be found in soils in which deep cracks do not form, such as hard-setting brown clays or sandy soils (SPRAT, 2022).	are approved under EPBC 2010/5344.
Golden-tailed Gecko	*Strophurus taenicauda*	-	NT	WildNet	The Golden-tailed Gecko is only found in the Brigalow Belt North and Brigalow Belt South bioregions of QLD and NSW. This is a mostly arboreal nocturnal species that feeds on a variety of insects and other invertebrates. It occupies a range of vegetation types, particularly where Acacia harpophylla, Casuarina cristata, Allocasuarina luehmannii, Eucalyptus crebra and callitris glaucophylla are growing (Pavey et al. 2021).	**Known to Occur.** Species has been recorded within the Study area at numerous locations. An abundance of suitable habitat is present.
Grey Snake	*Hemiaspis damelii*	E	E	PMST, WildNet	Queensland, records are known from near Goondiwindi and the adjacent Darling-Riverine Plain, from the Darling Downs and from the Lockyer Valley. Several isolated records also occur in the Rockhampton area. It favours woodlands, usually on heavier, cracking clay soils, particularly in association with water bodies. They shelter under rocks, logs and other debris as well as in soil cracks (SPRAT 2011).	**Possibly Occurring. MNES but listed after approval of EPBC 2010/5344.** While the nearest record of this species is 12 km to the south, there is limited suitable cracking clay habitat in the Study area.
Southern Snapping Turtle	*Elseya albagula*	CE	CR	PMST	The Southern Snapping Turtle is only found in the Burnett, Fitzroy, Raglan and Mary River drainages of south-east QLD. It prefers permanent flowing water habitats where there are suitable shelters and refuges like fallen trees. (www.environment.des.qld.gov.au).	**Unlikely to Occur.** Whilst limited suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
Woma Python	*Aspidites ramsayi*		NT	WildNet	The Woma python can be found in the west and centre of Australia from WA through southern NW and northern SA to southern QLD and northwestern NSW. Its range may be discontinuous. This species was previously common on sandplains with other populations in the south and east found amongst wheatbelt and goldfield areas (www.ala.org.au).	**Possibly Occurring.** Limited suitable habitat is present within the Study area and nearby historical records have been identified.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Yakka Skink	*Egernia rugosa*	V	V	PMST	Endemic to Queensland where its distribution is highly fragmented. Often associated with partly-buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. It is also known to excavate deep burrow systems. The Yakka Skink can persist in cleared habitats if shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens are available (DEHP 2017).	**Unlikely to Occur.** Whilst suitable habitat is present, this species is known to be rare and scattered in the east of its range. There have only been two records within 50 km of the SGP, one ~2km east of Gurulmundi State Fores, another ~6km east of Condamine State Forest. Impacts to 310 ha of habitat for this species are approved under EPBC 2010/5344.
Plant Species						
Curly-bark Wattle	*Acacia curranii*	V	V	PMST, WildNet	Grows in dry sclerophyll forests and semi-arid woodlands across a variety of habitats within western New South Wales and Queensland. It occurs on deeply weathered sandstones forming red sandy soils. The species occurs in widely scattered thickets in patches of diverse heath scrub with emergent trees (WetlandInfo).	**Possibly Occurring.** Suitable habitat is present however, the only known population occurs near Gurulmundi State Forest where it is restricted to an area of less than 20 km in diameter. Records within the Study area were not reviewed by the QLD Herbarium and have since been discounted as misidentifications.
Hairy-joint Grass	*Arthraxon hispidus*	V	V	PMST	In NSW and QLD, this species is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland. In the SE QLD Bioregion, A. hispidus has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests, and also with bog mosses in mound springs (QLD - Species Profile)	**Unlikely to Occur.** Whilst limited suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
Belson's Panic	*Homopholis belsonii*	V	E	PMST, WildNet	*Homopholis belsonii*'s distributional range lies within the Brigalow belt QLD, namely the Darling Downs area west of Toowoomba, near Oakey, Jondaryan, Bowenville, etc. The species is also found on the northwest slopes and plains of NSW, north of Warialdra. This grass species is found on poor soils in dry woodlands and at elevations of 200-520 m in NSW and 342-500 in QLD. There are three general types of habitat which	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified. Impacts on habitat for this species are approved under EPBC 2010/5344.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					support this species a) Rocky, basaltic hills; b) flat to gently undulating alluvial areas; and c) drainage lines. This species is commonly found amongst fallen timber, at the base of trees and shrubs, among branches and leaves of trees hanging low and around fence lines. It is believed to be shade dependent as it almost always occurs in these types of areas (SPRAT Profile).	
Austral Cornflower	*Rhaponticum australe*	V	V	PMST	The Austral Cornflower is currently confined to Queensland. The species was known to previously occur in NSW and VIC, but is now presumed extinct in those locations (2008). The current distribution of the Austral Cornflower extends from Allora (north of Warwick) to Callide (north-west of Biloela), QLD. This species usually grows on heavy black or red-brown clay, or clay loams derived from basalt. Populations are often confined to roadsides and cultivation headlands. Locations where the species occurs range in altitude up to 480 m above sea level. The species is often found in woodland and grassland and in association with Eucalyptus crebra, E. Orgadophila, E. populnea, E. tereticornis, E. melanophloia, Angophora subcelutina, A. floribunda, Dichanthium sericeum and Themeda triandra (SPRAT, 2019).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity. Impacts on habitat for this species are approved under EPBC 2010/5344.
Austral Toadflax	*Thesium australe*	V	V	PMST	Austral Toadflax occurs in NSW, ACT, QLD and CIV. Its current distribution is sporadic but widespread, occurring between the Bunya Mountains in SE QLD to NE VIC, and as far inland as the southern, central and northern tablelands in NSW and the Toowoomba region. It is a semi-parasitic species found on roots of a range of grass species, notably Kangaroo Grass. It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams. It occurs in shrubland, grassland or woodland, often in damp sites (SPRAT 2018).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity. Impacts on habitat for this species are approved under EPBC 2010/5344.
Bluegrass	*Dichanthium setosum*	V	-	PMST	Dichanthium setosum has been reported from inland NSW to QLD. There are also reports from WA and TAS. The species is associated with heavy basaltic black soils and red-brown loams with clay subsoils (predominantly cracking clays or alluvium, often in gilgai). It is often found in moderately disturbed areas such as cleared woodland, grassy	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					roadside remnants and highly disturbed pasture. The species may tolerate or benefit from disturbance, otherwise, disturbance is indicative of threatening processes in its habitat (SPRAT Profile).	
Gurulmundi Fringe Myrtle	*Calytrix gurulmundensis*	V	V	PMST, WildNet	*Calytrix gurulmundensis* is restricted to south-eastern QLD where it is known from Gurulmundi, Guluguba and Barakula areas, north-west of Toowomba. This species has been recorded in open shrubland with sparse, stunted Eucalyptus, *Casuarina* and *Acacia* spp. and in Triodia hummock grassland with scattered shrubs. The habitat at Gurulmundi State Forest is consistent with QLD RE 11.7.5. At this site, grader activity is suggested to have moved the species along tracks so that its distribution covers an area of several square kilometres (SPRAT Profile).	**Likely to Occur.** There is one record of this species from the southern end of Binkey State Forest, 8 km to the north-west of the Study area. Suitable habitat is present in the Study area. Impacts to 1,210 ha of habitat for this species are approved under EPBC 2010/5344.
Gurulmundi Heath Myrtle	*Micromyrtus carinata*	-	E	WildNet	*Micromyrtus carinata* is endemic to a small area to the north-west of Gurulmundi, on the crest of the Great Diving Range. The species occurs east of Chinchilla and north-west of Miles (occurs within the Gurulmundi State Forest). This species inhabits the tops of laterised ridges, on shallow to deep, yellow or red sands (QLD - Species Profile).	**Likely to Occur.** This species is only known from Gurulmundi State Forest, with a subpopulation located on the Wyona Property 10 km to the north of Miles (within PL304) approximately 4 km west of the Study area. Suitable habitat is present within the Study area.
Hando's Wattle	*Acacia handonis*	V	V	PMST, WildNet	Inhabits gently undulating slopes and stony ridges with laterite soils. Associated vegetation includes open forest or woodland with varying density of understory. Associated species include Eucalyptus fibrosa subsp. nubila, Corymbia watsoniana subsp. watsoniana, Lysicarpus angustifolius, and Allocasuarina inophloia (Halford, 1995a). Other wattles growing in the area include Acacia conferta, A. complanata, A. julifera and A. juncifolia (Hando, 2007). Associated understorey species include Dodonaea falcata, Boronia bipinnata, B. glabra, Cleistochloa subjuncea, Entolasia stricta, Schoenus kennyi, Triodia scariosa subsp. yelarbonensis, and Lomandra multiflora subsp. multiflora (SPRAT Profile).	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
King Blue-grass	*Dichanthium queenslandicum*	E	V	PMST	King Blue-grass is endemic to central and southern QLD where it occurs in three disjunct populations including: Hughenden district; from Nebo to Monto and west to Clermont and Rolleston; and Dalby district. Its extent of occurrence has reduced from 1100 km2 to 245 km2. Its area of occupancy is unknown, but based on the extent of occurrence it is likely to be restricted. This species occurs within the South Eastern QLD, Brigalow Belt South, Brigalow Belt North, Central Mackay Coast, Desert Uplands, Mitchell Grass Downs and Einasleigh Uplands Bioregions. The distribution of this species overlaps with several EPBC listed Threatened Ecological Communities. This species occurs on black cracking clay in tussock grasslands mainly in association with other species of blue grasses but also with other grasses restricted to this soil type. This species is mostly confined to natural grassland on the heavy black clay soils on undulating plains (SPRAT Profile).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
Mouse bush	*Homoranthus papillatus*	-	CR	WildNet	*Homoranthus papillatus* is restricted to Girraween National park, chiefly in the vicinities of Mount Norman and The Pyramids. This species occurs in pockets of decomposed granite with other heathy shrubs, on high exposed rock pavements and in adjoining heathy eucalypt woodlands (QLD - Species Profile)	**Unlikely to Occur.** There is a single (2001) record from Binkey State Forest however Tony Bean (*Homoranthus* expert at the Queensland Herbarium) considers this to most likely be a misidentification as the species is restricted to Girraween National Park.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
Ooline	*Cadellia pentastylis*	V	V	PMST, WildNet	Ooline occurs on the north-west slopes of NSW and in central and southern QLD where it is found within the 500 mm and 750 mm rainfall isohyets. This species is of considerable biogeographic interest as it is a relic of an extensive rainforest vegetation that covered much of Australia in the past. This species grows in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. It forms a closed or open canopy, as a dominant or commonly with White Box and White Cypress Pine, with an open understory and leaf litter dominating the forest floor (SPRAT Profile).	**Unlikely to Occur.** The nearest local collected samples is 23 km west of the Study area on the far side of Gurulmundi State Forest. A 1963 record at Myall Park is included in the Australian Virtual Herbarium, although accompanying notes indicate that this plant is cultivated. An additional low precision (5,121 m) observation is also shown in ALA approximately 5 km north of Myall Park. This is considered to be most likely the same cultivated record. Extensive searches for this distinctive species throughout the SGP have been unsuccessful and it is considered unlikely to occur.
Plunkett Mallee	*Eucalyptus curtisii*	-	NT	WildNet	Eucalyptus curtisii has two growth forms that occur in different habitats. The shorter mallee form is more likely to occur as the only eucalypt species on poorly drained lowland sites in shrubland dominated by banksia, with an understorey of heath plants, and sometimes E. conglomerata may also be present. The larger growth form occurs as scattered individuals on better drained soils in the more open areas of mixed eucalypt forests. Commonly associated species include Corymbia citriodora subsp. variegata, C. trachyphloia and Callitris endlicheri, less commonly associated with E. fibrosa, E. planchoniana and E. acmenoides. E. curtisii occurs on sandy podsoils with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones (www.wetlandinfo.des.qld.gov.au).	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified. Impacts on habitat for this species are approved under EPBC 2010/5344.
Queensland Western White Gum	*Eucalyptus argophloia*	V	CR	PMST, WildNet	Eucalyptus argophloia occurs on flat to undulating country at 300 - 340 m above sea level. It prefers deep, dark, heavy clay soils, often with strong gilgai development. It has been recorded growing in brigalow woodland and forest communities associated with Belah, Poplar Box and Inland Grey Box (www.wetlandinfo.des.qld.gov.au)	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified. Impacts on habitat for

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
						this species are approved under EPBC 2010/5344.
Red-soil Woolly Wrinklewort	*Rutidosis lanata*	-	NT	WildNet	Rutidosis lanata is restricted to western Darling Downs from north of Jackson to south of Hannaford, southeast QLD. A recent intensive survey of the area has recorded the species at only two of the five localities, near Meandarra and north of Jackson. This species occurs at altitudes of 280-320 m ASL in open eucalypt forests and woodlands including *Eucalyptus populnea-Casuarina cristata* forest, ironbark and *Acacia sparsiflora* forest, box ironwood forest, and E. populnea woodland with Eremophile mitchellii. It has been recorded growing on flat land or stony red ridges in red-brown gravelly sands, grey clays, red-brown clay or sandy loams (QLD - Species Profile).	**Likely to Occur.** Suitable habitat is present within the Study area and a nearby record from 2016 has been identified.
Small-leaved Denhamia	*Denhamia parvifolia*	V	V	PMST, WildNet	Denhamia parvifolia occurs from Eidsvold to Kingaroy, and near Chinchilla. The species occurs within Allies Creek State Forest and Koko State Forest. This species is found in vine forests and semi-evergreen vine thickets, commonly on basalt-derived, brown or red soils above 300m in altitude. It is also occasionally found in ecotone areas with open forests (QLD - Species Profile).	**Possibly Occurring.** Limited suitable habitat is present within the Study area and nearby historical records have been identified.
Tara Wattle	*Acacia lauta*	V	V	PMST	Localities are characterized by a gently undulating to flat landforms. Soils are moderately deep and hard setting with a weakly acidic to neutral sandy loam surface grading into neutral to alkaline sandy clay subsoil. The vegetation varies from open forest to low woodland with a dense or moderately dense shrub layer. Tree species present at all sites include Callitris glaucophylla (White Cypress Pine) and Allocasuarina luehmannii (Buloke) (SPRAT Profile).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
Waaje Wattle	*Acacia barakulensis*	-	V	WildNet	Found on yellowish sandy soils, described as pale loamy-sand over sandstone (Marburg Formation-sandstone). The species grows in similar habitat to the more common A. gittinsii, consisting of tall shrubland with Eucalypt emergents or shrubby woodland with Acacia sp. (e.g. probably A. johnsonii var. althoferi). Associated species include Eucalyptus tenuipes, Corymbia trachyphloia, Calytrix gurulmundensis, and Triodia mitchellii (Queensland Herbarium, 2011).	**Possibly Occurring.** This species is only known from five populations within Barakula State Forest, with the nearest record located 18 km to the north-east of the amendment area.
Winged Pepper-cress	*Lepidium monoplocoides*	E	-	PMST	Lepidium monoplocoides is widely distributed on the inland plains of south-eastern Australia, occurring from northern NSW to western	**Unlikely to Occur.** Whilst suitable habitat is present within the Study

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					Victoria, with an old record from south-eastern SA. The species occurs in the Murray Darling Depression, Diverina, Darling Riverine Plains and Cobar Peneplain Bioregions. This species occurs in open, sparsely vegetated sites in a range of habitats on heavy clay or clay-loam soils, usually on sites that are seasonally flooded or prone to waterlogging, in arid to semi-arid areas with an average rainfall range of 200-450 mm per year. Vegetation communities in which the species occurs include grasslands, wetlands and floodplain woodlands dominated by Eucalyptus coolabah and Eucalyptus largiflorens, and chenopod shrublands dominated by Atriplex, Maireana and/or Nitraria species. Locations where this species occurs tend to be ephemeral, and it may be an opportunistic species able to take advantage of seasonally available habitat (National Recovery Plan).	area, there are no nearby historical records in the vicinity.
	Acacia wardellii	-	NT	WildNet	*Acacia wardellii* is known from south of Roma, south-west of Chinchilla and the Thomby Range in south-east QLD. In the Thomby Range, the species has been collected near Rocky Glen Homestead, Glenmore in the Silver Springs Gas Field, and in an area ranging from 15 km east-north-east to 15 km east-south-east of Condamine. It has also been collected 16 km west of Inniscraig Homestead south of Roma, near Binjour south-east of Eidsvold and Rockwood Station, 36 km south-east of Chinchilla. This species grows in gravelly soil on shallow weathered sandstone in eucalypt woodland and has been recorded from disturbed and recently burnt areas. The species has been described from tall open forest with Corymbia trachyphloia, C. intermedia, Eucalyptus major, E. cloeziana with a sparse Allocasuarina torulosa shrub layer (QLD - Species Profile).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
	Apatophyllum teretifolium	-	NT	WildNet	*Apatophyllum teretifolium* occurs in Expedition Range, just west of Expedition Range State Forest; Expedition National Park north-west of Taroom; Carnarvon National Park north-north-west of Injune; Lonesome National Park north-east of Injune; Barakula State Forest near Chinchilla and Nour Nour National Park north-west of Gayndah. This species is found in: woodland consisting of Eucalyptus decorticans and/or Acacia shirleyi, with Callitris endlicheri and sometimes with E. cloeziana, Corymbia hendersonii and E. exserta; woodland of Corymbia	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					citriodora, C. watsoniana and Eucalyptus mediocris on sandstone; low woodland of Eucalyptus tenuipes, C. trachyphloia on shallow sandy soil; and Corymbia hendersonii, Syncarpia glomulifera, Allocasuarina littoralis woodland with a dense shrubby understorey including Xylomelum cunninghamianum, Banksia collina, Persoonia sp. and Xanthorrhoea sp. Apatophyllum teretifolium occurs on steep rocky slopes around the tops and bases of cliff lines and on the ends of rocky spurs (SPRAT Profile)	
	Aphyllorchis anomala	-	NT	WildNet	The Pauper Orchid occurs in north-eastern QLD, mainly from Rossville to the Atherton Tableland, in Finch Hatton George and in Conway Range near Airlie Beach. This species grows at lower altitudes in rainforests, where it occurs in moist shady locations adjacent to streams. It is typically found in sandy soils or loams rich in decaying vegetation (Australian Tropical Rainforest Orchids).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
	Cryptandra ciliata	-	NT	WildNet	*Cryptandra ciliata* grows in woodland on sandstone ridges and slopes from the Barakula State Forest to near Theodore in south-east QLD (Atlas of Living Australia).	**Known to Occur.** Suitable habitat is present within the Study area and records have been identified within the Study area.
	Eucalyptus pachycalyx subsp. waajensis	-	E	WildNet	*Eucalyptus pachycalyx* subsp. *waajensis* is known from three sites between Miles, Taroom, Eidsvoid and west of Springsure in QLD and also in Grafton, NSW. This species grows in woodland communities, on hillsides and ridge tops on shallow, sandy soils derived from sandstone and granite (QLD - Species Profile).	**Possibly Occurring.** Limited suitable habitat is present within the Study area and nearby historical records have been identified in Barakula State Forest.
	Eucalyptus sideroxylon subsp. improcera	-	V	WildNet	*Eucalyptus sideroxylon* subsp. *improcera* is known only from the Waaje area of Barakula State Forest about 70 km north-north-west of Chinchilla. Here it is confined to a sandy lateritised plateau supporting heathland and shrubland with scattered emergent eucalypts. The associated eucalypts are E. panda, E. pachycalyx subsp. waajensis, Corymbia trachyphloia subsp. trachyphloia and C. bloxsomei (Bean, 2010b).	**Possibly Occurring.** Limited suitable habitat is present within the Study area and nearby historical records have been identified in Barakula State Forest.
	Eucalyptus virens	V	V	PMST	Eucalyptus virens has a very limited distribution in southern Queensland and is currently known from 5 locations scatters over a distance of approximately 500km. Locations include near Inglewood, Tara, north-east of Eidsvold and the scarp on approach to the Maranoa River near	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity. Impacts on

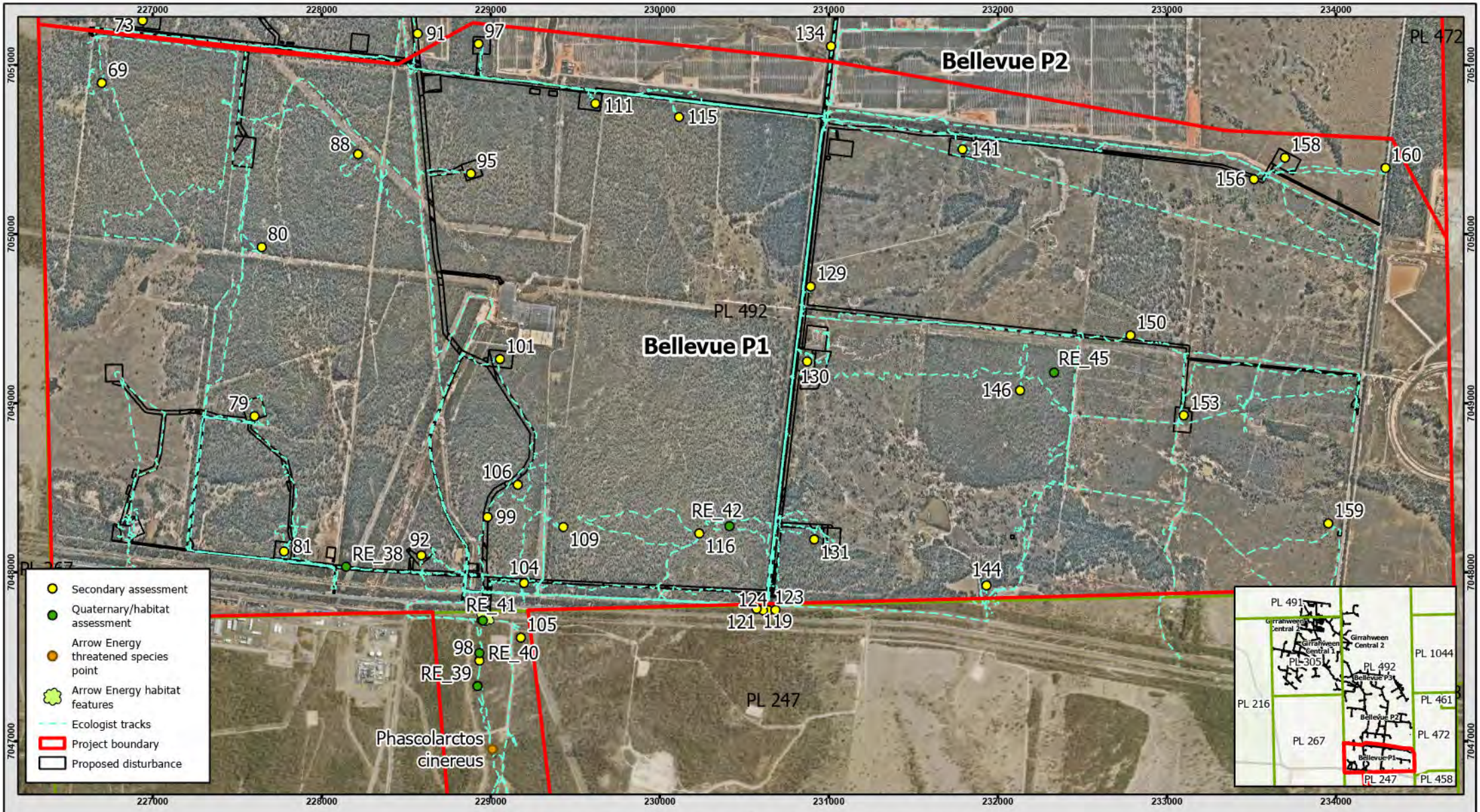
Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					Mt Moffatt, 10km east-south-east of Brovinia, north of Binjour and north-west of Injune. This species occurs on sandy soils on low rises, hillslopes, sandstone escarpments and scree slopes. This species grows in woodland communities (QLD - Species Profile).	habitat for this species are approved under EPBC 2010/5344.
	Fimbristylis vagans	-	E	WildNet	A sedge to 80cm tall that fringes ephemeral watercourses and lagons on alluvium (No Reference).	**Unlikely to Occur.** No suitable habitat is present within the Study area and no nearby historical observations have been identified.
	Homoranthus decumbens	E	V	PMST, WildNet	*Homoranthus decumbens* occurs in QLD where it is restricted to Barakula State Forest near Chinchilla. This population consists of approximately 50 plants. This species occurs on flat country on deep sandy soils with lateritic pebbles, in heath and shrubby woodland. Regional Ecosystems likely to support this species include 11.7.5, 11.7.5a, 11.7.5b and 11.5.21 (SPRAT Profile).	**Unlikely to Occur.** Similar habitat is present in the Study area, although extensive field survey did not identify any populations of this distinctive tree species. The nearest records are from Barakula State Forest, approximately 29 km to the north-east.
	Melaleuca groveana	-	NT	WildNet	Melaleuca groveana has a fragmented distribution from Port Stephens NSW to the Blackdown Tableland in central QLD. This species grows on exposed rocky ridges, high mountain slopes and the summits of mountains, at altitudes between 340-600m ASL. It generally occurs in heaths and eucalypt woodlands and forests with heath understoreys. It is also found in tall open forest with a grassy understory and in microphyll vine forest. It has been recorded growing on red sandy loams, skeletal rocky soils and sandy soils over sandstone rock (QLD - Species Profile).	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified in Barakula State Forest.
	Micromyrtus patula	-	E	WildNet	Micromyrtus patula is only known from the type locality at Barakula State Forest. This species grows in heathland on an almost flat, rocky platform of laterised sandstone on skeletal soil. It is associated with stunted specimens of Eucalyptus excerta and E. tenuipes, as well as Kardomia jucunda, Acacia julifera subsp. julifera, Seringia cololata and Melaleuca thymifolia (DES - Species Search, 2020).	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified in Barakula State Forest.
	Philotheca sporadica	-	NT	PMST, WildNet	Philotheca sporadica is known from the south-east QLD just north of Tara to approximately 12 km east of Kogan in the Darling Downs Pastoral District. In 1995 the QLD herbarium had recorded 11	**Possibly Occurring.** Suitable habitat is present within the Study area and

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
					populations and at least four have subsequently included. Within the Condamine River catchment this species occurs on soils derived from low fertility laterised Cretaceous sandstones in undulating to flat top or rounded hills. It is associated with open shrubland to closed shrubland to closed woodland dominated by Allocasuarina inophloia, Angophora leiocarpa, Callistris endlicheri, Callistris glaucophylla, Eucalyptus crebra, Corymbia watsoniana, Eucalyptus exerta, Eucalyptus fibrosa, E. fibrosa subsp. nubillis and Lysicarpus angustifolius (SPRAT, 2022).	nearby historical records have been identified.
	Polianthion minutiflorum	V	V	PMST	Polianthion minutiflorum is known from Redcliffe vale, about 110 km west of Mackay, south to Kingaroy, covering a distance of approximately 800 km. This species is usually found in forest and woodland on sandstone slopes and gullies with skeletal soil, or sometimes deeper sands adjacent to deeply weathered laterite (www.des.qld.gov.au/species-search).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
	Rutidosis glandulosa	-	NT	WildNet	*Rutidosis glandulosa* is known from approximately 15 populations across 6 distinct localities. This species occurs as far north as the Blackdown Tableland national Park, where 5 populations have been recorded. There is also one population just south on the Planet Downs Pastoral Holding. Other locations include Carnarvon Gorge National Park and just south on the Carnarvon Range, Gwambagwine, Barakula State Forest and Thulimbah. This species generally occurs on sandy or gravelly well drained soil in grassy open eucalypt woodland. Around Blackdown National Park, this species was observed growing in open forest dominated by Eucalyptus interstans, E. sphaerocarpa and Angophora leiocarpa. It has also been recorded in dense woodland, within spinifex heathland and open forests dominated by Corymbia citriodora, Eucalyptus crebra, Allocasuarina luehmannii with herby understories (QLD - Species Profile).	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified.
	Solanum stenopterum	-	V	WildNet	Solanum stenopterum is patchily distributed across the Darling Downs in QLD from Gayndah south to Goondiwindi, west to Jackson and east to Oakey. It inhabits grassland or woodlands of belah and poplar box on black, brown or red clay loam soils. It also grows on loamy ridges, along roadsides and in paddocks (www.des.qld.gov.au/species-search).	**Possibly Occurring.** Suitable habitat is present within the Study area and nearby historical records have been identified.

Common Name	Scientific Name	EPBC Status	NC Status	Source	Habitat Description	Likelihood of Occurrence
	Vincetoxicum forsteri	E	E	PMST	Vincetoxicum forsteri has rarely been collected and is known from eight localities in the Dubbo area and Mt Crow near Barraba in NSW, and "Myall Park" near Glenmorgan in QLD. This species is also conserved within Goobang National Park, Eura State Forest, Goonoo State Forest, Pilliga West State Forest and Coolbaggie Nature Reserve. This species grows in dry scrub, open forest and woodlands and overlaps with the distribution of the Brigalow and White Box-Yellow Box-Blakely's Red Gum Threatened Ecological Communities (Approved Conservation Advice, 2008).	**Unlikely to Occur.** Whilst suitable habitat is present within the Study area, there are no recent historical records in the vicinity.
	Westringia parvifolia	V	V	PMST	Westringia parvifolia is known from four collections near Yelarbon, Inglewood and Woondiwindi in south-west QLD and from near Yetman in northern NSW. This species grows with Baker's Mallee (Eucalyptus bakeri) and Green Malle (E. viridis) and between clumps of Spinifex on sandy and stony soils (SPRAT, 2022).	**Unlikely to Occur.** This species is known only from four collections located over 100 km to the south of the Study area. Inclusion only based on modelled distribution within PMST which appears to be contrary to the conservation advice for this species. There are no nearby records.
	Xerothamnella herbacea	E	E	PMST, WildNet	Xerothamnella herbacea is known from two sites north-east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, QLD. This species occurs in Brigalow dominated communities in shaded situations, often in leaf litter and is associated with gilgais (SPRAT, 2022).	**Possibly Occurring.** While there is (limited) suitable habitat in the Study area, the nearest record for this species is from 41 km to the east (ALA, 1984). Impacts on 110 ha of habitat for this species are approved under EPBC 2010/5344.

Appendix E

Ecological Field Survey (EFS) sheets



Bellevue Part 1 - Ecological Survey Extent

Source:
Arrow Energy Pty Ltd
Geoscience Australia
DNRME

Date:22/03/2024
Issued To: Tom Casey
Author: Holly Morecroft

Kilometers
0 1 2

Coordinate System: GDA2020 MGA Zone 56 Scale 1:30,000 @ A4

N

arrow energy
go further

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Note: The dimensions, areas, number of lots, size and location of corridor information are approximate only and may vary.

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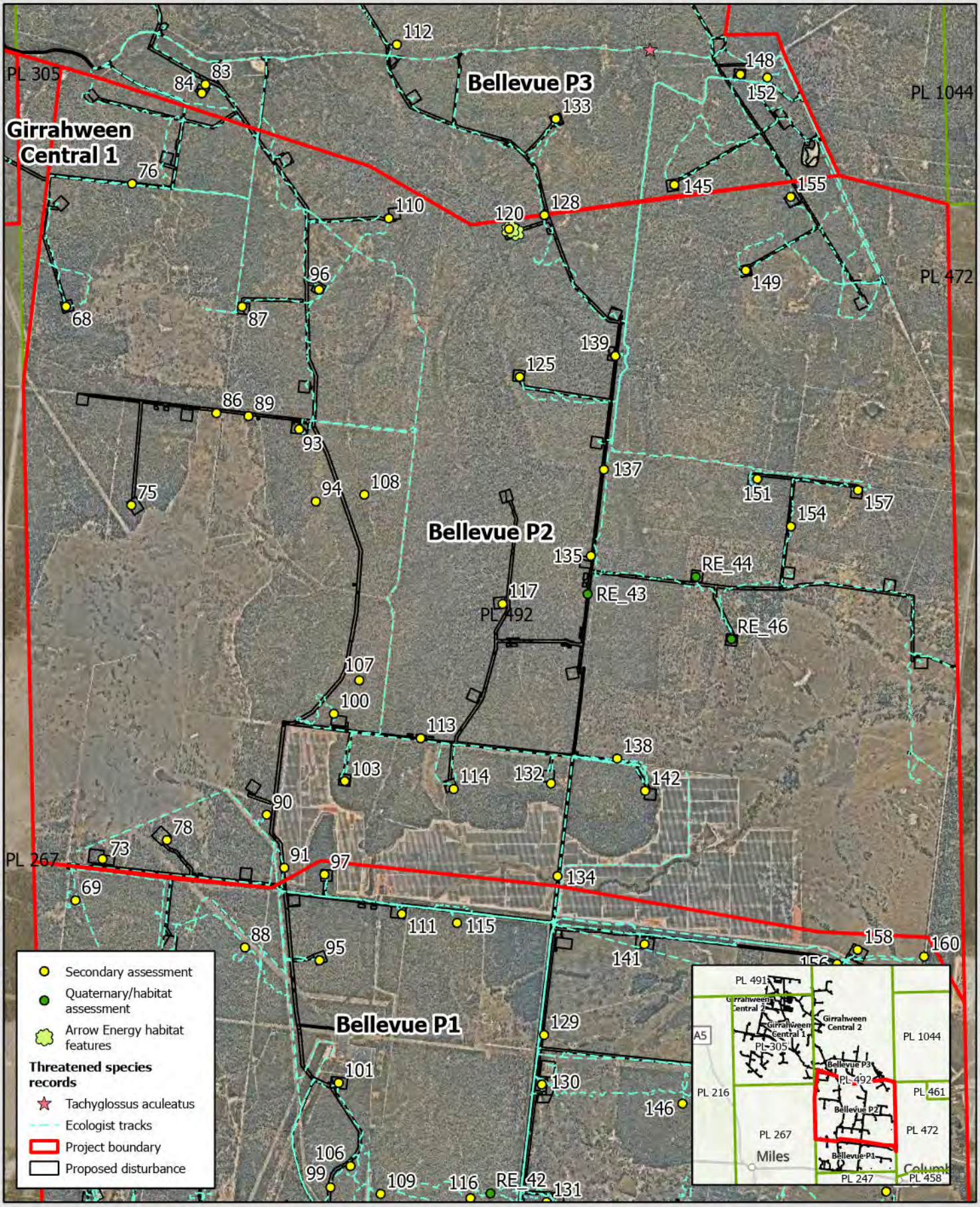

Bellevue Part 2 - Ecological Survey Extent

Source:
Arrow Energy Pty Ltd
Geoscience Australia
DNRME

Date:22/03/2024
Issued To: Arrow Energy
Author: Arrow Energy

0 1 2
Kilometres
Scale 1:45,000 @ A4
Coordinate System: GDA2020 MGA Zone 56

N

arrow energy go further

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Note: The dimensions, areas, number of lots, size and location of corridor information are approximate only and may vary.

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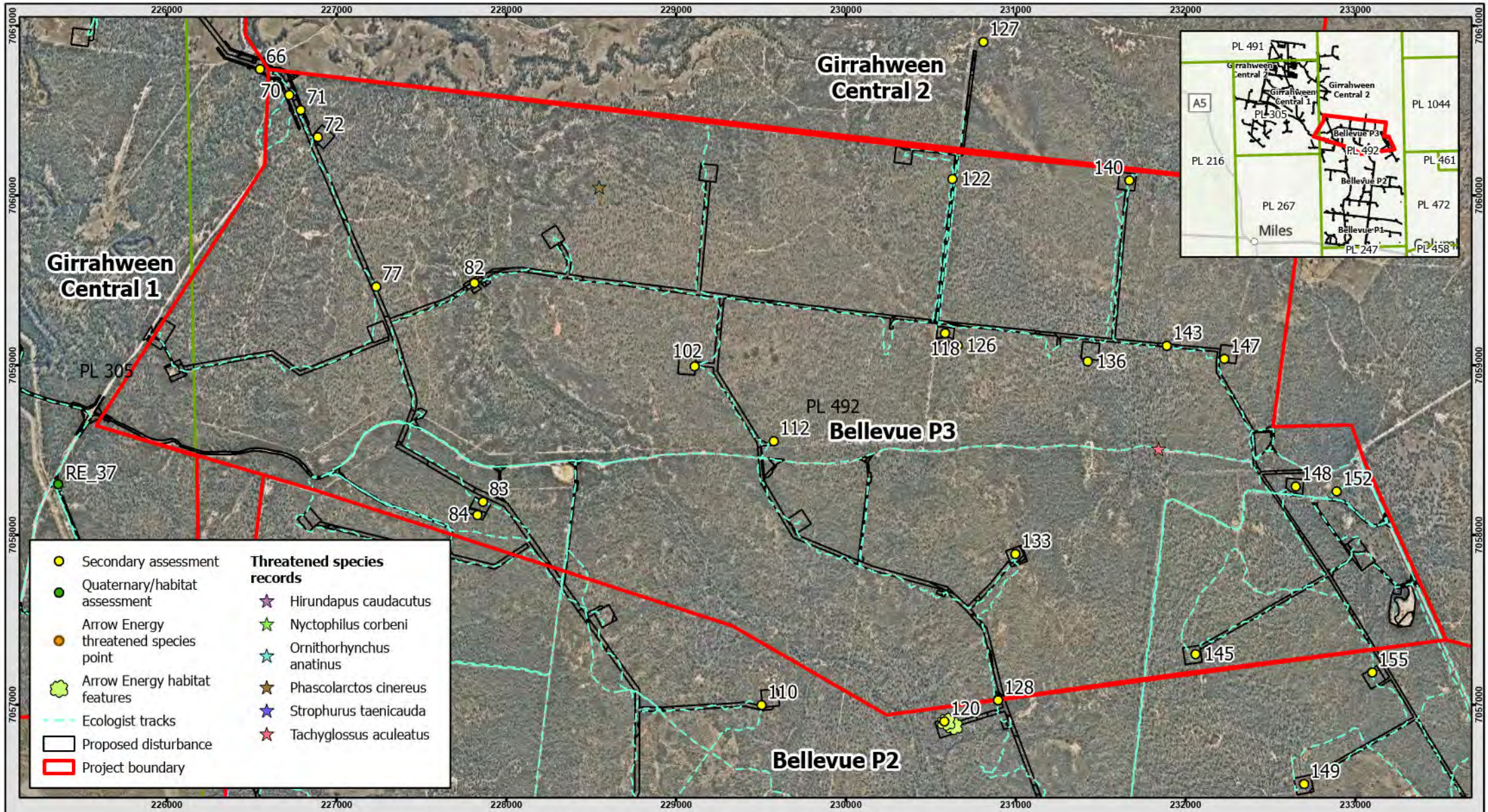

Bellevue Part 3 - Ecological Survey Extent

Source:
Arrow Energy Pty Ltd
Geoscience Australia
DNRME

Date:22/03/2024
Issued To: Tom Casey
Author: Holly Morecroft

0 1 2 Kilometers

Coordinate System: GDA2020 MGA Zone 56 Scale 1:30,000 @ A4

N

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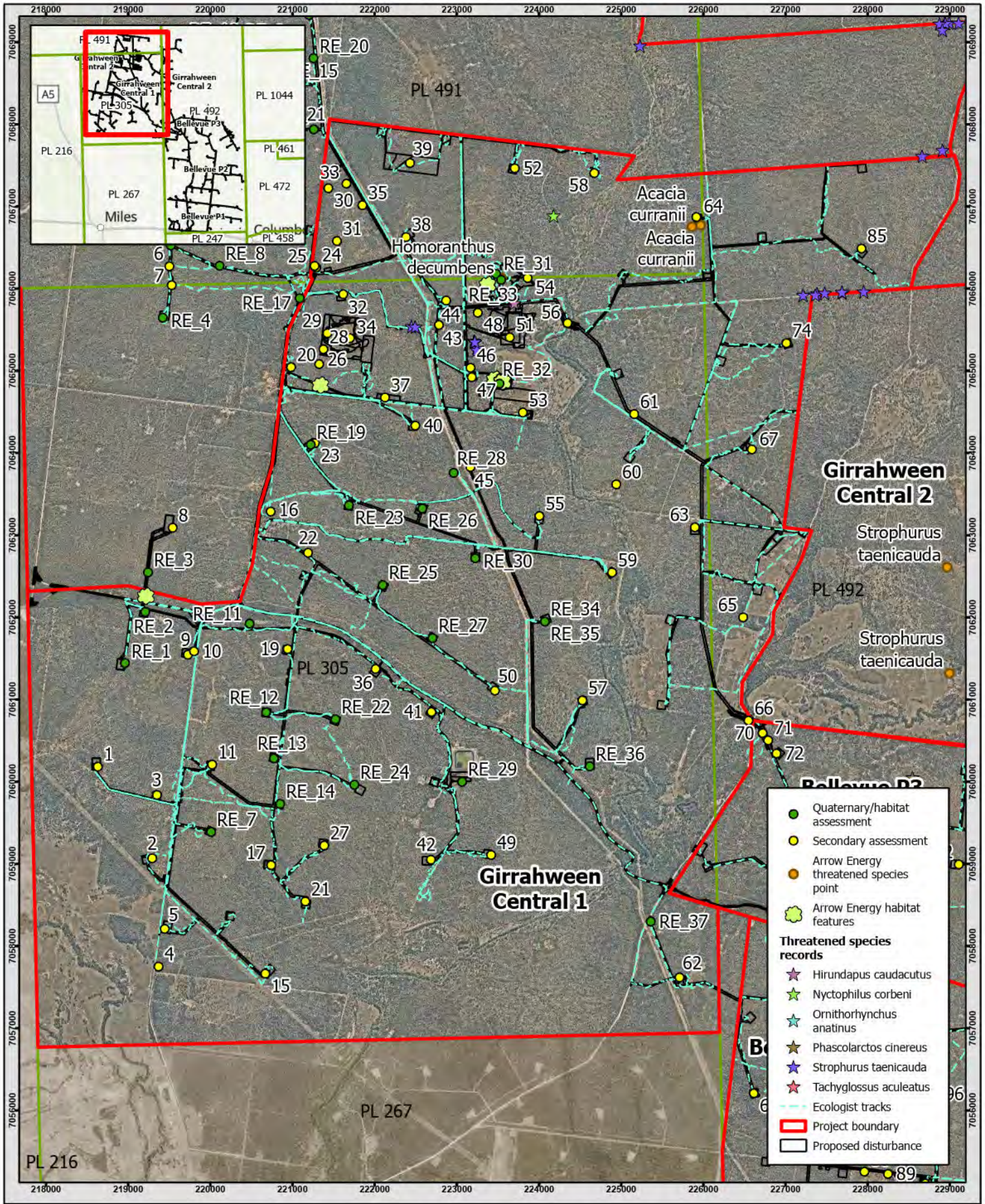

Girrahween Central Part 1 - Ecological Survey Extent

Source:
Arrow Energy Pty Ltd
Geoscience Australia
DNRME

Date:22/03/2024
Issued To: Arrow Energy
Author: Arrow Energy

Kilometres
Scale 1:60000 @ A4
Coordinate System: GDA2020 MGA Zone 56

N

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Note: The dimensions, areas, number of lots, size and location of corridor information are approximate only and may vary.

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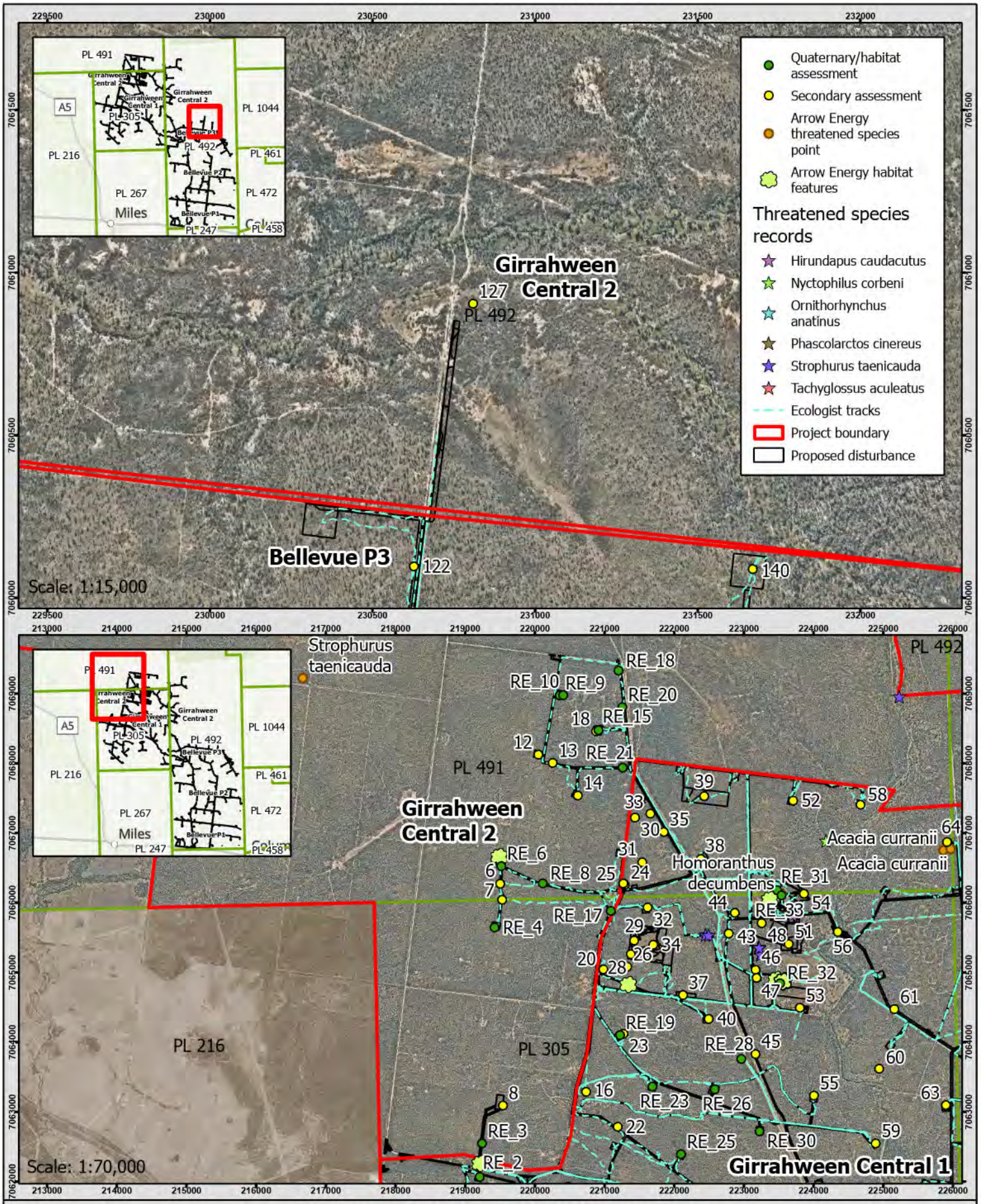
ARROW ENERGY - SURAT GAS PROJECT



Girrahween Central 2 - Ecological Survey Extent

Source:
Arrow Energy Pty Ltd
Geoscience Australia
DNRME

Date:22/03/2024
Issued To: Arrow Energy
Author: Arrow Energy

Kilometres

Coordinate System: GDA2020 MGA Zone 56

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Secondary Data

Label	Date	File Name
1	2023-05-03	1_Girrahween Central P2
2	2023-05-02	2_Girrahween Central P2
3	2023-05-03	3_Girrahween Central P2
4	2021-10-26	4_Castledean 101 Access
5	2021-10-26	5_Castledean 101
6	2023-08-23	6_GirrahweenP2_OC11.3.4_WP200
7	2023-08-23	7_GirrahweenP2_Gathering_System_WP200
8	2023-08-23	8_GirrahweenP2_WP190
9	2023-05-03	9_Girrahween Central P2
10	2023-08-22	10_GirrahweenP1_Access_track_WP101
11	2023-05-04	11_Girrahween Central P2
12	2023-08-24	12_GirrahweenP2_WP115
13	2023-08-24	13_GirrahweenP2_GatherginSystem_WP115
14	2023-08-24	14_GirrahweenP2_WP240
15	2023-05-09	15_Girrahwenn Central P2
16	2023-04-19	16_Girrahween Central P1
17	2023-05-10	17_Girrahwenn Central P2
18	2023-08-24	18_GirrahweenP2_WP239
19	2023-05-04	19_Girrahween Central P2
20	2023-04-11	20_Girrahween Central P1
21	2023-05-10	21_Girrahwenn Central P2
22	2023-05-31	22_Girrahween Central P-1
23	2023-04-17	23_Girrahween Central P1
24	2022-12-07	24_Girrahween Geotech
25	2021-10-26	25_Yeronga 101 Camp
26	2022-12-07	26_Girrahween Geotech
27	2023-05-10	27_Girrahwenn Central P2
28	2022-12-07	28_Girrahween Geotech
29	2023-05-19	29_Girrahween Central P2

Label	Date	File Name
30	2021-10-26	30_Yeronga 101 Access
31	2023-02-28	31_Girrahween FCS
32	2023-04-11	32_Girrahween Central P1
33	2023-02-28	33_Girrahween FCS
34	2023-05-19	34_Girrahween Central P2
35	2023-02-28	35_Girrahween FCS
36	2023-05-05	36_Girrahween Central P2
37	2023-05-15	37_Girrahween Central P2
38	2023-04-12	38_Girrahween Central P1
39	2023-05-31	39_Girrahween Central P-1
40	2023-04-17	40_Girrahween Central P1
41	2023-05-08	41_Girrahwenn Central P2
42	2023-05-09	42_Girrahwenn Central P2
43	2023-04-12	43_Girrahween Central P1
44	2023-04-12	44_Girrahween Central P1
45	2023-08-24	45_GirrahweenP1_GatheringSystem_Reassessment
46	2023-03-01	46_Girrahween FCS
47	2023-04-12	47_Girrahween Central P1
48	2023-03-01	48_Girrahween FCS
49	2023-05-08	49_Girrahwenn Central P2
50	2023-04-18	50_Girrahween Central P1
51	2022-12-07	51_Girrahween Geotech
52	2023-04-12	52_Girrahween Central P1
53	2023-04-12	53_Girrahween Central P1
54	2023-08-25	54_GirrahweenP1_Quarry
55	2023-04-19	55_Girrahween Central P1
56	2023-03-01	56_Girrahween FCS
57	2023-04-18	57_Girrahween Central P1
58	2023-04-12	58_Girrahween Central P1
59	2023-04-18	59_Girrahween Central P1
60	2023-04-04	60_Girrahween Central P1
61	2023-03-09	61_Bellevue
62	2023-05-09	62_Girrahwenn Central P2
63	2023-04-04	63_Girrahween Central P1
64	2023-04-05	64_Girrahween Central P1
65	2023-04-03	65_Girrahween Central P1
66	2023-03-10	66_Bellevue
67	2023-04-04	67_Girrahween Central P1
68	2022-02-22	68_Alderley 229
69	2020-11-04	69_Alderley 111
70	2022-02-14	70_11.3.25-1
71	2022-02-14	71_11.3.2-1
72	2022-02-14	72_Alderley 248
73	2022-03-15	73_Alderley 123 Option
74	2023-04-04	74_Girrahween Central P1
75	2022-03-14	75_Alderley 201-203
76	2022-04-13	76_ROW Lot848BWR739
77	2022-02-14	77_Disturbed 11.5.1-1
78	2022-03-15	78_Alderley 124
79	2020-11-03	79_Alderley 104
80	2020-11-03	80_Alderley 107

Label	Date	File Name
81	2020-11-03	81_Alderley 102
82	2022-02-15	82_11.3.25-2
83	2022-02-22	83_Alderley 246
84	2023-08-22	84_Bellevue3_WP246_Reassessment
85	2023-04-05	85_Girrahween Central P1
86	2022-03-14	86_Cleared-1
87	2022-02-22	87_Alderley 230
88	2020-11-04	88_Alderley 110
89	2022-03-16	89_Cleared Shrubby-1
90	2023-03-08	90_Bellevue
91	2020-06-23	91_Gathering south of Alderley 181
92	2020-11-05	92_Alderley 101
93	2023-05-29	93_Bellevue Part 2
94	2022-03-16	94_Alderley 197
95	2020-11-05	95_Alderley 148
96	2022-02-22	96_Alderley 214
97	2020-06-23	97_Alderley 149
98	2021-08-19	98_Regrowth 11.7.4-2
99	2021-08-19	99_Regrowth 11.7.4-1
100	2023-05-29	100_Bellevue Part 2
101	2020-11-05	101_Alderley 117 (multi wll pad)
102	2022-02-15	102_Alderley 244
103	2020-06-24	103_Alderley 183
104	2020-11-05	104_HDD Pad Warrego Highway
105	2020-11-09	105_McNulty EWA South of Warrego Hwy
106	2021-08-19	106_RE 11.7.4-1
107	2022-03-16	107_Alderley 192
108	2022-03-16	108_11.3.14-1
109	2020-11-11	109_Alderley 133
110	2022-02-24	110_Alderley 213
111	2021-04-29	111_Well Pad Option
112	2022-02-15	112_11.5.1-1
113	2022-03-17	113_11.7.2-1
114	2020-06-24	114_Alderley 186
115	2020-11-11	115_Alderley 151-154
116	2020-11-11	116_Alderley 134
117	2022-04-12	117_Alderly 223
118	2021-10-26	118_Alderley 251 Camp
119	2023-07-20	119_Warrego HWY-Kerwicks Rd Intersection
120	2023-08-22	120_Bellevue2_WP217_Reassessment
121	2023-07-20	121_Warrego HWY-Kerwicks Rd Intersection
122	2022-02-15	122_11.5.1-2
123	2023-07-20	123_Warrego HWY-Kerwicks Rd Intersection
124	2023-07-20	124_Warrego HWY-Kerwicks Rd Intersection
125	2022-02-24	125_Alderley 219
126	2022-12-08	126_Alderly 242
127	2021-10-26	127_Alderley 251
128	2022-02-23	128_11.7.2-1
129	2021-04-29	129_Gathering North of Alderley 137-139
130	2020-11-03	130_Alderley 138 (multi wll pad)
131	2020-11-02	131_Alderley 135 (re-located).

Label	Date	File Name
132	2020-06-24	132_Alderley 187
133	2022-02-23	133_Alderley 216
134	2022-03-17	134_Kerwick Rd Upgrades
135	2022-04-12	135_Alderly 221
136	2022-12-08	136_Alderly 240
137	2022-04-12	137_ROW Lot748BWR294
138	2023-06-01	138_Bellevue Part 2
139	2022-02-23	139_11.7.6-1
140	2022-02-16	140_11.5.1-3
141	2020-11-03	141_Alderley 161-4 (multi wll pad)
142	2020-06-24	142_Alderley 189
143	2022-02-15	143_11.7.7-1
144	2020-11-02	144_Access track Bellevue Pt1
145	2022-02-17	145_Alderley 236
146	2020-11-03	146_Alderley 142
147	2022-02-16	147_Alderley 238
148	2022-02-17	148_Alderley 237
149	2022-02-17	149_Alderley 234
150	2023-03-07	150_Bellevue
151	2023-05-30	151_Bellevue Part 2
152	2022-02-17	152_Regrowth 11.5.1a
153	2020-11-06	153_Alderley 143
154	2023-05-30	154_Bellevue Part 2
155	2022-02-17	155_Alderley 235
156	2020-11-11	156_Tie-in East of Alderley 161-164
157	2023-05-30	157_Bellevue Part 2
158	2020-06-23	158_Alderley 171-174
159	2020-11-06	159_Alderley 147
160	2020-06-23	160_Turnout east of Alderley 170s

Quaternary Data

Date	Label	File Name
2023-05-03	RE_1	RE_1_Girrahween Central P2
2023-05-03	RE_2	RE_2_Girrahween Central P2
2023-08-23	RE_3	RE_3_GirrahweenP2_WP190_RE
2023-08-23	RE_4	RE_4_GirrahweenP2_WP200
2023-08-23	RE_6	RE_6_Koala Survey_WP330
2023-05-03	RE_7	RE_7_Girrahween Central P2
2023-08-23	RE_8	RE_8_GirrahweenP2_GatheringSystem_WP330_RE
2023-08-24	RE_9	RE_9_GirrahweenP2_WP241_RE
2023-08-24	RE_10	RE_10_Koala_Survey_WP241
2023-05-03	RE_11	RE_11_Girrahween Central P2
2023-05-04	RE_12	RE_12_Girrahween Central P2
2023-05-04	RE_13	RE_13_Girrahween Central P2
2023-04-04	RE_14	RE_14_Girrahween Central P2
2023-08-24	RE_15	RE_15_Koala Survey_WP239

Label	Date	File Name
2023-08-23	RE_17	RE_17_GirrahweenP2_GatheringSystem_WP234_RE
2023-08-24	RE_18	RE_18_Koala Survey _GS_WP239
2023-05-31	RE_19	RE_19_Girrahween Central P-1
2023-08-24	RE_20	RE_20_GirrahweenP2_GatheringSystem_WP239
2023-08-24	RE_21	RE_21_GirrahweenP2_GatheringSystem_WP240
2023-05-04	RE_22	RE_22_Girrahween Central P2
2023-04-19	RE_23	RE_23_Girrahween Central P1
2023-05-04	RE_24	RE_24_Girrahween Central P2
2023-04-18	RE_25	RE_25_Girrahween Central P1
2023-04-19	RE_26	RE_26_Girrahween Central P1
2023-04-18	RE_27	RE_27_Girrahween Central P1
2023-08-24	RE_28	RE_28_GirrahweenP1_OC_Reassessment
2023-05-15	RE_29	RE_29_Girrahween Central P2
2023-04-18	RE_30	RE_30_Girrahween Central P1
2023-05-31	RE_31	RE_31_Girrahween Central P-1
2023-05-15	RE_32	RE_32_Girrahween Central P2
2023-08-25	RE_33	RE_33_GirrahweenP1_Quarry_RE
2023-04-18	RE_34	RE_34_Girrahween Central P1
2023-04-18	RE_35	RE_35_Girrahween Central P1
2023-04-17	RE_36	RE_36_Girrahween Central P1
2023-08-22	RE_37	RE_37_GirrahweenP1_Access_Track
2020-11-05	RE_38	RE_38_Gathering E of Alderley 106
2023-10-25	RE_39	RE_39_McNulty-Pipeline-Koala Survey-02
2023-10-25	RE_40	RE_40_McNulty-Pipeline-RE-01
2023-10-25	RE_41	RE_41_McNulty-Pipeline-Koala Survey-01
2020-11-12	RE_42	RE_42_Alderley 133 and 134 Gathering
2022-04-13	RE_43	RE_43_<Null>
2023-05-30	RE_44	RE_44_Bellevue Part 2
2020-11-03	RE_45	RE_45_Possible multi well pad
2023-05-30	RE_46	RE_46_Bellevue Part 2

Arrow Energy Threatened Species Points

OBJECTID	Date time Submitted	Scientific Name	Common Name	Collector Expertise
1	2012-08-31 14:57	Strophurus taenicauda	Golden-tailed Gecko	Specialist
2	2012-08-31 14:59	Strophurus taenicauda	Golden-tailed Gecko	Specialist
3	2012-08-31 15:01	Strophurus taenicauda	Golden-tailed Gecko	Specialist
4	2013-09-09 15:37	Acacia curranii	Curly-bark Wattle	Ecologist - flora
5	2013-09-09 15:38	Acacia curranii	Curly-bark Wattle	Ecologist - flora
6	2013-09-09 15:40	Homoranthus decumbens		Ecologist - flora
7	2023-11-07 0:11	Phascolarctos cinereus	Koala	Ecologist
8	2023-11-07 0:11	Phascolarctos cinereus	Koala	Ecologist
9	2023-11-07 0:11	Phascolarctos cinereus	Koala	Ecologist

Habitat Features

OBJECTID	Date time Submitted	Habitat Feature Type	Comments Notes
1	2013-09-05 11:52	Hollow-bearing tree	Large mature Eucalyptus populnea with hollows
2	2013-09-05 11:56	Burrow	
3	2016-03-18 10:44	Habitat tree (Alive)	Mature tree - avoid if possible
4	2016-03-18 10:45	Habitat tree (Alive)	Mature tree - avoid if possible
5	2016-03-18 10:45	Habitat tree (Alive)	Mature tree - avoid if possible
6	2016-03-18 10:45	Habitat tree (Alive)	Mature tree - avoid if possible
7	2016-03-18 10:46	Other	Grass tree (type A plant) - avoid if possible
8	2016-03-18 10:47	Other	Grass tree (type A plant) - avoid if possible
9	2016-03-18 10:47	Other	Grass tree (type A plant) - avoid if possible
10	2016-03-18 10:47	Other	Grass tree (type A plant) - avoid if possible
11	2016-03-18 10:47	Other	Grass tree (type A plant) - avoid if possible
12	2016-03-18 10:48	Other	Grass tree (type A plant) - avoid if possible
13	2016-03-18 10:48	Other	Grass tree (type A plant) - avoid if possible
14	2016-03-18 10:48	Other	Grass tree (type A plant) - avoid if possible
15	2016-03-18 10:49	Other	Grass tree (type A plant) - avoid if possible
16	2016-03-18 10:49	Other	Grass tree (type A plant) - avoid if possible
17	2016-03-18 10:49	Other	Grass tree (type A plant) - avoid if possible
18	2016-03-18 10:49	Other	Grass tree (type A plant) - avoid if possible
19	2016-03-18 10:50	Other	Grass tree (type A plant) - avoid if possible
20	2016-03-18 10:50	Other	Grass tree (type A plant) - avoid if possible
21	2016-03-18 10:50	Other	Grass tree (type A plant) - avoid if possible
22	2016-03-18 10:51	Other	Grass tree (type A plant) - avoid if possible
23	2023-09-04 1:27	Log	Approx. 2m log in the ground
24	2023-09-04 1:30	Log	Approx. 3m log in the ground
25	2023-09-04 1:33	Stag	Stag with a hole (>50cm) in middle
26	2023-09-04 1:35	Stag	Stag with a central hollow (<50 cm)
27		Hollow-bearing tree	Eucalyptus crebra
28		Stag	Hollow on stag
29		Hollow-bearing tree	Eucalyptus crebra with a hollow > 50 cm
30		Hollow-bearing tree	Eucalyptus crebra with a hollow > 50 cm
31		Hollow log	
32		Hollow-bearing tree	Eucalyptus crebra with a hollow > 50 cm
33		Hollow log	
34		Hollow log	

Threatened Species Records

OBJECTID	Scientific Name	Data Resource Name	Year
1	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
2	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
3	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
4	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
5	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
6	Tachyglossus aculeatus	WildNet - Queensland Wildlife Data	2009
7	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
8	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
9	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
10	Ornithorhynchus anatinus	WildNet - Queensland Wildlife Data	2010
11	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
12	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
13	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
14	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
15	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
16	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
17	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
18	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
19	Strophurus taenicauda	ALA species sightings and OzAtlas	2011
20	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
21	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
22	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
23	Nyctophilus corbeni	WildNet - Queensland Wildlife Data	2013
24	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
25	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
26	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013

OBJECTID	Scientific Name	Data Resource Name	Year
27	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
28	Hirundapus caudacutus	WildNet - Queensland Wildlife Data	2013
29	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
30	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
31	Strophurus taenicauda	WildNet - Queensland Wildlife Data	2013
32	Phascolarctos cinereus	WildNet - Queensland Wildlife Data	1987

Koala Survey Datasheet

Site:	Date: 24/08/23	Lat:	Long:
Vegetation community description: 56J 220913 7066475 11.7.2 Koala Survey wp239			

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	Percent canopy cover of each canopy tree species
1. Eucalyptus fibrosa	30
2. Callitris glaucophylla	10
3. Allocasuarina luehmannii	10
4.	
5.	
6.	
Total Canopy Cover:	50
Vegetation ground cover (% of the ground area):	60
Leaf litter cover (% of the ground area):	20
Bare ground cover (% of the ground area):	10
Area of surface water (% of the ground area):	-
Distance (m) to surface water:	-
Evidence of dogs in the area?	yes
Evidence of scratches/scats (type and age)?	n/o

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	0
Total number of trees surveyed	30
Proportion of trees with Koala scats beneath	0

Were any Koalas observed? If so, record where possible...

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	Description

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stringer Recorder: IM & NU Day/Date: Wed 03/05/23

Purpose 140 – 142 WP, Ecological site Assessment

Locality: (inc. distance/direction to nearest town) Miles

GPS: Zone 56 E 0218961 N 7061444

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		14 - 16	
T1		~~20~~ - ~~40~~	30%
T2		~~10~~ - ~~20~~ 8 - 10	50%
T3		~~1~~ - ~~10~~ 6 - 8	~~40~~ 20%
S1		-	
S2		-	
G		0.1 - 0.2	20%

Structural formation: (including height)

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
D	T1	E. Fibrosa
D	T2	A. Shirleyi
A	T3	A. leocalyx
A	T3	A. semilunata
A	T3	Acacia species ???
		Mulga fern
		Chrysopogon fallax
		Aristida

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rocks

Land system: Woodland

Landform: Clay loam > 20%

Soils: Dark brown

Field observation and notes: Dieback significant (50%)
Recent fire. Shrub layer regrowth

Landzone: 7

RE code changes

Existing RE code: 11.7.7 / 11.7.2

Proposed RE code: 11.7.7 / 11.7.2

END Photos: 8824 – 8827 (NU phone)

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stringer Recorder: HM & NU Day/Date: Wed 03/05/23

Purpose WP118

Locality: (inc. distance/direction to nearest town) Miles

GPS: Zone 56 E 0219208 N 7062067

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		16 - 18	
T1		35-40	15%
T2		-	
T3		43 - 85	30%
S1		-	
S2		-	
G		0.1 - 0.2	10%

Structural formation: (including height) Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
D	T1	E. Fibrosa
A/D	T1/T3	A. Shirleyi
A	T3	A. leiocalyx
G	A	Goodenia
G	A	Mulga fern
G	A	Chrysopogon fallax
G	D	Aristida spaput-medusae

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rocks

Land system: Woodland

Landform: Clay sandy loam

Soils: Pale brown

Field observation and notes: No T2 layer, severe Fireburn dieback > 75% of T3 affected. Photo: 8830-8833 Landzone:

RE code changes

Existing RE code: 11.7.7

Proposed RE code: 11.7.7

END No hollows but very large E. Fibrosa. Misteltoe common.

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween PZ. WP190

Site No. **Recorder:** Thiago Moura **Day/Date:** 23 Aug 23

Purpose Access track to WP190

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0219242 N 7062548

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	10	8 - 15	
T2	6	6 - 7	
T3		-	
S1	1	1 - 2	
S2	0.5	0.1 - 1	
G	0.5	0.1 - 1	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus fibrosa
T1	c	Corymbia trachyphloia
T2	s	Callitris glaucophylla
T2	a	Allocasuarina luehmanni
T2	a	Acacia shirleyi
S1	a	Acacia shirleyi
G	a	Gonocarpus urceolatus, chrysocephalum apiculatum, Aristida captus-medusaea.

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 7

RE code changes

Existing RE code: 11.7.7

Proposed RE code: 11.7.7

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Recorder: Thiago Moura Day/Date: 23 Aug 23

Purpose Well Pad 200

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0219421 N 7065646

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	20	19 - 23	S
T1	12	9 - 15	M
T2	6	4 - 8	S
T3		-	
S1	1.5	1 - 2	S
S2		-	
G		-	

Structural formation: (including height) woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus crebra
T1	c	Callitris glaucophila
T2	a	Allocasuarina luehmanni
T2	a	Acacia leiocalyx
S1	a	Acacia leiocalyx
S1	a	Acacia similunata
G	a	Dodonaea peduncularis, Eriachne mucronata, Gahnia aspera, Aristida obscura
E	a	Eucalyptus crebra

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

Koala survey WP330

Koala Survey Datasheet

Site:	Date: 23/08/2023	Lat:	Long:
Vegetation community description: 56J 219518 7066526 RE 11.5.1			

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	**Percent canopy cover of each canopy tree species**
1. *Eucalyptus crebra*	**40**
2. *Callitris glaucophylia*	**20**
3. *Allocasuarina luhemanni*	**10**
4.	
5.	
6.	
Total Canopy Cover:	**70**
Vegetation ground cover (% of the ground area):	**60**
Leaf litter cover (% of the ground area):	**30**
Bare ground cover (% of the ground area):	**10**
Area of surface water (% of the ground area):	**0**
Distance (m) to surface water:	**4000 km**
Evidence of dogs in the area?	**Yes**
Evidence of scratches/scats (type and age)?	**No**

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	**0**
Total number of trees surveyed	**30**
Proportion of trees with Koala scats beneath	**0**

Were any Koalas observed? If so, record where possible…

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	**Description**

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. CA113 Recorder: NU Day/Date: 03.05.2023

Purpose Ecological site Assessment

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0220007 N 7059389

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	13	12 - 14	
T2		-	
T3	7	6 - 8	
S1		-	
S2	0'6	0'2 - 1	
G	0'1	0'1 - 0'2	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	E. [illegible]
T1	cv	E. fibrosa
T3	s	Callitris glaucophylla
S2		A leiocalyx
G		Panicum decompositum
		Chrysopogon fallax
		Cheilanthes distan
		Aristida caput-medusae

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Open woodland

Landform: Floodplain

Soils: Sandy clay loam (Reddish)

Field observation and notes: Photos@8463-66

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween P2. Gathering System WP330

Site No. 02 **Recorder:** Thiago Moura **Day/Date:** 23. Aug 23

Purpose Gathering system

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0220113 N 7066278

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	11	8 - 16	M
T2	5	4 - 7	S
T3		-	
S1	1	1 - 2	S
S2		-	
G	0.1	0.1 - 1	M

Structural formation: (including height) Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus crebra
T1	c	Callitris glaucophilla
T2	s	Allocasuarina luehmanni
T2	a	Callitris glaucophilla
S1	a	Acacia leicalyx
G	a	Gahnia aspera, Aristida chicura, Triachne mucronata, Cheilanthes sieberi

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. **Recorder:** Thiago Moura **Day/Date:** 24 Aug 2023

Purpose Well Pad and Access track

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0220356 N 7068976

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	20	18 - 23	S
T1	14	10 - 17	M
T2	4	3 - 7	S
T3		-	
S1	1	1 - 2	S
S2		-	
G	0.5	0.1 - 1	S

Structural formation: (including height)
Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s -** subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	D	Eucalyptus fibrosa
T2	C	Callitris glaucophila
T2	A	Allocasuarina luehmanni
S1	A	Allocasuarina luehmanni

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 7

RE code changes

Existing RE code: 11.7.4

Proposed RE code: 11.7.4

END

Koala Survey Datasheet

Site:	Date: 23/08/2023	Lat:	Long:
Vegetation community description: 56J 220406 7068978 RE 11.7.4 Koala Survey _WP241			

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	**Percent canopy cover of each canopy tree species**
1. *Eucalyptus crebra*	**40**
2. *Callitris glaucophylia*	**30**
3. *Allocasuarina luhemanni*	**5**
4.Corymbia trachypholia	**5**
5.Lysicarous angustifolius	**5**
6.	
Total Canopy Cover:	**85**
Vegetation ground cover (% of the ground area):	**50**
Leaf litter cover (% of the ground area):	**30**
Bare ground cover (% of the ground area):	**10**
Area of surface water (% of the ground area):	**0**
Distance (m) to surface water:	**4000 km**
Evidence of dogs in the area?	**Yes**
Evidence of scratches/scats (type and age)?	**No**

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	**0**
Total number of trees surveyed	**30**
Proportion of trees with Koala scats beneath	**0**

Were any Koalas observed? If so, record where possible…

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	**Description**

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Thorne Recorder: HM & NU Day/Date: 03/05/23 Wed.

Purpose Access track

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0220478 N 7061924

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		10 - 12	
T1		26 - 28	
T2		12 - 20	8-10
T3		5 - 12	6-8
S1		-	
S2		1 - 5	1-2
G		0.1 - 1	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T2&3

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; **s** - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	C	E. Crebra
T1	C	E. Fibrosa
T2&3	D	A. leuhmanni
T1	A	C. Glaucophylla
S2	A	A. leucalyx
		Fimbristylis spp.
		Aristida caput medusa
		Melanis ripens
		Digitaria sanguinalis
		Dodenia triangularis
		Chrysopogon fallax

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rocks

Land system: Woodland

Landform: Clay > 20%

Soils: Pale grey / brown

Field observation and notes: Photo: 8846 – 8849

Check drainage feature/watercourse Landzone:

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Thorne Recorder: HM/NU Day/Date: Thurs

Purpose WP179, Ecological site/Structure 04/05/23

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0220679 N 7660844

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	18	16 - ~~30~~ 20	
T1	~~28~~	~~20~~ 30	15%
T2	~~18~~ 9	6 - ~~18~~ 12	30%
T3		-	
S1		1 - ~~6~~ 4	5%
S2		-	
G		0.1 - 1	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T2

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; **s** - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	D	E. Crebra
T2	D	A. leuhmanni
S1	A	A. semilunata
S1	A	C. Glaucophylla
T1	A	Eucalypt species ★
	G	Panicum paludosum
	G	Eragrostis sororia
	G	Fimbristylis sp
	G	Aristada caput-medusa

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Woodland

Landform: Clay > 20%

Soils: Orange/brown/pale

Field observation and notes: severely fire burnt – recent

photos - 8887 - 8890

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Thurne Recorder: HM & NU Day/Date: 04/05/23

Purpose WP137 Ecological site Assessment

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0220773 N 7960284

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	17	15-18	
T1	27	20-30	10%
T2	15 11	10-12 20	30%
T3		-	
S1	3	1/2 - 6	
S2		-	
G		0.1 - 1	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T2

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
D	T1	E. Crebra
D	T2	A. leunmanni
A	T2	C. Glaucophylla
A	S1	A. leiocalyx
	G	Eragrostis Sororia
	G	Aristida caput-medusa
	G	Chrysopogon fallax
	G	Fimbristylis spp

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Woodland

Landform: Clay > 20%

Soils: Pale brown

Field observation and notes: Photos: 8910 – 8913

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stimson Recorder: HM & NU Day/Date: Thurs 04/05/23

Purpose WP112, Ecological Site Assessment

Locality: (inc. distance/direction to nearest town) miles

GPS: Zone 56 E 0220849 N 7059730

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	~~25~~	- 24	
T1	~~26~~	20 - ~~30~~	10%
T2	~~15~~ 11	10 - ~~20~~ 12	10%
T3		-	
S1	47	6 - ~~10~~ 8	
S2		-	
G	0.1	0.1 - 1	5%

Structural formation: (including height)

Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
C	T1	E. Crebra
C	T1	E. Fibrosa
C	T2	A. leuhmanni
C	T2	C. Glaucophylla
A	S1	A. semiluata
A	G	Aristida caput-medusae
A	G	Whitegoodenia?? ★
A	G	Fimbristylis spp
A	G	Digitaria spp.
A	G	Chrysopogon fallax

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: NO rock

Land system: Woodland

Landform: Clay > 20%

Soils: Pale brown

Field observation and notes: photo 8915 →

Landzone: 7

RE code changes

Existing RE code: 11.5.1 / 11.7.7

Proposed RE code: 11.7.7

END

Girrahween P2. Gathering System. WP234

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. ..... Recorder: Thiago Moura Day/Date: 23/08/23

Purpose Gathering system

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0221088 N 7065883

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	20	18 - 25	S
T1	11	9 - 15	M
T2	5	4 - 7	S
T3		-	
S1	1	1 - 2	V
S2		-	
G		-	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; *s* - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus cubra
T1	c	Callitris glaucophyla
T2	s	Callitris glaucophyla
S1	a	Allocasuarina luna
G	a	Aristida caput medusae, A. obscura
		Glandularia aristigera, Eriachne
		aristigera, Chrysocephalum apiculatum

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.51

END

Koala Survey - WP239.

Koala Survey Datasheet

Site:	Date: 24/8/23	Lat:	Long:
Vegetation community description: 11.7.4		56J 221201 7069330	

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	Percent canopy cover of each canopy tree species
1. Eucalyptus crebra	20
2. Allocasuarina luehmannii	10
3. Angophora leiocarpa	30
4. Acacia Shirleyi	10
5. Corymbia trachyphloia	10
6.	
Total Canopy Cover:	80
Vegetation ground cover (% of the ground area):	60
Leaf litter cover (% of the ground area):	20
Bare ground cover (% of the ground area):	20
Area of surface water (% of the ground area):	—
Distance (m) to surface water:	—
Evidence of dogs in the area?	Yes
Evidence of scratches/scats (type and age)?	No

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	0
Total number of trees surveyed	30
Proportion of trees with Koala scats beneath	0

Were any Koalas observed? If so, record where possible...

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	**Description**

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. WP210 Recorder: NU Day/Date: 31.05.2023

Purpose Ecological site Assessment

Locality: (inc. distance/direction to nearest town) Girraween Central P.1

GPS: Zone 56 E 0221222 N 7064101

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	17	16 - 18	
T2	13	12 - 14	
T3		-	
S1	3	2 - 4	
S2	1.5	1 - 2	
G	0.7	0.1 - 0.2	

Structural formation: (including height) Woodland/grazing land

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus
T1	c	Angophora leiocarpa
T2	a	Callitris glaucophylla
S1	a	Callitris glaucophylla
S1	a	A. leiocalyx
S1	a	A. ixiophylla
G	a	Fimbristylis dichotoma
	a	Chrysocephalum apiculatum
	a	Aristida spp.
	a	Panicum decompositum

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system: Woodland/grazing land

Landform: flat to gently undulating floodplain

Soils: sandy clay loam

Field observation and notes: photos @ 9688-91

Landzone:

RE code changes

Existing RE code: RE 11.5.1 (LC/NCAP)

Proposed RE code: RE 11.5.1 (LC/NCAP)

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween - Gathering System - WP 239

Site No. 5 **Recorder:** Thiago Moura **Day/Date:** 24 Aug 23

Purpose GS Wellpad 239

Locality: (inc. distance/direction to nearest town) 221255 7068805

GPS: Zone 5 6 E 0 ~~2 2 0 9 1 4~~ N ~~7 0 6 8 4 7~~ 7

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	18	17 - 22	S
T1	15	10 - 16	M
T2	5	3 - 7	
T3		-	
S1	1	1 - 2	S
S2		-	
G	0.5	0.1 - 1	S

Structural formation: (including height) woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
E	a	Eucalyptus fibrosa
T1	d	Eucalyptus fibrosa
T2	c	Eucalyptus fibrosa
T2	a	Callitris glaucophylla
S1	a	Callitris glaucophilla
G		Triachne mucronata, Gahnia aspera, Geodenia hederacea

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 7

RE code changes

Existing RE code: 11.7.7

Proposed RE code: 11.7.7

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween P2 - Gathering System - WP240

Site No. **Recorder:** Thiago Moura **Day/Date:** 24 Aug 23

Purpose Gathering System

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0221260 N 7067938

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	10	8 - 15	M
T2	6	4 - 8	S
T3		-	
S1	1	1 - 2	S
S2	0.5	0.1 - 1	M
G		-	

Structural formation: (including height)

woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus crebra
T1	c	Corymbia trachiphelia
T1	s	Angophora leiocarpa
T2	a	Acacia shirleyi
T2	a	Lysicarpus angustifolius
T2	a	Callitris glaucophylla.
G		Aristida obscura, Eriachne mucronata, Gahnia aspera,

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 7

RE code changes

Existing RE code: 11.7.4

Proposed RE code: 11.74

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stimson Recorder: HM & NW Day/Date: 04/05/23

Purpose 134 WP, Ecological site Assessment

Locality: (inc. distance/direction to nearest town) Miles

GPS: Zone 56 E 0221523 N 7066759

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	18	16 - 20	
T1	~~25~~	~~20-30~~	~~10~~ %
T2		-	
T3		-	
S1		-	
S2		-	
G		-	

Structural formation: (including height)
Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; **s** - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
C	T1	E. Fibrosa
C	T1	E. Crebra

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Woodland

Landform: Ashy sand clay

Soils: Black/brown

Field observation and notes: Very severely fire burnt. No ground, shrub or T2. Photo: 8594 Landzone: 7

RE code changes

Existing RE code: 11.7.7

Proposed RE code: 11.7.7

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Rees Recorder: HM BNU Day/Date: 19.04.23

Purpose WP 167, Ecology site Assessment (Wed)

Locality: (inc. distance/direction to nearest town) Miles

GPS: Zone 56 E 0221687 N 7063363

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		~~20~~ 12 - 16	15-18
T1	17	~~20~~ - ~~30~~	
T2	9	8 - ~~20~~	10
T3		2 - 4	
S1		~~1~~ - ~~3~~	
S2		-	
G		0.1 - 1	

Structural formation: (including height)

Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; **s** - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	D	E. crebra
T2	C	A. leiocarpa
T2	C + T3	A. leuhmannii
T3	A	A. leiocalyx
G		panicum spp.

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Woodland

Landform: Flat.

Soils: Red/Brown clay-sand loam,

Field observation and notes: 8441 – 8444 (photos)

Landzone:

RE code changes

Existing RE code: 11.5.1 (ecosmart ground ~~tha~~ truthed)

Proposed RE code: ✓ consistent w/ 11.5.1

END

Severely fire damaged. High die off

A Severely fire burnt.

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stimson Recorder: HM/NU Day/Date: Thurs 04/05/23

Purpose WP127, Ecological site Assignment

Locality: (inc. distance/direction to nearest town) MILES

GPS: Zone 5 E 0221753 N 7059963

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	20	18 - 22	
T1	25	20 - 30	1%
T2		-	
T3		-	
S1		-	
S2		-	
G		-	

Structural formation: (including height) Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
C	T1	E. Crebra
C	T1	E. Fibrosa
		C. Glaucophylla

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Woodland

Landform: Ash sandy clay

Soils: Pale brown

Field observation and notes: Unidentifiable Acacias due to fire burn. No Shrub ground or T2 **Landzone:** 7

RE code changes Mistletoe (burnt) present.

Existing RE code: 11.7.7

Proposed RE code: 11.7.7

END Photos: 8906 →

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stiller Recorder: HM & NU Day/Date: 18.04.23

Purpose WP164, 14AU38 Ecology site Assessment (tues)

Locality: (inc. distance/direction to nearest town) Miles

GPS: Zone 56 E 0222098 N 7062392

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		~~14~~ -	
T1	15	14 - 16	40%
T2	12	10 - ~~4~~14	20%
T3	8	5 - 10	15%
S1	2.5	1 - 5	10%
S2		-	
G		-	

Structural formation: (including height) Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; *d* – dominant; *c* – co-dominant; *s* - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	D	E. Crebra
T2 T1+T2	A	E. Fibrosa
T3	C	A. leuhmanni
S1	D	A. semilunata
T3	A	C. Glaucophylla

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Flat

Landform: Woodland

Soils: Brown clay

Field observation and notes: 8351 → 8354

Termite mounds scat, recent fire Landzone:

RE code changes

Existing RE code: ~~11.7.4/11.7.7/11.7.5/11.7.2~~ 11.5.1 (3D)

Proposed RE code: 11.5.1 (consistent w/ Ecosmart mapping)

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Rees Recorder: HM & NU Day/Date: 19.04.23 (Wed)

Purpose WP160

Locality: (inc. distance/direction to nearest town) miles

GPS: Zone 56 E 0222580 N 7063324

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	24	20-30	
T2	13	5-20	
T3		-	
S1	4	1-5	
S2		-	
G		0.1-1	

Structural formation: (including height)

Ecologically dominant layer:

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1/T2	D/C	E. crebra
T2/S1	C/D	A. leuhmanni
T2	C	C. Glaucophylla
S1	A	A. leiocalyx
S1	A	A. semiiunata
S1	A	A. ixiophylla

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rock

Land system: Woodland

Landform: Flat.

Soils: Brown/red clay sand

Field observation and notes: Fire scars frequent. 8445 - 8448 (photos) Landzone:

RE code changes

Existing RE code: 11.5.1

Proposed RE code: ✓ consistent

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stiller Recorder: HM & NU Day/Date: 18.04.23

Purpose NP170, 14AU38 Ecology (site visits)

Locality: (inc. distance/direction to nearest town) Miles Assessment

GPS: Zone 56 E 0222703 N 7661747

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	15	14 - 16	35%
T2	12	10 - 14	10%
T3	5	4 - 6	30%
S1	1.5	1 - 3	8%
S2		-	
G		-	

Structural formation: (including height) Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
D	T1+2	E. crebra
D	T3	A. leuhmanni
-	S1	A. semilunata
S	T3	C. glaucophylla
S	T1	A. leiocarpa

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: NO rock

Land system: Flat

Landform: Woodland

Soils: Brown / pale clay / loam / sand

Field observation and notes: 8343 → 46

Landzone: 5

RE code changes ~~11.7.4/11.7.7/11.7.5/11.7.2~~ 11.5.1 (3P)

Existing RE code: ~~11.5.1 → check~~

Proposed RE code: ✓ 11.5.1 (consistent w/ Esmart mapping)

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween P2. OC. Reassessment

Site No. ____ **Recorder:** Thiago Mewes **Day/Date:** 24 Aug 2023

Purpose OCRE 11.3.4 → Possible PP protected zone on Gathering System

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0222962 N 7063759

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	21	20 - 25	S
T1	15	10 - 17	M
T2	5	4 - 6	S
T3		-	
S1	1.5	1 - 2	S
S2		-	
G	0.5	0.1 - 1.0	S

Structural formation: (including height) Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
E	a	Eucalyptus crebra
T1	d	Eucalyptus camaldulensis
T1	c	Angophora leiocarpa
T1	a	Eucalyptus tereticornis
T2	a	Eucalyptus camaldulensis
T2	a	Angophora leiocarpa
S1	a	Acacia spp.

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 3

RE code changes

Existing RE code: 11.3.4 (Reo) 11.3.14 (Gov)

Proposed RE code: 11.3.4

END

See EFS - Girrahween P2. Gathering System_Reassessment.

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween Central

Site No. ____ **Recorder:** HM & NU **Day/Date:** 15/05/23

Purpose Laydown - Infra 43 Man

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0223064 N 7059999

56 223064 7059999

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1		12 - 18	
T2		8 - 12	
T3		4 - 8	
S1		1 - 6	2-4
S2		1 - 2	
G		0.1 - D'2	

Structural formation: (including height)

Ecologically dominant layer: & T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
D	T1/T2	E. crebra.
A	T3	A. seriluata
A	G	D. triangularis
		Fimbristylis
		Chloris truncata
		Goodenia lunata
		Chrysopogon fallax
		Caput-medusa (Aristida)

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: NO rock

Land system: Wd

Landform: Flat

Soils: Brown Sand clay > 20% clay

Field observation and notes:

9196 →

Landzone:

RE code changes

Existing RE code: 11.7.7 (LC, NCAP)

Proposed RE code: 11.7.7 (LC, NCAP)

END

Subject to recent fire.

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stiler Recorder: HM & NU Day/Date: 18.04.23 (Tues)

Purpose WP 162, 14AU38, Ecology site Assessment

Locality: (inc. distance/direction to nearest town) Miles

GPS: Zone 56 E 0223223 N 7062720

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	~~18~~	~~RA - P8~~	
T1	16	14 - 18	20%
T2	12	10 - 14	5%
T3	8	5 - 10	20%
S1	4	1 - 5	15%
S2		-	
G		-	

Structural formation: (including height)

Woodland

Ecologically dominant layer: ~~T2~~ T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	D	E. crebra
T3	C	A. leuhmanni
T3	C	C. Glaucophylla
S1	A	A. semilunata
T1	A	A. leocarpa
		Fimbristylis sp.
		Caput-medusa

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rocks

Land system: Woodland

Landform: Flat

Soils: Ash brown / Clay sandy loam

Field observation and notes: # 8367 → 8370

Landzone:

RE code changes

Existing RE code: ~~11.7.4/11.7.7/11.7.5/11.7.2~~ 11.5.1 (3D)

Proposed RE code: 11.5.1 (Consistent w/ ecosmart mapping)

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Facilities Infrastructure: Proposed Quarry option 2

Site No. / **Recorder:** NU **Day/Date:** 31.05.2021

Purpose Ecological site Assessment

Locality: (inc. distance/direction to nearest town) Girrahween central P.1

GPS: Zone 56 E 0223478 N 7066179

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	15	14 - 16	30%
T2	10	8 - 12	
T3	7	6 - 8	
S1	3	2 - 4	
S2		-	
G		0'1 - 0'2	

Structural formation: (including height) Woodland/Grassland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum; ***d*** – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	E. fibrosa
T2	c	Callitris glaucophylla
T3	s	E. fibrosa
S1	a	A. leiocalyx
		Hakea spp.
G	a	Aristida caput-medusae
		Filmyrilis dichotoma
		Dianella spp.
		Heteropogon contortus

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system: Woodland

Landform: Alluvial floodplain

Soils: Sandy clay loam

Field observation and notes: photos @ 9712-15

Landzone:

RE code changes

Existing RE code: 11.7.7 and 11.7.4

Proposed RE code: 11.7.7 and 11.7.4

END

Recent fire - very low groundcover

No. soil crusts, alluvial sandy clay soil

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location Girrahween central

Site No. **Recorder:** HM B NV **Day/Date:** 15/05/23

Purpose Water tank Mon

Locality: (inc. distance/direction to nearest town) Miles / Girrahween

GPS: Zone 56 E 0422351 N 7064844 9

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	17	15 - 20	
T2	9	8 - 10	
T3		-	
S1	2	1 - 3 4	
S2		-	
G		0.1 - 0.2	

Structural formation: (including height)

Ecologically dominant layer:

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
D	T1	E. spp.
D	S1	A. semilunata
A	T2	Maleluca spp.
A	G	Leucopogon biflorus
A	G	Eulalia aurea
A	G	Eragrostis sororia
A	G	Aristida caput-medusa
A	G	D. triangularis

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: Small sized clay rocks

Land system: Clear, scattered regrowth

Landform: Flat

Soils: Pale / ash brown

Field observation and notes: No clear T2/3.
9174 – 9177 (photos)

Landzone:

RE code changes

Existing RE code: Cleared

Proposed RE code: cleared

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. ____ Recorder: Thiago Moura Day/Date: 25 Aug 2023

Purpose Girrahween Quarry

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0223539 N 7066109

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	–	-	
T1	3	2 - 6	S
T2		-	
T3		-	
S1	1.5	1 - 2	S
S2		-	
G		-	

Structural formation: (including height)

Shrubland (disturbed)

Ecologically dominant layer: S1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; **s** - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	a	Eucalyptus fibrosa
T1	a	Callitris glaucophylla
S1	d	Eucalyptus fibrosa
S1	c	Allocasuarina luehmannii

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone:

RE code changes

Existing RE code: Gov - Non-remnant / Geo - 11.7.4 Regrowth Casuarina

Proposed RE code: Non-remnant

END

Photos 130. 133. Meander. Survey

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Stiller Recorder: HM & NV Day/Date: 18.04.23

Purpose WP171, 14AU38, Ecology site assessment (tues)

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0224071 N 7061949

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	20	~~18~~ 15-23	5%
T2	12	12-18	~~12~~ 40%
T3	~~10~~ ~~8~~ ~~12~~		
S1	~~3~~ 3	1-6	20%
S2		-	
G		-	

Structural formation: (including height) Mixed land

Ecologically dominant layer: T2

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	D	E. crebra
T2	D	C. Glaucophylla
S1	D	A. ixiophylla
T2	A	A. ~~leeuwenbergii~~ leptodictyx

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: No rocks

Land system: Flat

Landform: Woodland

Soils: Ash brown clay loam

Field observation and notes: 8391 → 8394

Landzone: 5

RE code changes

Existing RE code: ~~11.7.4/11.7.7/11.7.5/11.7.2~~ 11.5.1 (3D)

Proposed RE code: 11.5.1 (consistent w/ E-smart mapping)

END

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. Shiller Recorder: HM & NU Day/Date: 18.04.23

Purpose WP115, 14AU38, Ecology site (+ves)

Locality: (inc. distance/direction to nearest town) Miles Assessment

GPS: Zone 56 E 0224618 N 7066187

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	19	-	
T1	22	15-23	40%
T2	11	8-15	25%
T3		-	
S1	4	1-5	25%
S2		-	
G	0.5	0.1-1	10%

Structural formation: (including height)
Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1/2	D	E. Fibrosa
T2	C	C. Glaucophylla
T3	A	A. leacalyx

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: NO rocks

Land system: Woodland

Landform: Flat

Soils: Sandy Ash/white clay soil

Field observation and notes: 2618 → 2621

Landzone: 5

RE code changes

Existing RE code: ~~11.7.4/11.7.7/11.7.5/11.7.2~~ 11.5.1 (3D)

Proposed RE code: 11.5.1 (consistent w/ ecosmart mapping)

END

Girrahween Pl_ Access track . 2E03

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. 1 Recorder: Thiago Moura Day/Date: 22 Aug 23

Purpose Access track - Girrahween Central part 1

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0225360 N 7058299 J

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	19	17 - 20	S
T1	11	9 - 17	M
T2		-	
T3		-	
S1	4	2 - 6	S
S2		-	
G		0.1 - 1	S

Structural formation: (including height)

Woodland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; *c* – co-dominant; **s** - subdominant, *a* – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus crebra
T1	c	Angophora leiocarpa
S1	a	Acacia semilunata
S1	a	Acacia leicolyx
E	a	Eucalyptus crebra
G	a	Aristida Obscura, Glandularia aristigera, Bothriochloa blandhii

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone: 5

RE code changes

Existing RE code: 11.5.1

Proposed RE code: 11.5.1

END

No access to the property (LLO).

Observation made from the fence ≅ 5m distance

Bellevue Pt 1

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. 2 Recorder: Peter Hall Day/Date: 5 November 2020

Purpose

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0228144 N 7048031

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	6	4 - 9	M
T2		2 - 4	V
T3		-	
S1		1 - 2	V
S2		-	
G		0.1 - 1	D

Structural formation: (including height)

OF

Ecologically dominant layer: T.

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T	d	Acacia oxyphylla
T_2	d	Acacia oxyphylla
S.	d	Acacia oxyphylla
G		native grasses.

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types: Kumbarilla beds JKk sandstone, mudstone, siltstone.

Land system: Duricrust

Landform: Undulating

Soils: shallow red over rock

Field observation and notes: Plot 524N, 525E, 523S, 527W

Landzone: 7

RE code changes

Existing RE code: QLD Sout 11.7.4/11.7.7/11.7.5/11.7.2/ 3D Ecosmart 11.5.1

Proposed RE code: 11.7.2

END

Koala Survey Datasheet

McNutt Pipeline 02

Site: 2	Date: 25 24.10.23	Lat: 228922	Long: 704/7326
Vegetation community description: Regrowth RE 11.7.4			

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	Percent canopy cover of each canopy tree species
1. Eucalyptus exserta	10
2. Acacia leiocalyx	20
3. Callitris glaucophylla	20
4. Acacia ~~falc~~ ixiophylla	10
5.	
6.	
Total Canopy Cover:	60
Vegetation ground cover (% of the ground area):	70
Leaf litter cover (% of the ground area):	30
Bare ground cover (% of the ground area):	–
Area of surface water (% of the ground area):	–
Distance (m) to surface water:	–
Evidence of dogs in the area?	n/o
Evidence of scratches/scats (type and age)?	–

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	0
Total number of trees surveyed	30
Proportion of trees with Koala scats beneath	0

Were any Koalas observed? If so, record where possible…

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	**Description**

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

McNulty_Pipeline_01

Site No. 1 Recorder: Thiago Neves Day/Date: ~~24.10.23~~ 25.10.23

Purpose Pipeline

Locality: (inc. distance/direction to nearest town)

GPS: Zone 56 E 0228932 N 7047523

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E	22	18 - 25	V
T1	~~15~~13	10 - 15	S
T2	7	4 - 9	D
T3		-	
S1	1.5	1 - 2	M
S2		-	
G	0.5	0.1 - 1	S

Structural formation: (including height) woodland

Ecologically dominant layer: T2

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T2	d	Acacia shirleyi
T2	a	Acacia leiocalyx
T1	a	Eucalyptus crebra
T1	a	Eucalyptus fibrosa
E	a	Eucalyptus crebra
Si	c	Acacia shirleyi
Si	s	Acacia leiocalyx

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system:

Landform:

Soils:

Field observation and notes:

Landzone:

RE code changes

Existing RE code: 11.7.4

Proposed RE code: ~~Regrowth 11.7.4~~ Regrowth 11.7.4

END

Koala Survey Datasheet

McNulty_Koala Survey_01

Site: 01	Date: 25/10/23	Lat: 228953	Long: 704/7714
Vegetation community description: LC RE 11.7.4			

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	Percent canopy cover of each canopy tree species
1. Acacia leiocalyx	20
2. Acacia Shirleyi	40
3. Eucalyptus crebra	10
4. Eucalyptus fibrosa	10
5. Callitris glaucophylla.	10
6.	
Total Canopy Cover:	90
Vegetation ground cover (% of the ground area):	70
Leaf litter cover (% of the ground area):	25
Bare ground cover (% of the ground area):	5
Area of surface water (% of the ground area):	—
Distance (m) to surface water:	—
Evidence of dogs in the area?	No
Evidence of scratches/scats (type and age)?	—

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	0
Total number of trees surveyed	30
Proportion of trees with Koala scats beneath	0

Were any Koalas observed? If so, record where possible…

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	**Description**

Koala Survey Datasheet

Alderley 134, 133

Site: RE11.7.4	Date: 12/11/20	Lat: 7048271	Long: 2304 12
Vegetation community description:			

Habitat Assessment (Jurskis 2001).

Canopy tree species composition	Percent canopy cover of each canopy tree species
1. Eucalyptus fibrosa	~~20~~ 10
2. Acacia leiocalyx	~~20~~ 10
3.	
4.	
5.	
6.	
Total Canopy Cover:	20
Vegetation ground cover (% of the ground area):	30
Leaf litter cover (% of the ground area):	70
Bare ground cover (% of the ground area):	0
Area of surface water (% of the ground area):	0
Distance (m) to surface water:	~350m to ephemeral watercourse
Evidence of dogs in the area?	No
Evidence of scratches/scats (type and age)?	No

Spot Assessment Technique (Phillips & Callaghan 2011).

Number of trees with Koala scats beneath (within 1m of tree base)	0
Total number of trees surveyed	**30**
Proportion of trees with Koala scats beneath	0

Were any Koalas observed? If so, record where possible...

Koala's sex:	
Koala's disease status:	
Koala's reproductive status:	
Tree species:	
Tree height:	
Tree DBH:	

Photograph log.

Photo number	**Description**

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. WP211 Recorder: NU Day/Date: 30 05 2023

Purpose Ecological site Assessment

Locality: (inc. distance/direction to nearest town) Bellevue Part 2

GPS: Zone 56 E 0232250 N 7053790

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	12	10 - 14	
T2	7	6 - 8	
T3		-	
S1	3	2 - 4	
S2	1.5	1 - 2	
G		0.1 - 0.2	

Structural formation: (including height)

Grassland + Vegetation (13m)

Ecologically dominant layer: T_1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T_1	d	E. populnea
T_2	c	Corymbia leichhardtii
S_1	s	A. shirleyi
S_1	s	A. leiocalyx
G	a	Aristida caput-medusae
	a	Panicum decompositum
	a	Fimbristylis dichotoma

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system: Grassland

Landform: Flat to gently undulating floodplains

Soils: Sandy clay loam

Field observation and notes: Photos 9655-58

Landzone: 5

RE code changes

Existing RE code: 11.5.1 (Regrowth)

Proposed RE code: 11.5.1 (Regrowth)

END

Ecological Field Survey ORG-ARW-HSM-FOR-0005?

Bellevue Pt 1

SITE IDENTIFICATION			
Site Name:	Alder Lg 142	Date:	3 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	232129
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7049076
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
486 North	# 4609		#	
East	# 4610		#	
South	# 4611		#	
West	# 4612		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	(Grazing)	(Forestry)	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	(Logging)	Thinning	No disturbance						
Dieback	0%	(1-25%)	26-75%	>76%	n/a							
Site condition	Very good	(Good)	Moderate	Poor	Degraded							
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	(**FOR**)	(**WDL**)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		**Avg DBH (cm) of EDL**			
Canopy cover (%) of EDL	>70% (dense/closed)	(30-70% (mid-dense))	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	(Mid-dense)	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia stricta					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067 targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S 180°	Start Easting	232132		End Easting	232129			
		Start Northing	7049097		End Northing	7049051			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)		4	12	2	4			1	2
Canopy cover (%)		30%		10%				1%	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Allocasuarina leuhmannii		16		12	4			
Callitris glaucophylla		29		27				2
Angophora leiocarpa		4		4				
Cangabia clarksoniana		1		1				
Acacia leiocarpa		4					3	1
Lomandra patens								
Aristida caput-medusae								
A. calycina								
Fimbristylis dichotoma								
Chielanthes sieberi								

Bc P
T1 S2
BO
T1 T2
SBA
T1
RBW
T1
A. leu
S1 S2

5 + 5 + 7 + 1 + 5
4 + 4 + 1

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	413	414	415	416	417	
Native perennial grass		1	5	15	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	100	99	45	50	60	
Rock						
Bare ground			30	35	20	
Cryptogams			10			
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1			
Survey result	11.5.1			
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	1	No. of hollow logs		Total length of logs (>10cm)	37.5	No. of logs (>10cm)	7
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
large trees					

E	Endangered	**Special Least Concern Species**
V	Vulnerable	Echidna, Platypus, Migratory Species
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species**
CBS	Colonial Breeding Species	Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	Large trees.
Notes			

A 1.1 Sheet D – Regional Ecosystem type assessment site

Location

Site No. WP210 Recorder: NV Day/Date: 30.05.2023

Purpose Ecological Site Assessment

Locality: (inc. distance/direction to nearest town) Bellevue Part 2

GPS: Zone 56 E 0232569 N 7053232

Vegetation structure

Median height of the EDL is to be measured

Stratum	Median height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1	15	14 - 16	
T2		-	
T3		-	
S1	3	2 - 4	
S2		-	
G	0.15	0.1 - 0.2	

Structural formation: (including height)

Grassland

Ecologically dominant layer: T1

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s** - subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	Eucalyptus spp.
T1	c	E. populnea
S1	s	Acacia salicina
Gr	a	Aristida caput-medusae
	a	Panicum decompositum
	a	Fimbristylis dichotoma
	a	Cheilanthes spp.

Geology, landform, soils

Geology map/scale/year:

Geology code and rock types:

Land system: Grassland

Landform: Flat to gently undulating floodplains

Soils: Sandy clay loam soil

Field observation and notes: Photos @ 9659-62

Landzone: 5

RE code changes

Existing RE code: 11.5.1 (Regrowth) Non-remnant

Proposed RE code: 11.5.1 (Regrowth)

END

SITE IDENTIFICATION			
Site Name:	Stringer	**Date:**	Wed 03/05/23
Tenure:	MWP146–149	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad Multi	☐ Gas Processing Facility	**Easting (E)**	218631
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060185
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 5820		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**('Clay loam')**	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4m		
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G
Avg height (m) of EDL	28m					**Avg DBH (cm) of EDL**			60cm		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	218649	End Easting	218613
		Start Northing	7060167	End Northing	7060198

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		14 | 30	6 | 14	1 | 6		0.1 | 1
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalypt Fibrosa				II	~~IIII IIII IIII~~	~~IIII~~ II		
Acacia shirleyi						14+28+14		
Acacia semilunata						II+30		
Callitrus glaucophylla				II	III			
Acacia leiocalyx					I	II		
Purple lovegrass								
Saltbush??								100+
Aristida sp								
Melanis repens								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8815	→	→	→	→	
Native perennial grass		20	80	50	50	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		10	5	20		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	50	10	10	10	
Rock						
Bare ground	80	20	5	20	40	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7/11.7.5	NA	LC/LC	NCAP/NCAP
Survey result	11.7.7/11.7.5	NA	LC/LC	NCAP/NCAP
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	/	No. of hollow logs	/	Total length of logs (>10cm)	5m	No. of logs (>10cm)	6
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	100	Per hectare (x 20)	120

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	(Absent)		Present	
Waterway	(Absent)		Present	
Potential for nectar / pollen	Absent	Scattered	(Common)	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	(Abundant)
Potential for seeding grass cover	Absent	Scattered	Common	(Abundant)
Dense shrub/grass shelter	Absent	(Scattered)	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	(Common)	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	(Common)	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	(Absent)	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	(Multiple layers)	Deep layers
Leaf litter coverage	Absent	Scattered	(Common)	Abundant
Termite mounds (>50cm)	Absent	Scattered	(Common)	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	Absent	(Scattered)	Common	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	(Common)	Abundant
Mistletoe/Epiphytes	Absent	Scattered	(Common)	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	1

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes	(No)	Is the vegetation suitable for slashing only?
	(Yes)	No	Is the slope < 5%?
Suitable – if all 4 questions are yes	(Yes)	No	Is the clay content > 20%?
	(Yes)	No	Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	R. Stringer	**Date:**	02/05/23
Tenure:	CA-104	**Assessor(s):**	HM BNU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	219238
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7059104
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 0773		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	(Downs – open, rolling, ashy, pebbly)	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	(SW)	Nil
Soil Colour	White	Yellow	Orange	Brown	(Red)			
	Black	Grey	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	~~12m~~ 5m		
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	13m					**Avg DBH (cm) of EDL**			30cm			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	0219341	End Easting	219244
		Start Northing	7059011	End Northing	7059125

Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		~~15~~	~~30~~	~~8~~	~~15~~	x	~~8~~			0.1	x
Canopy cover (%)		12	14	10		6				2	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Callitris Glaucophylla					33+14	ii		
E. ~~Crebra~~ Fibrosa				iii	i		++++ iii	iii
A. leiocalyx								ii
Cryptophylum Apiculatum								
Wahlenbergia capillaris								
Mulga fern (Cheilanthes distans)								
Love grass (purple) (Eragrostis brownii)								
Aristida sp								
Goodenia sp								
Leucopogon biflorus								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8768	→	→	→	→	
Native perennial grass	85	20	90	10	95%	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	10		10	5	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter		20	10	80		
Rock						
Bare ground	10	50				
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4	NA	LC	NCAP
Survey result	11.7.7	NA	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	No, gov definition of regional ecosystem details for 11.7.7 fit vegetation more accurately.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	3m	No. of logs (>10cm)	2
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	60	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	X	No. of trees with hollows (>30cm)	X

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Stringer	**Date:**	Wed 03/05/23
Tenure:	WP114	**Assessor(s):**	HM & TW

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	219348
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7059841
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8797		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content**)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**('Clay loam')**	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1.5m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	28m 14				**Avg DBH (cm) of EDL**		40cm 27					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	219345	End Easting	219356
		Start Northing	7059816	End Northing	7059861

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		~~15~~ ~~30~~	~~6~~ ~~15~~	~~x~~ ~~6~~		0.1 x2
Canopy cover (%)		13 15	8 10	6 8		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Angophera leiocarpa				III				
Allocasarina leuhmanni					IIII	14+11+15		
Acacia semilunata					IIII	~~IIII~~ IIII		
Acacia leiocalyx					III	28+~~IIII~~I		
Acacia shirleyi					III	~~III~~		
Eucalyptus fibrosa						I		
Calitris Glaucophylla				II				
Mulga fern (Cheilanthes distans)								
Panicum spp								
Melanis repens								
Aristida sp								
Fimbristylis spp.								
Chrysopogon fallax								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8792	→	→	→	→	
Native perennial grass	30	20	20	30	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	20	10	10		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	5	10	30	10	10	
Rock						
Bare ground	55	50	40	60	80	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	—	No. of hollow logs	—	Total length of logs (>10cm)	3m	No. of logs (>10cm)	11
Per hectare (x 20)	—	Per hectare (x 20)	—	Per hectare (x 20)	60	Per hectare (x 20)	220

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Castledean 101 access	**Date:**	26/10/21
Tenure:	PL305	**Assessor(s):**	Mel & Jannico

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	219370
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7057752
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 19		#	
East	# 20		#	
South	# 21		#	
West	# 22		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)			
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)			
Aspect	N	S	E	W	NE	NW	SE	(SW)	Nil
Soil Colour	White	Yellow	(Orange)	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent		(Scattered)	Frequent					
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1		S2		G		
Avg height (m) of EDL	9					**Avg DBH (cm) of EDL**		15				
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting 1233	219345	End Easting	219393
		Start Northing	7057748	End Northing	7057751

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		8 10	3 5		0.5 1.5	
Canopy cover (%)		10	10		10	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Walwhalleya subxerophila								
Eragrostis leptostachya								
Aristida caput-medusae								
Ancistrachne uncinulata								
Ground cover grass	Digitaria diffusa							
Daisy shrub	Cassinia laevis							
Lomandra filiformis								
Cheilanthes suberi								
Hibiscus sturtii								
Dianella longifolia								
Xerochrysum bracteatum								
Blue forb (photo)	Brunonia australis							
Micromyrtus sessilis		6					卌 | (6)	
Corymbia bloxsomei		3		(1)	|| (2)			
Alphitonia excelsa		1					(1)	
~~[illegible]~~ Eriachne mucronata								
Acacia lixocalyx		39		|||| (4)	卌 || (7)		卌 卌 卌 卌 卌 ||| (28)	
Callitris glaucophylla		9		(1)	卌 ||| (8)			
Badgeroo	Lysicarpus angustifolius	5			|||| (4)		(1)	
~~Pungent leaf shrub (photo)~~	Styphelia viridis	11					卌 卌 | (11)	

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	23	24	25	26	27	
Native perennial grass	100	30	5	100	100	66
Native other grass (if relevant)	–	–	–	–	–	
Native forbs and other species (non-grass)	–	10	10	–	–	4
Native shrubs (<1m)	–	5	0	–	–	1
Non-native grass	–	–	0	–	–	
Non-native forbs and shrubs	–	–	0	–	–	
Litter	–	45	40	–	–	17
Rock	–	10	0	–	–	2
Bare ground	–	–	50	–	–	10
Cryptogams	–	–	0	–	–	
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.3.4(3D)	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	–	Per hectare (x 20)	–	Per hectare (x 20)	–	Per hectare (x 20)	–

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Thick grass	Rufous bettongs	—			
Exfoliating bark	Golden tail gecko	NT			
	Microbat	CBS			
Double Barred Finch	call				
Singing honey eater	call				
Magpie	call				
Macropod	Scat				
Leaden flycatcher	call				
Grey fantail	call				

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 54m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Castledean 101	**Date:**	26/10/21
Tenure:	PL305	**Assessor(s):**	Mel & Jannica

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	219444
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7058207
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 10		#	
East	# ↓		#	
South	# ↓		#	
West	# 13		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	17					**Avg DBH (cm) of EDL**			30			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	Throughout	ESU		

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	219473	End Easting	219466	
		Start Northing	7058220	End Northing	7058195	
Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		15 20	3 6		0.5 1.5	
Canopy cover (%)		15	20		10	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Paspalidium distans								
Chrysopogon fallax								
Eragrostis leptostachya								
Enteropogon acicularis								
Aristida leptopoda								
Aristida ramosa								
Aristida caput-medusae								
Lomandra (photo) Lomandra filiformis								
Dianella longifolia								
Eremophila debilis								
Ground cover grass - small wide leaves Digitaria diffusa								
Gahnia aspera								
* Glandularia aristigera								
Solanum elliptium								
Eucalyptus crebra		2		11 (2)				
Corymbia ~~sp~~ trachyphloia		1		(1)				
Eucalyptus exserta		1			(1)			
~~Lomx~~ Callitris glaucophylla		3			(1)		11 (2)	
Acacia leucolyx		3					111 (3)	
Allocasuarina luehmanii		112		~~[illegible]~~	~~[illegible]~~ 11 (32)		~~[illegible]~~ (80)	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	14	15	16	17	18	
Native perennial grass	40	60	40	30	20	38
Native other grass (if relevant)	–	–	–	–	–	
Native forbs and other species (non-grass)	–	5	–	–	–	1
Native shrubs (<1m)	–	–	–	–	–	
Non-native grass	–	–	–	–	–	
Non-native forbs and shrubs		–	–	–	–	
Litter	40	20	20	70	70	44
Rock	–	–	–	–	–	
Bare ground	15	15	40	–	10	16
Cryptogams	5	–	–	–	–	1
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1 (3D)	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES 5m+2m + 3.5			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	10.5m	No. of logs (>10cm)	3
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	210	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other					
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**		**Other Information (e.g. age, collected, active/inactive)**
			Easting	**Northing**	
Bark	Gecko - golden tail	NT	throughout		
Logs	Snakes	-	throughout		
Exfoliating Bark	Microbats	CBS	throughout		
Tree Hollows	Reptiles	NT	"		
Hooded Robin					
Rainbow Bee-eater					
Grey fantail					
Noisy Miner					
Yellow, rumped Thornbill					
Striated pardalote					
Singing honeyeater					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	OC 18.3.4 WP 200	**Date:**	23 Aug 23
Tenure:		**Assessor(s):**	Thiago Moreira

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	219504
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7006275
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 54		#	
East	# 55		#	
South	# 56		#	
West	# 57		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SI ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale ✓	Dark	Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate ✓	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	~2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓		T2		S1		S2		G			
Avg height (m) of EDL	8				**Avg DBH (cm) of EDL**		30					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% ✓ (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent ✓			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey [illegible]

targetzero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	SE	Start Easting		56J 219482		End Easting		56J 219523			
		Start Northing		7066278		End Northing		7066267			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)	/	10	18	6	10			1	2	0.1	1
Canopy cover (%)	/	30		10				5		5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus crebra		23		☒☒☒☒☐				
Callitris glaucophylla		~~31~~ 34		☒☒☒☒	☒☒		☐	
Acacia leucolyx		8					☒☐	
Cryptandra ciliata								
Rutidosis lanata								
Amphipogon caricinus								
Peplidium foecundum								
Griachne mucronata								
Glandularia aristigera								
Aristida caput. medusae								
Dodonaea peduncularis								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	62	61	60	59	58	
Native perennial grass	10	20		20	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	30	20	60	30	
Native shrubs (<1m)	20					
Non-native grass						
Non-native forbs and shrubs						
Litter	10	40	10	20	20	
Rock						
Bare ground	50	10	70	10	30	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	(no) 11.3.1	NCAP	OC	OC
Survey result	11.5.1	NCAP	LC	LC
Agree with mapped RE? If **no**, provide justification from field data	No. Species present correspond to RE 11.5.1 as vegetation surround.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	4	**No. of logs (>10cm)**	1
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	80	**Per hectare (x 20)**	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	√ Absent		Present	
Wetland / Swamp / Waterbody	√ Absent		Present	
Waterway	√ Absent		Present √	
Potential for **nectar / pollen**	Absent	Scattered	Common	√ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	√ Abundant
Potential for **seeding grass cover**	Absent	√ Scattered	Common	√ Abundant
Dense shrub/grass shelter	Absent	√ Scattered	√ Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	√ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	√ Absent	Scattered	√ Common	Abundant
Large rocks (>30cm)	√ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	√ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	√ Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	√ Scattered	Common	Abundant
Termite mounds (>50cm)	√ Absent	√ Scattered	Common	Abundant
Rock piles	√ Absent	Scattered	√ Common	Abundant
Trees with shedding bark	Absent	Scattered	√ Common	Abundant
Soil cracks	Absent	Scattered	√ Common	√ Abundant
Koala feed trees	Absent	Scattered	√ Common	√ Abundant
Mistletoe/Epiphytes	Absent	Scattered	√ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
log					
Skeleton					
Burrow					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes ✓	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	✓ Yes / No ✓ ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Ginghween P2. Gathering System upgrade	**Date:**	23 Aug 23
Tenure:	PL 491	**Assessor(s):**	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	661 219525
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7066045
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 65		#	
East	# 66		#	
South	# 67		#	
West	# 68		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	6				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			20			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense) ✓		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse ✓			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	SE	Start Easting		SGJ 2/9503		End Easting		SGJ 0219557			
		Start Northing		7066052		End Northing		7066033			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)	/	10	17	6	9			1	2	0.1	1
Canopy cover (%)		30		10				10		5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Angophora leiocarpa		20		☒☒☒L	U			
Allocasuarina hum		21		☒U	L☒I			
Callistris glaucophyla		15		☒I			☒ ☐	
Eucalyptus cebra		14		☒☒I	U			
Aristida obscura								
Dodonaea peduncularis								
Chrysocephalum apiculatum								
Gahnia aspera								
Glandularia aristigera								
Aristida caput-medusae								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	73	72	71	70	69	
Native perennial grass					10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		10	10	~~10~~		
Native shrubs (<1m)		10				
Non-native grass						
Non-native forbs and shrubs						
Litter	30	30	10	30	30	
Rock						
Bare ground	70	50	80	70	~~70~~ 60	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1	NCAP	LC	LC
Survey result	11.5.1	~~NAP~~ NCAP	LC	LC
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	√ Absent		Present	
Wetland / Swamp / Waterbody	√ Absent		Present	
Waterway	√ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	√ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	√ Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	√ Abundant
Dense shrub/grass shelter	Absent	√ Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	√ Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	√ Common	Abundant
Large rocks (>30cm)	√ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	√ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	√ Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	√ Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	√ Scattered	Common	Abundant
Rock piles	√ Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	√ Common	Abundant
Soil cracks	√ Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	√ Abundant
Mistletoe/Epiphytes	Absent	Scattered	√ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes √	No	
Ecologist	Yes	No √	
Species Management Plan	Yes	No √	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No √ Yes / No √ Yes / No √ Yes / No √		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No √	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

Girrahween . WP190

SITE IDENTIFICATION			
Site Name:	Scouted WP190	**Date:**	23. Aug 23
Tenure:	305	**Assessor(s):**	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	361 219545
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7006089
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 28		#	
East	# 29		#	
South	# 30		#	
West	# 31		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE ✓	NW	SI	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black ✓	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	7				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			22			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense) ✓		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse ✓			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG ARW NSM FOR 0000

targetzero
► zero incidents ► zero injuries

→ SGJ 219561 - 7063115

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N/E	Start Easting	SGJ 219523			End Easting	SGJ ~~219556~~				
		Start Northing	7063066			End Northing	~~7063107~~				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		8	15	6	7			1	2	0.1	1
Canopy cover (%)		20		20				5		5	
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Eucalyptus crebra				☒☒1							
Corymbia ~~tra~~ trachyphloia				1							
Callitris glaucophyla				☒☒	☒		☒				
Acacia shirleyi							☒1				
Gahnia obscura											
Arostilda caput-medusae											
Chrysocephalum apiculatum											
Rutidosis lanata											
Gonocarpus urceolatus											
Dodonaea peduncularis											

target zero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	36	35	34	33	32	
Native perennial grass	40	20	20	20	20	
Native other grass (if relevant)				1		
Native forbs and other species (non-grass)	20	20	10	10	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	10	30	10	30	
Rock						
Bare ground	30	50	20	60	40	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1 (Go)	NCAP	LC	LC
Survey result	11.7.7	NCAP	LC	LC
Agree with mapped RE? If no, provide justification from field data	No. Eucalyptus fibrosa was not listed on the EPS but was present on the site. Eucalyptus was the dominant species with presence of Corymbia trachyphloia and Acacia shirleyi which is more suitable for the regional ecosystem comparison of RE. 11.7.7			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	√ Absent		Present	
Wetland / Swamp / Waterbody	√ Absent		Present	
Waterway	√ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	√ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	√ Abundant
Potential for **seeding grass cover**	Absent	√ Scattered	Common	√ Abundant
Dense shrub/grass shelter	Absent	√ Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	√ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	√ Absent	Scattered	√ Common	Abundant
Large rocks (>30cm)	√ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	√ Absent	Scattered	Common	Abundant
Leaf litter depth	√ Absent	√ Single layer	Multiple layers	Deep layers
Leaf litter coverage	√ Absent	√ Scattered	Common	Abundant
Termite mounds (>50cm)	√ Absent	√ Scattered	Common	Abundant
Rock piles	√ Absent	Scattered	Common	Abundant
Trees with shedding bark	√ Absent	√ Scattered	Common	Abundant
Soil cracks	Absent	√ Scattered	Common	√ Abundant
Koala feed trees	Absent	√ Scattered	Common	√ Abundant
Mistletoe/Epiphytes	Absent	√ Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Hollow					
Burrows					
Dogs					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	✓ Yes	No ✓	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	✓ Yes / No ✓ ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			

Blacksoil



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero

SITE IDENTIFICATION			
Site Name:	Stringer	**Date:**	03/05/23 Wed
Tenure:	WP101	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	219732
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7061547
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8841		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	30m					**Avg DBH (cm) of EDL**			40cm			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	219715			End Easting	219738				
		Start Northing	7061525			End Northing	7061566				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		20	35	8	20			1	8	0.1	1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra				II				
E. Fibrosa								
Callitrus Glaucophylla				~~IIII~~	IIII+II+II+I		III	
Acacia leocalyx							20+24	
Acacia triptera							II	
Chrysocephalum apiculatum								
Panicum sp								
Chrysopogon fallax								
Muiga fern (Cheilanthes distans)								
Eragrostis Sororia								
Fimbristylis spp								
Eulalia aurea								
Leptorchynchos baileyi								
Aristida-caput medusa								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	5835	→	→	→	→	
Native perennial grass	20	20	80	5	60	
Native other grass (if relevant)						
Native forbs and other species (non-grass)					10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	40	10	10	15	10	
Rock						
Bare ground	40	70	10	80	20	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.5.1/11.7.7	NA	LC/LC	NCAP/NCAP
Survey result	11.5.1	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	/	**No. of hollow logs**	/	**Total length of logs (>10cm)**	9m	**No. of logs (>10cm)**	3
Per hectare (x 20)	/	**Per hectare (x 20)**	/	**Per hectare (x 20)**	180	**Per hectare (x 20)**	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Nest	small bird		219733	7061542	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Recent fire, heavy dieback



North face of transect



East face of the transect



South face of the transect



West face of the transect

Girrahween PL. Access track. WP 101

SITE IDENTIFICATION			
Site Name:	Assessment of	**Date:**	22 Aug 23
Tenure:	492	**Assessor(s):**	Tracey Mower

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	56J 219799
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7661564
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 24		#	
East	# 25		#	
South	# 26		#	
West	# 27		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE ✓	NW	SI	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark ✓	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate ✓	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	3				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓			T2		S1			S2		G	
Avg height (m) of EDL	9					**Avg DBH (cm) of EDL**						
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% ✓ (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent ✓	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N/E	Start Easting		56J 219780		End Easting		56J 219823			
		Start Northing		7061567		End Northing		7061608			
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)			8	15	4	6			1	2	0.1 / 1
Canopy cover (%)			20								
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Eucalyptus cubica				☒☒	☐						
Acacia leucolomax							☒☐				
Callitris glaucophylla					☒						
Gahnia aspera											
Chorizema parviflorum											
Briachne mucronata											
Chrysopogon filipes											
Bothriochloa bladhii											
Chrysocephalum apiculatum											
Melinis repens											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	19	20	21	22	23	
Native perennial grass	20	30	30	20	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	20	10			
Native shrubs (<1m)	20					
Non-native grass						
Non-native forbs and shrubs						
Litter	40	40	40	30	10	
Rock						
Bare ground	10	10	20	50	70	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1 (part)	NA	LC	LC
Survey result	11.5.1	NCAP	LC	LC
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	2	No. of logs (>10cm)	1
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	40	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	✓ Absent		Present	
Wetland / Swamp / Waterbody	✓ Absent		Present	
Waterway	✓ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	✓ Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	✓ Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	✓ Common	Abundant
Dense shrub/grass shelter	Absent	✓ Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	✓ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	✓ Common	Abundant
Large rocks (>30cm)	✓ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	✓ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	✓ Single layer	Multiple layers	Deep layers
Leaf litter coverage	✓ Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	✓ Absent	Scattered	Common	Abundant
Rock piles	✓ Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	✓ Scattered	✓ Common	Abundant
Soil cracks	Absent	✓ Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	✓ Abundant
Mistletoe/Epiphytes	Absent	Scattered	✓ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
logs					
stags					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	✓ Yes	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Thorne WP135	**Date:**	04/05/23 Thurs
Tenure:		**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	~~822~~ 220024
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060205
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8224		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	20m					**Avg DBH (cm) of EDL**			35cm			
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)			n/a		
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse			Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	220019	End Easting	220025
		Start Northing	7060184	End Northing	7060233

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		20 | 30	8 | 20		1 | 5	0.1 | 1
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. Theresa								
E. Crebra				IIII	///// II			
C. Glaucophylla					////+12+5			
A. leiocalyx							///	
Eulalia aurea								
Leptorhynchos baileyi								
Kangaroo grass (Themeda triandra)								
Panicum spp.								
Aristida purpurea								
Cheilanthes distans								
Chrysopogon fallax								
Fimbristylis spp								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8119 →				8123	
Native perennial grass	20	30	10		10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	30		20		10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	20	20	10		
Rock						
Bare ground	40	50	50	90	80	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1	NA	LC	NCAP
Survey result	11.5.1	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	/	No. of hollow logs	/	Total length of logs (>10cm)	39	No. of logs (>10cm)	13
Per hectare (x 20)	/	Per hectare (x 20)	/	Per hectare (x 20)	780	Per hectare (x 20)	260

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

SITE IDENTIFICATION			
Site Name:	Girrahween PP. WP115	**Date:**	24 Aug 2023
Tenure:	PL 4/91	**Assessor(s):**	*Thiago Moura*

DEVELOPMENT TYPE & LOCATION									
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**					
☑	Well Pad	☐	Gas Processing Facility	**Easting (E)**	220051				
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7068125				
☐	Monitoring	☑	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☑56
☐	Roads & Tracks	☐	Seismic Line						
☐	Work over	☐	Property (area) wide						

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	113 ~~108~~ ~~115~~			
East	114 ~~116~~			
South	115 ~~117~~			
West	116 ~~118~~			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☐Downs – open, rolling, ashy, pebbly	☑Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☐Level (<1%)	☑Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45°)				
Aspect	☐N	☐S	☑E	☐W	☐NE	☐NW	☐SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☑Brown	☐Red			
	☐Black	☐Grey	☑Pale	☐Dark	☐Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☐'Sandy clay Loam'	☑'Clay loam'	☐'Clay loam sandy'	☐'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☑Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

Ecological Field Survey

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☑Grazing	☑Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☐Clearing	☐Cultivation	☑Regrowth	☑Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☑1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☑Good	☐Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☑Scattered	☐Frequent	**Time Since**	☐Recent	☑Old	**Average Height (m)**	3
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	☐CEST ☐Rf ☐H ☐FOR ☑WDL ☐GRL ☐IMP ☐LKE ☐RIP ☐SHR ☐SW ☐DIS				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☑T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	20	
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☑10-30% (sparse)	☐<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☑Sparse	☐Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☑Not Found On Site
Weed infestations	☐Found on Site – records below	☑Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

targetzero ► zero incidents ► zero injuries

targetzero ► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	E	Start Easting	220025	56J	End Easting	56J 220475							
		Start Northing	7068130		End Northing	7068120							
Stratum	E	T1		T2		T3		S1		S2/Seedlings			
Height range (m)		10	15	5	7			1	2	0.1	1		
Canopy cover (%)		10		20				5		10			
Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed										
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2					
		Total											
Eucalyptus crebra		10		⊠⊠									
Allocasuarina luehmannii		15					⊠⊠⊠						
Angophora leiocarpa		4		□									
Acacia shirleyi		12			⊠L		⊠						
Corymbia trachyphloia		6		⊠1									
Callitris glaucophylla		10			⊠⊠								
Acacia leiocalyx		8			⊔		⊠						
Lysicarpus angustifolius		7			⊠L								
Alphitonia excelsa.		4			□								
Gahnia aspera													
Eriachne mucronata													
Bothriochloa bladhii													
Aristida obscura													

Ecological Field Survey ORG-ARW-HSM-FOR-00067

targetzero ► zero incidents ► zero injuries

targetzero ► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

Ecological Field Survey

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	108	109	110	110	112	
Native perennial grass	60	20	10	20	20	
Native other grass (if relevant)	1					
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	30	10	50	10	
Rock						
Bare ground	30	50	80	30	70	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE Eco	11.7.7	NCAP	LC	LC
Survey result	11.7.7			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	2	No. of hollow logs	1	Total length of logs (>10cm)	4	No. of logs (>10cm)	2
Per hectare (x 20)	40	Per hectare (x 20)	20	Per hectare (x 20)	80	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	✓✓ ☐Absent		☐Present	
Wetland / Swamp / Waterbody	☐Absent		☐Present	
Waterway	✓ ☐Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☐Common	☑Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☑Common	☐Abundant
Potential for **seeding grass cover**	☐Absent	☐Scattered	☑Common	☐Abundant
Dense shrub/grass shelter	☐Absent	☑Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☐Scattered	☑Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☑Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☑Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☑Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☑Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☐Absent	☑Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☑Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☑Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☑Scattered	☐Common	☐Abundant
Soil cracks	☐Absent	☑Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☐Common	☑Abundant
Mistletoe/Epiphytes	☐Absent	☐Scattered	☑Common	☐Abundant

Ecological Field Survey

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
logs					
burrows					
logs					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	☑Yes	☐No	
Ecologist	☐Yes	☑No	
Species Management Plan	☐Yes	☐No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	☐Yes	☑No	Is the vegetation suitable for slashing only?
	☑Yes	☐No	Is the slope < 5%?
	☑Yes	☐No	Is the clay content > 20%?
	☑Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☑No	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween P2. Gathering System WP	**Date:**	24 Aug 2023
Tenure:	PL491 115	**Assessor(s):**	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	~~220~~ 220255
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7067999
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56) J
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 99		#	
East	# 100		#	
South	# 101		#	
West	# 102		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)			
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)			
Aspect	N	S	E	W	NE	NW	SI	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red		
	Black	Grey	Pale ✓	Dark	Mottled		
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**	
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**	
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)			
Erosion	Absent ✓	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank	

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate ✓	Poor	Degraded							
Fire scars	Absent	Scattered ✓	Frequent	**Time since**	Recent	Old ✓	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP** ✓	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1 ✓		S2		G			
Avg height (m) of EDL	1				**Avg DBH (cm) of EDL**		4 5					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a ✓			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse ✓		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)								
Transect Start compass bearing	ESW	Start Easting	56J 220236		End Easting	56J 220276		
		Start Northing	7067991		End Northing	7068021		
Stratum	E	T1	T2	T3	S1		S2/Seedlings	
Height range (m)	/	4 / 10	/	/	1	2	0.1	1
Canopy cover (%)	/	5	/	/	10		20	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia leiocalyx			10				☒☒	
Eucalyptus fibrosa			5	☒				
Goodenia hederacea								
Rutidosis lanata								
Bothriochloa bladii								
Aristida obscura								
Gahnia aspera								
Eriachne mucronata								

Ecological Field

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	103	104	105	106	107	
Native perennial grass	10	30	20	30	30	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	20	20	10	10	20	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	10	10	20	10	
Rock						
Bare ground	60	40	60	40	40	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE ECO	11.7.4	NCAP	LC	LC
Survey result	Non-Remnant	–	–	–
Agree with mapped RE? If no, provide justification from field data	No. Non presence of key species. Also, vegetation does not cover more than 50% of the understorey predominant canopy and average more than 70% at the understorey height.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)		No. of logs (>10cm)	
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	√ Absent		Present	
Wetland / Swamp / Waterbody	√ Absent		Present	
Waterway	√ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	√ Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	√ Common	Abundant
Potential for **seeding grass cover**	Absent	√ Scattered	√ Common	Abundant
Dense shrub/grass shelter	Absent	√ Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	√ Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	√ Absent	√ Scattered	Common	Abundant
Large rocks (>30cm)	√ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	√ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	√ Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	√ Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	√ Scattered	Common	Abundant
Rock piles	√ Absent	Scattered	Common	Abundant
Trees with shedding bark	√ Absent	Scattered	Common	Abundant
Soil cracks	√ Absent	Scattered	√ Common	Abundant
Koala feed trees	Absent	Scattered	√ Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	√ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	–	No. of trees with hollows (>30cm)	–

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Burrows					
logs					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		**If required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	✓ Yes / No ✓ Yes / No ✓ Yes / No ✓ Yes / No		✓ Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

240 SITE IDENTIFICATION			
Site Name:	Girrahween P2. WP240	**Date:**	24/ Aug 23
Tenure:		**Assessor(s):**	

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	220615
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7067535
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 90		#	
East	# 91		#	
South	# 92		#	
West	# 93		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE ✓	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale ✓	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging ✓	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	3				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			30			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse) ✓			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse ✓		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

target zero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N/E	Start Easting	36J 220595		End Easting	36J 220636					
		Start Northing	7067515		End Northing	7067561					
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)	/	10	15	6	9			1	2	0.1	1
Canopy cover (%)	/	10		30				5		25	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus fibrosa		13		𝍸	⊔			
Corymbia trachyphloia		6		𝍸	L			
Eucalyptus decorticans		2		L				
Allocasuarina luehmannii		13			𝍸		⊓	
Callitris glaucophylla		16		𝍸	𝍸		L	
Acacia ligulata		8					𝍸	
Cheilanthes sieberi								
Peptidium fasciculum								
Gahnia aspera								
Dodonaea pedunculariis								
Rutidosis lanata								
Gahnia aspera								
Eriachne mucronata								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	94	95	96	97	98	
Native perennial grass	20			20	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	70	70	20	10	20	
Rock						
Bare ground	10	30	80	70	60	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE ECO	11.5.1	NCAP	LC	LC
Survey result	11.7.4	NCAP	LC	LC
Agree with mapped RE? If no, provide justification from field data	No. Presence of Eucalyptus decorticans, Corymbia trachyphloia and Callitris glaucophylla with low to tall shrub (Acacia kirtonii) characterizes RE 11.7.4.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	✓ Absent		Present	
Wetland / Swamp / Waterbody	✓ Absent		Present	
Waterway	✓ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	✓ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	✓ Common	✓ Abundant
Potential for **seeding grass cover**	Absent	Scattered	✓ Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	✓ Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	✓ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	✓ Absent	Scattered	✓ Common	Abundant
Large rocks (>30cm)	✓ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	✓ Absent	✓ Scattered	Common	Abundant
Leaf litter depth	✓ Absent	✓ Single layer	Multiple layers	Deep layers
Leaf litter coverage	✓ Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	✓ Absent	✓ Scattered	Common	Abundant
Rock piles	✓ Absent	Scattered	✓ Common	Abundant
Trees with shedding bark	Absent	Scattered	✓ Common	Abundant
Soil cracks	Absent	✓ Scattered	Common	✓ Abundant
Koala feed trees	Absent	Scattered	✓ Common	✓ Abundant
Mistletoe/Epiphytes	Absent	Scattered	✓ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
logs					
diggings					
burrows					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 105	**Date:**	09 May 2024
Tenure:		**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☐	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 0220671					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7057662					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	46			
East	47			
South	48			
West	49			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☒Downs – open, rolling, ashy, pebbly	☐Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☒Level (<1%)	☐Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☒N	☐S	☐E	☐W	☐NE	☐NW	☐SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☒Brown	☐Red			
	☐Black	☐Grey	☒Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	**☐'Loam'**	**☐'Silty loam'**		
	☐'Sandy clay Loam'	**☐'Clay loam'**	**☐'Clay loam sandy'**	**☒'Silty clay loam'**	**☐'Light clay'**	**☐'Light medium clay'**		
	☐'Medium clay'	**☐'Medium heavy clay'**	**☐'Heavy clay'**	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☒Grazing	☐Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☒Clearing	☐Cultivation	☒Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☐1-25%	☒26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☐Moderate	☒Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	10
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	**☐CEST ☐Rf ☐H ☐FOR ☒WDL ☐GRL ☒IMP ☐LKE ☐RIP ☐SHR ☐SW ☒DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	6		**Avg DBH (cm) of EDL**	15	
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☐10-30% (sparse)	☒<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☐Very sparse	☒Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

targetzero ► zero incidents ► zero injuries

targetzero ► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	N		Start Easting	56J 0220665			End Easting	56J 0220673					
			Start Northing	7057642			End Northing	7057687					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)	-	-	-	-	-	-	-	-	-	-	0.1	0	
Canopy cover (%)	-		-		-				-		5		

Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		Total						
Eucalyptus fibrosa								10

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			**E**	**T1**	**T2**	**T3**	**S1**	**S2**
		TOTALS						
Fimbristylis dichotoma								
Laxmannia gracillis								
Chrysocephalum apiculatum								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	**54**	**53**	**52**	**51**	**50**	
Native perennial grass				5	5	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	5		5			
Non-native grass						
Non-native forbs and shrubs						
Litter			5	5		
Rock						
Bare ground	95	100	90	90	95	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.5.1 (3D EcoSmart)	NA	LC	NCAP
Survey result	No-remnant	NA	NA	NA
Agree with mapped RE? If **no**, provide justification from field data	No. Location does not have a woody layer or understories present. There is evidence of area has been disturbance by clearing as well, area was critical affected negatively by bush fire. Area does not have 50% cover and 70% height and characteristic species compared to reference site.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☒Scattered	☐Common	☐Abundant
Potential for **fleshy fruiting plants**	☐Absent	☒Scattered	☐Common	☐Abundant
Potential for **seeding grass cover**	☐Absent	☒Scattered	☐Common	☐Abundant
Dense shrub/grass shelter	☐Absent	☒Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☒Absent	☐Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☒Absent	☐Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☒Absent	☐Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☒Absent	☐Scattered	☐Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☒Common	☐Abundant
Mistletoe/Epiphytes	☒Absent	☐Scattered	☐Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	NA	**No. of trees with hollows (>30cm)**	NA

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
NA					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Rees	**Date:**	19 04 23 (Wed)
Tenure:	WPI72	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	220740
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7063293
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8435		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	(NW)	SE	(SW)	Nil
Soil Colour	White	Yellow	(Orange)	(Brown)		(Red)			
	Black	Grey	(Pale)	Dark		Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	(Sandy clay loam')	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	15				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	15m					**Avg DBH (cm) of EDL**			30cm			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	220732	End Easting	220738
		Start Northing	7063266	End Northing	7063309

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		16 | 25/18	8 | 16/12		X/2 | 8/4	0.1 | 1
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra				IIII				
A. leuhmanni					++++ ++++ +26		~~++++~~	
C. Glaucophylla					++++ ++++ II			
A. leptocalyx							++++ +15	
A. ixiophylla							++++ +15	~~++++ ++++~~
A. semilunata							~~++++~~	~~++++~~ II
Unknown sp.							I	
Dodonia triangularis								
Panicum spp.								
Fimbristylis spp.								
Aristida caput-medusa								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8430					
Native perennial grass	5	20	50	50	50	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	5	5	5	10	10	
Rock						
Bare ground	90	75	45	40	40	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (ecosmart)	11.5.1	~~LC~~ N/A	LC	NC/AP
Survey result	11.5.1	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	10	No. of logs (>10cm)	1
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	200	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 110	**Date:**	10 May 2023
Tenure:	PL305	**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 220737					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7058985					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	76			
East	77			
South	78			
West	79			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☐Downs – open, rolling, ashy, pebbly	☒Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☒Level (<1%)	☐Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☐NE	☐NW	☐SE	☒SW	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☒Brown	☐Red			
	☐Black	☐Grey	☒Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content**)	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☐'Sandy clay Loam'	☐'Clay loam'	☐'Clay loam sandy'	☒'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☒Grazing	☐Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☒Clearing	☐Cultivation	☒Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☐1-25%	☒26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☐Moderate	☒Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	7
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	**☐CEST ☐Rf ☐H ☒FOR ☐WDL ☐GRL ☐IMP ☐LKE ☐RIP ☐SHR ☐SW ☒DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	20	
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☐10-30% (sparse)	☒<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☒Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	SW		**Start Easting**	56J 220748			**End Easting**	56J 220726					
			Start Northing	7059007			**End Northing**	7058962					
Stratum	**E**		**T1**		**T2**		**T3**		**S1**		**S2/Seedlings**		
Height range (m)	-	-	-	-	-	-	-	-	-	-	0.1	1	
Canopy cover (%)	-		-		-		-		-		10		

Common name / Collection name	**Species name**	**Sample (Field No.)**	**Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed**					
NB: Record ground cover species within 50m x 10m transect			**E**	**T1**	**T2**	**T3**	**S1**	**S2**
		Total						
Eucalyptus crebra		**15**						15
Callitris glaucophyla		**5**						5
Acacia semilunata		**6**						6

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Goodenia rotundifolia								
Bothriochloa bladhii								
Laxmannia gracillis								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	84	83	82	81	80	
Native perennial grass			5		10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	5	5	20	5		
Non-native grass						
Non-native forbs and shrubs						
Litter	20	10				
Rock						
Bare ground	75	85	75	95	90	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	Regrowth (11.5.1)	NA	LC	NCAP
Survey result	No-remnant	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	No. Area has the characteristic species for 11.5.1, however it does not have 50% cover and 70% height to reference site. Also, there is evidence of clearing procedure on site and very low density of ground vegetation.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☒Scattered	☐Common	☐Abundant
Potential for **fleshy fruiting plants**	☐Absent	☒Scattered	☐Common	☐Abundant
Potential for **seeding grass cover**	☐Absent	☒Scattered	☐Common	☐Abundant
Dense shrub/grass shelter	☒Absent	☐Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☒Absent	☐Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☒Absent	☐Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☒Absent	☐Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☐Absent	☐Scattered	☐Common	☒Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☒Scattered	☐Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☒Common	☐Abundant
Mistletoe/Epiphytes	☐Absent	☒Scattered	☐Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	NA	**No. of trees with hollows (>30cm)**	NA

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
NA					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero

SITE IDENTIFICATION			
Site Name:	Girrahween.. WP239	Date:	24 Aug 23
Tenure:	PL 491	Assessor(s):	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	220889
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7068448
☐ Monitoring	☑ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 81		#	
East	# 82		#	
South	# 83		#	
West	# 84		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SI ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale ✓	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**			
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**			
	'Medium clay'	**'Medium heavy clay'** ✓	**'Heavy clay'**	(Saline mud)					
Erosion	Absent ✓	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered ✓	Frequent	**Time since**	Recent	Old ✓	**Average Height (m)**	3				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			22			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense) ✓		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse ✓		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

target zero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SE	Start Easting	561 220858	End Easting							
		Start Northing	7068453	End Northing							
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)	18	23	10	17	3	7	/		1	2	e.1	1
Canopy cover (%)	5		40		10		/		5		<5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus fibrosa			1	5	1		1	
Callitris glaucophylla					1			
Acacia leiocalyx							2	
Allocasuarina luehmannii					1		1	
Cheilanthes sieberi								
Eriachne mucronata								
Eriania aspera								
Goodenia hederacea								
Ruticbosia lanata								
Dodonaea pedunculata								
Chrysocephalum apiculatum								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	85	86	87	88	89	
Native perennial grass	10	10	10		20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)		20	10	30	30	
Non-native grass						
Non-native forbs and shrubs						
Litter	80	30	60	60	40	
Rock						
Bare ground	10	40	30	10	10	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7. (Eco)	N/CAP	LC	LC
Survey result	11.7.7	N/CAP	LC	LC
Agree with mapped RE? If no, provide justification from field data	yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	7	No. of logs (>10cm)	4
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	√ Absent		Present	
Wetland / Swamp / Waterbody	√ Absent		Present	
Waterway	√ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	√ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	√ Abundant
Potential for **seeding grass cover**	Absent	√ Scattered	√ Common	√ Abundant
Dense shrub/grass shelter	Absent	√ Scattered	Common	√ Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	√ Abundant
Large Non-Eucalypts (>20cm DBH)	√ Absent	Scattered	√ Common	Abundant
Large rocks (>30cm)	√ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	√ Absent	√ Scattered	Common	Abundant
Leaf litter depth	Absent	√ Single layer	Multiple layers	Deep layers
Leaf litter coverage	√ Absent	√ Scattered	Common	Abundant
Termite mounds (>50cm)	√ Absent	Scattered	Common	Abundant
Rock piles	√ Absent	Scattered	√ Common	Abundant
Trees with shedding bark	Absent	Scattered	√ Common	Abundant
Soil cracks	Absent	√ Scattered	Common	√ Abundant
Koala feed trees	Absent	Scattered	√ Common	√ Abundant
Mistletoe/Epiphytes	Absent	Scattered	√ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Log					
Skeleton					
Burrow					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	✓ Yes / No ✓ Yes / No ✓ Yes / No ✓ Yes / No	✓	Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			

target zero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Bellevue Par-12, WP190	Date:	29.05.2023
Tenure:	PL 492	Assessor(s):	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	229015
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7052565
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9559		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	(Sandy clay loam')	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)		Scattered		Frequent		
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL	11						**Avg DBH (cm) of EDL**			12		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	N	Start Easting	229019	End Easting	229004		
		Start Northing	7052592	End Northing	7052586		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		10 12	6 8		2 4	0.1 0.2	
Canopy cover (%)							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Callitris glaucophylla		147		81	66			
A. leiocalyx		157					157	
Psydrax odorata		2					2	
Paspalum urvillei								
Cheilanthes distans								
Eragrostis sororia								
Aristida caput-medusae								
Melinis repens								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9554 →					
Native perennial grass	20	60	70	35	60	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	15	5	10	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	70	25	25	55	30	
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.7.7	N/A	LC	NCAP
Survey result	11.7.7	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	6	No. of logs (>10cm)	3
Per hectare (x 20)	X	Per hectare (x 20)	X	Per hectare (x 20)	120	Per hectare (x 20)	30

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	X	No. of trees with hollows (>30cm)	X

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	(Yes)	No	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

* ground layer grass dominated.



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Thorne	**Date:**	Thurs 04/05/23
Tenure:	WP131	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	220946
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7061616
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 88579		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	(Orange	Brown)	Red	Black	Grey	(Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)		
Erosion		(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%		26-75%	>76%	n/a						
Site condition	Very good	Good		Moderate	Poor	Degraded						
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	12m					**Avg DBH (cm) of EDL**			25cm			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	220931			End Easting	220951				
		Start Northing	7061593			End Northing	7061636				
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)	25	30	16	25	6	16			1	6	0.1	1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra			1	11				
A. leuhmanni				13	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	14	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8874 →					
Native perennial grass	70	70	75	15	2	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	10				
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	5	15	15	15	8	
Rock						
Bare ground	20	5	10	70	90	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1	NA	LC	NCAP
Survey result	11.5.1	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	~~/~~	No. of hollow logs	~~/~~	Total length of logs (>10cm)	39	No. of logs (>10cm)	13
Per hectare (x 20)	~~/~~	Per hectare (x 20)	~~/~~	Per hectare (x 20)	780	Per hectare (x 20)	260

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	(Absent)		Present	
Waterway	(Absent)		Present	
Potential for **nectar / pollen**	Absent	Scattered	(Common)	Abundant
Potential for **fleshy fruiting plants**	Absent	(Scattered)	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	(Abundant)
Dense shrub/grass shelter	(Absent)	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	(Abundant)
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	(Common)	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	(Absent)	Scattered	Common	Abundant
Leaf litter depth	Absent	(Single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	(Scattered)	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	(Common)	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	Absent	(Scattered)	Common	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	(Common)	Abundant
Mistletoe/Epiphytes	(Absent)	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Ojinchween WP159	**Date:**	11 Apr 2023
Tenure:	491	**Assessor(s):**	Twingo Mouse

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	0220981
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7765045
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 6		#	
East	# 7		#	
South	# 8		#	
West	# 9		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E ✓	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark ✓	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam' ✓	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent ✓	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance	
Dieback	0%	1-25% ✓	26-75%	>76%	n/a		
Site condition	Very good	Good ✓	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)** 7
Disturbance notes	Bush fire last month						

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**

Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).

Ecologically dominant layer (EDL)	T1	T2 ✓	S1	S2	G
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	212	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% ✓ (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse ✓	Very sparse	Absent

Threatened Flora, Type A Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Type A Flora (list below)	Found on Site – records below	Not Found On Site ✓

Orchidaceae sp. (Orchids)	*Xanthorrhoea sp.* (Grass trees	*Myrmecodia sp.* (Ant plants)	*Cycadaceae sp.* (Cycads)	*Zamiaceae sp.* (Cycads)	*Huperzia sp.* (Lace plants)	*Platycerium sp.* (Staghorns)	*Brachychiton sp.* (Bottle trees)	*Livistona sp.* (Cabbage palms)	*Hydnophytum sp.* (Ant plants)

Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora, Type A Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	0220458			End Easting	0221007		
		Start Northing	7065016			End Northing	7065052		
Stratum	E	T1		T2		T3	S1		S2/Seedlings
Height range (m)	/	12	8	32	8	/	1	2	0.1 / 1
Canopy cover (%)	/	40%		30		/	10		5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus cephra		8		17	☒			1
Acacia leiocalyx		1						1
Allocasuarina luehmannii		5		1			☐	
Callitris glaucophylla		1		1				
Fimbristylis dichotoma								
Dodonea triangularis								
Aristida caput-medusae								
Aristida caput-medusae								
Eragrostis lanicauda								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	1	2	3	4	5	
Native perennial grass	70	5	10	20	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		10	10	10	5	
Native shrubs (<1m)					5	
Non-native grass						
Non-native forbs and shrubs						
Litter	10	5	10	5	10	
Rock						
Bare ground	20	60	70	65	70	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Regrowth 11.5.1	LC	LC	LC
Survey result	Regrowth 11.5.1	LC	LC	LC
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	-	Per hectare (x 20)	-	Per hectare (x 20)	-	Per hectare (x 20)	-

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent	Scattered ✓	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered ✓	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common ✓	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered ✓	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered ✓	Common ✓	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered ✓	Common	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant ✓
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Koala, Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes ✓	No	for clearing vegetation
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓ ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 109	**Date:**	10 May 2923
Tenure:	PL305	**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 221150					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7058538					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	99			
East	100			
South	101			
West	102			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☐Downs – open, rolling, ashy, pebbly	☒Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☒Level (<1%)	☐Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☐NE	☐NW	☒SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☒Brown	☐Red			
	☐Black	☐Grey	☒Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☐'Sandy clay Loam'	☐'Clay loam'	☐'Clay loam sandy'	☒'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☒Grazing	☒Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☐Clearing	☐Cultivation	☒Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☒1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☐Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	10
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	☐**CEST** ☐**Rf** ☐**H** ☐**FOR** ☐**WDL** ☐**GRL** ☐**IMP** ☐**LKE** ☐**RIP** ☐**SHR** ☐**SW** ☐**DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL		**Avg DBH (cm) of EDL**			
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☒10-30% (sparse)	☐<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☐Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	SE		Start Easting	56J 221131			End Easting	56J 221182					
			Start Northing	7058551			End Northing	7058534					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)	-	-	8	12	4	6			1	2	0.1	1	
Canopy cover (%)	-		15		6				>1				

Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		Total						
Eucalyptus crebra		**37**		20	3			15
Acacia leicolayx		**26**			20		6	

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			**E**	**T1**	**T2**	**T3**	**S1**	**S2**
		TOTALS						
Fimbristylis dichotoma								
Murdannia graminea								
Austrostipa scabra								
Capillipedium spicigerum								
Dodonea triangularis								
Dichanthium sericeum								
Calotis cuneifolia								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	98	97	96	95	94	
Native perennial grass		40	30	5	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5	10		20	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	30	15	10	20	30	
Rock						
Bare ground	70	40	50	75	40	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4 (3D EcoSmart)	NA	LC	NCAP
Survey result	11.7.4	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☐Common	☒Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☐Common	☒Abundant
Potential for **seeding grass cover**	☐Absent	☐Scattered	☐Common	☒Abundant
Dense shrub/grass shelter	☐Absent	☐Scattered	☒Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☐Scattered	☒Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☐Scattered	☒Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☒Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☐Absent	☐Scattered	☒Common	☐Abundant
Termite mounds (>50cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☐Scattered	☒Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☐Common	☒Abundant
Mistletoe/Epiphytes	☐Absent	☐Scattered	☒Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	NA	**No. of trees with hollows (>30cm)**	NA

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Girrahween Central P-1	Date:	31.05.2023
Tenure:	PL 305	Assessor(s):	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	221191
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7062786
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9684		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	Time since	Recent	Old	Average Height (m)			
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS
Key: CEST-Coastal & estuarine; Rf-Rainforest (including SEVT); H-Heath; FOR-Forest; WDL-Woodland; GRL-Grassland; IMP-Improved pasture; LKE-Lake/dam; RIP-Riparian; SHR-Shrubland; SW-Swamp/Wetland; DIS-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	15				Avg DBH (cm) of EDL		20					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	N	Start Easting	221181		End Easting	221197							
		Start Northing	7062764		End Northing	7062807							
Stratum	E	T1		T2		T3		S1		S2/Seedlings			
Height range (m)		4	16	8	10	6	8	2	4	0·1	2		
Canopy cover (%)													

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (S0m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus		22		19	3			
Allocasuarina leuhmannii		19			9	7		3
Melaleuca ixiodendylla		20						20
Dicksonia antarctica								
Pteridium esculentum								
Chrysocephalum apiculatum								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
TOTALS								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9679	→	→	→	→	
Native perennial grass	20	10	10	5	5	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	20	40	25	25	
Rock						
Bare ground	50	70	50	70	70	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.7.7	N/A	LC	NCAP
Survey result	11.7.7	"	"	"
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)	14	No. of logs (>10cm)	7
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	280	Per hectare (x 20)	140

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent ×	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ×	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	X	No. of trees with hollows (>30cm)	X

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	(Yes) / No		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

210

SITE IDENTIFICATION			
Site Name:	WP (165)	**Date:**	17.04.23 (Mon)
Tenure:	REES, EAU38	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	221272
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7064118
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	#	8286	#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	12m					**Avg DBH (cm) of EDL**			18cm			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	0221286			End Easting	0221258				
		Start Northing	7064100			End Northing	7064139				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		12	15	9	12	52	69	1	2	0.1	1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra				2				
Allocasurina leuhamanni					6	7+2	+5+7	
A. leiocalyx						3	111+6+75	
A. leucarpa					1	1	[illegible]	
Grass tree							1	20+
Dianella sp								
Aristida grass sp								
Mulga Cem								
Crysophylum apiculatum								
Metinis Ribens								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	0281 →					
Native perennial grass	60	70	50	70	80	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	5	10				
Non-native grass						
Non-native forbs and shrubs						
Litter	5	10	40	10	15	
Rock						
Bare ground	30	10	10	20	5	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D (11.5.1)	~~11.7.4 / 11.7.7 / 11.7.5 / 11.7.12~~	~~E / C~~ N/A	L	NCA?
Survey result	11.5.1	LC	LC	NCA?
Agree with mapped RE? If **no**, provide justification from field data	Consistent with Ecosmart & 3D mapping Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)	4m	No. of logs (>10cm)	X5
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species	
V	Vulnerable		
NT	Near Threatened		
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds	
CBS	Colonial Breeding Species		

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Recent fire damage



North face of transect



East face of the transect



South face of the transect



West face of the transect

Camp

SITE IDENTIFICATION			
Site Name:	Girraween FCS	Date:	7 Dec 2022
Tenure:	PL 491	Assessor(s):	Teresa Carvalho, Thiago Moura, Peter Hoff

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	221299
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7066257
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 35		#	
East	# 36		#	
South	# 37		#	
West	# 38		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	(Silty loam)		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion		(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	(Clearing)	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	(26-75%)	>76%	n/a			
Site condition	Very good	Good	(Moderate)	Poor	Degraded			
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes	~~Area appears to have been subject to severe fire~~							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**(WDL)**	**(GRL)**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	(T1)		T2		S1		S2		G			
Avg height (m) of EDL	10				**Avg DBH (cm) of EDL**		19					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		(10-30% (sparse))		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		(Very sparse)		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	Found on Site – records below	(Not Found On Site)

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	S.	Start Easting	22 1292			End Easting	21 2 84						
		Start Northing	706 6 277			End Northing	7066 233						
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)			6	13	2	6			1	2	0.1	1	
Canopy cover (%)			20%		5%				>1%		>1%		
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed										
NB: Record ground cover species within 50m x 10m transect			E		T1		T2		T3		S1		S2
		TOTALS											
Callitris glaucophylla		4			1		3						
Acacia leiocalyx		5					3				2		
A. aprepta		1			1								
Crasspedia sp.													
Fimbristylis dichotoma													
Panicum decompositum													
Chrysopogon fallax													
Sphaeromorphea acutrilis													
Goodenia sp.													

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

targetzero
► zero incidents ► zero injuries

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	39	40	41	42	43	
Native perennial grass	65	65	90	20	35	
Native other grass (if relevant)			5	15		
Native forbs and other species (non-grass)	29	30				
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	5	5	5	65	63	
Rock						
Bare ground						
Cryptogams	/					
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	cleared + HVR	11.5.1		
Survey result	Cleared + HVR	11.5.1		
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	No. of hollow logs	0	Total length of logs (>10cm)	4.5	No. of logs (>10cm)	2
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Termite mounds					
Trees					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees Termites
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	See above Not a well yard
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Kranew 101 Camp	**Date:**	26/10/21
Tenure:	PL491	**Assessor(s):**	J. Kelk

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	221269
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7066277
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☒ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 28		#	
East	# 29		#	
South	# 30		#	
West	# 31		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes	Cleared site											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2 G
Avg height (m) of EDL	0.3	**Avg DBH (cm) of EDL**	N/A	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse) n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	WNW	Start Easting	221292		End Easting	221246					
		Start Northing	7066267		End Northing	7066283					
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)	-	-	5	8	-	-	-	-	-	-	-
Canopy cover (%)	-		~~4~~ 1%		-		-		-		-

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia		1		1				
Cypress pine	Callitris glaucophylla	1		1				
Whip Grass - medusa	Aristida caput-medusae							
~~[illegible]~~	Evolvulus alsinoides							
Stylo								
Sporobolus sp.								
Aristeda ramosa								
Celotis cuneifolia								
Eragrostis ~~orie~~ leptostachya								
Chrysopogon fallax								
Walwhalleya subxcophylla								
~~Ste~~ Mains pest	Glandularia aristigera							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	37				36	
Native perennial grass	60	85	80	70	70	73
Native other grass (if relevant)						
Native forbs and other species (non-grass)		10	20	20	10	12
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter						
Rock						
Bare ground	40	5		10	20	15
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Cleared (3D)	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other					
Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Clearing trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



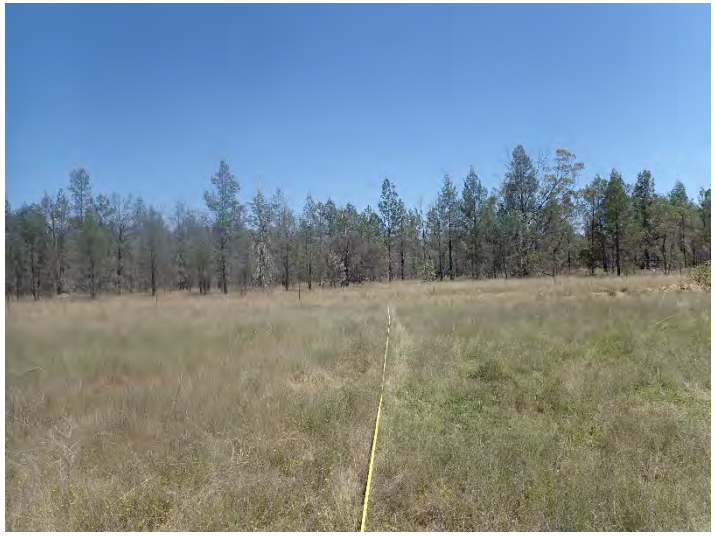
North face of transect



East face of the transect



South face of the transect



West face of the transect

Scarred

SITE IDENTIFICATION			
Site Name:	Girrahween Res. Dew Camp	**Date:**	07. Dec 22
Tenure:	PL ~~PPL~~ 305	**Assessor(s):**	TC / PH / TM

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	0221320
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7065083
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 44		#	
East	# 45		#	
South	# 46		#	
West	# 47		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	(Silty loam)		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion		(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1.0				
Disturbance notes	Subject to a severe fire in the past											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	~~T1~~			T2		S1			S2			G
Avg height (m) of EDL				1.0		**Avg DBH (cm) of EDL**			1 a			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

221325
7065056

221323
7065105

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	~~02~~ ~~21~~ ~~4~~ ~~8~~			End Easting	~~7~~ ~~6~~ ~~4~~ ~~6~~ ~~8~~				
		Start Northing	~~022~~ ~~7~~ ~~4~~ 618			End Northing					
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)			2	6					1	2	0.1 / ~~1~~
Canopy cover (%)											
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
VLW Acacia ixiophylla		97		2			4	39			
Callitris glaucophylla		2									
Allocasuarina leuhmann		12		11			1				
Perotis rara											
Aristida caput-medusae											
Fimbristylis dichtoma											
Eragrostis sp											
Chiolanthes sieberi											
Panicum decomposition											
Goodenia sp											
Dodonea triangularis											
Eragrostis sp											
Paper daisy											

VLF
S2
S1
~~13~~
E2
BCP
T1
S1
T1
11

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	48	49	50	51	52	
Native perennial grass	65	10	20	80	70	
Native other grass (if relevant)			5			
Native forbs and other species (non-grass)		~~10~~			10	
Native shrubs (<1m)		10	50			
Non-native grass						
Non-native forbs and shrubs		5				
Litter	35		15	20	20	
Rock						
Bare ground		75	10			
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	HVR 11.5.1			
Survey result	HVR 11.7.15			
Agree with mapped RE? If no, provide justification from field data	low shrubland. Area has been subject a fierce wild fire. much of the REDL (SI) now dead dead.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	(Absent)		Present	
Waterway	(Absent)		Present	
Potential for **nectar / pollen**	Absent	(Scattered)	Common	Abundant
Potential for **fleshy fruiting plants**	(Absent)	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	(Common)	Abundant
Dense shrub/grass shelter	Absent	(Scattered)	Common	Abundant
Large Eucalypts (>30cm DBH)	(Absent)	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	(Absent)	Scattered	Common	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	(Absent)	Scattered	Common	Abundant
Leaf litter depth	Absent	(single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	(Scattered)	Common	Abundant
Termite mounds (>50cm)	Absent	(Scattered)	Common	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	(Absent)	Scattered	Common	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	(Scattered)	Common	Abundant
Mistletoe/Epiphytes	Absent	(Scattered)	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Fauna mud Trail					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	Trees.
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	Not a focus
Notes			

Area has had a fire in the past



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 111	**Date:**	10 May 2023
Tenure:	PL305	**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 221383					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7059222					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	85			
East	86			
South	87			
West	88			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☒Downs – open, rolling, ashy, pebbly	☐Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☐Level (<1%)	☒Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☒NE	☐NW	☐SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☒Brown	☐Red			
	☐Black	☐Grey	☒Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content**)	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☐'Sandy clay Loam'	☐'Clay loam'	☐'Clay loam sandy'	☒'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☒Grazing	☒Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☒Clearing	☐Cultivation	☒Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☒1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☒Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	8
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	☐**CEST** ☐**Rf** ☐**H** ☐**FOR** ☒**WDL** ☐**GRL** ☐**IMP** ☐**LKE** ☐**RIP** ☐**SHR** ☐**SW** ☒**DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	30	
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☐10-30% (sparse)	☐<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☐Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	NE		Start Easting	56J 22137			End Easting	56J 221401					
			Start Northing	7059204			End Northing	7059244					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)	-	-	10	15	4	8			1	2	0.1	1	
Canopy cover (%)	-		10		15				5		5		

Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		Total						
Eucalyptus crebra		**10**		9	1			
Allocassuarina luehmanni		**17**		1	12		5	
Acacia semilunata		**7**					7	

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			**E**	**T1**	**T2**	**T3**	**S1**	**S2**
		TOTALS						
Calotis cuneifolia								
Capillipedium spicigerum								
Cenchus ciliaris								
Eragrotis cilianensis								
Echinochloa colona								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	93	92	91	90	89	
Native perennial grass	20	5	10			
Native other grass (if relevant)						
Native forbs and other species (non-grass)		10				
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	30	30	20	10	
Rock						
Bare ground	70	55	60	80	90	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.7 (3D EcoSmart)	NA	LC	NCAP
Survey result	11.7.7	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	2	**No. of logs (>10cm)**	2
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	40	**Per hectare (x 20)**	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☒Common	☐Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☒Common	☐Abundant
Potential for **seeding grass cover**	☐Absent	☒Scattered	☐Common	☐Abundant
Dense shrub/grass shelter	☐Absent	☒Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☐Scattered	☒Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☒Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☐Absent	☒Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☒Absent	☐Scattered	☐Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☒Common	☐Abundant
Mistletoe/Epiphytes	☐Absent	☒Scattered	☐Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	**No. of trees with hollows (>30cm)**	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
NA					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Scamp

(1:50)

SITE IDENTIFICATION			
Site Name:	Gimlet Camp HVR 17.5	Date:	7 Dec 2022
Tenure:	PL 305	Assessor(s):	TH. TM T.C

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	221385
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7016265
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (66)
☐ Roads & Tracks	☐ Seismic Line	Other description	Camp
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 53		#	
East	# 54		#	
South	# 55		#	
West	# 56		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	22								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	S	Start Easting	221396			End Easting	221376				
		Start Northing	7065286			End Northing	7065236				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		6	15	2	6			1	2	0.1	1.0
Canopy cover (%)		20%		30%				1%		> 1%	
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Eucalyptus ~~[illegible]~~ crebra		12		11	1						
Allocasuccina leuhmannii		51		33	18						
~~[illegible]~~ Acacia ixiophylla		10					2	8			
Aristida spp											
Pentatis rare											
Gahnia aspera											
Goodenia sp											

NR1

T_1 T_2

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	57	58	59	60	61	
Native perennial grass	30	30	40	10	25	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)			10			
Non-native grass						
Non-native forbs and shrubs						
Litter	30	40	40	10		
Rock						
Bare ground	40	40	10	80	25	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	HVR 11.5.1			
Survey result	11			
Agree with mapped RE? If no, provide justification from field data	Yes HVR 11.5.1			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	~~Common~~	Abundant
Potential for **fleshy fruiting plants**	~~Absent~~	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	~~Scattered~~	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	~~Scattered~~	Common	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	~~Absent~~	Scattered	Common	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	~~Common~~	Abundant
Mistletoe/Epiphytes	Absent	~~Scattered~~	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Large tree,					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Tree
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	Not a large tree
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero

SITE IDENTIFICATION			
Site Name:	Girrahween Central	**Date:**	19/05/23
Tenure:	Infra-Warehouse/office	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type office facility		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	221424
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7065456
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 9404		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	0.5
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	9-11m 10	**Avg DBH (cm) of EDL**	15-17cm 16									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	221401	End Easting	221448
		Start Northing	7065461	End Northing	7065454

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		11 25 14	6 11		2 64	0.1 0.2
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. Crebra		1		1				
A. ixiophylla		6					++++	1
A. leuhmanni		4					1111	
A. semiurata		1					1	
Eulalia aurea								
Apiculatum chrysocephalum								
Eragrostis minor								
Eimbrystillis sp.								
Chrysopogon fallax								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9400	→				
Native perennial grass	80	90	80	80	90	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter						
Rock						
Bare ground	20	10	20	20	10	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (Ecosmart)	Non-rem/cleared	N/A	N/A	N/A
Survey result	cleared	"	"	"
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)		No. of logs (>10cm)	
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Recent fire



North face of transect



East face of the transect



South face of the transect

West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Yeronga 101 access	**Date:**	26/10/2021
Tenure:	PL49	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	1239 ~~221439~~ 221436
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7067223
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 37		#	
East	# ↓		#	
South	#		#	
West	# 40		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	17	**Avg DBH (cm) of EDL**	25									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting 1237	221417	End Easting 1238	221454	
		Start Northing	7067231	End Northing	7067210	
Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		15 17	6 9	3 4	~~4~~ 0.5 1.5	
Canopy cover (%)		5	50	5	10	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida caput-medusae								
Dichanthium sericeum								
Galnica aspera								
Lomandra filiformis								
~~Brunoniella~~ Evolvulus alsinoides								
Cheilanthes sieberi								
Dianella caerulea								
Aristida ramosa								
Panicum effusum								
Hibiscus sturtii								
Waluhalleya subxerophila								
Cultitris glaucophylla		2		11 (2)				
Pungent shrub	Styphelia viridis	8					~~IIII~~ 111 (8)	
Eucalyptus exsperta		3			111 (3)			
Wilga	Geijera ~~Ex~~ parviflora	1			~~IIII IIII IIII IIII~~		(1)	
Allocasuarina luehmanii		89			~~IIII IIII IIII IIII~~ (10)	~~IIII IIII IIII~~ 11 (17)	11 (2)	
Alphitonia excelsa		12			(1)	~~IIII~~ 1111 (9)	11 (2)	
Acacia leiocalyx		35				~~IIII IIII IIII IIII IIII~~ (25)	~~IIII IIII~~ (10)	
Eucalyptus crebra		6 ~~8~~		1111 (4)	11 (2)			

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	41	→	→	→	45	
Native perennial grass	30	65	55	75	70	59
Native other grass (if relevant)						
Native forbs and other species (non-grass)		3				0·6
Native shrubs (<1m)		2	2			0·8
Non-native grass						
Non-native forbs and shrubs						
Litter	~~60~~ 70	10	43	25	30	35·6
Rock						
Bare ground		20				4
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1 (3D)	DCNA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4+147	No. of logs (>10cm)	~~IIII~~ 5
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	140	Per hectare (x 20)	100

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 24m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION

Site Name:	Solar Panel Farm 1	**Date:**	28/02/23
Tenure:	PL 491	**Assessor(s):**	HM, TM, NU

DEVELOPMENT TYPE & LOCATION

Development Type				Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐	Well pad	☐	Gas Processing Facility	**Easting (E)**	221543
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7066581
☐	Monitoring	☐	Pipeline	**Datum**	~~GDA94~~, MGA zone: 55 or (56)
☐	Roads & Tracks	☐	Seismic Line	**Other description**	Solar Farm GDA2020
☐	Work over	☐	Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 135		#	
East	# 136		#	
South	# 137		#	
West	# 138		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)

Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)

Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	(E)	W	(NE)	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	(Pale)	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	(Clayey sand')	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	(Silty clay loam')	Light clay	Light medium clay'	Medium clay'	Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank

post fire

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	5				
Disturbance notes	Fire present x2 weeks prior to survey.											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS

Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL			**Avg DBH (cm) of EDL**	8.6	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora, Type A Flora and Weeds (declared and locally significant)									
Threatened Flora	Found on Site – records below				Not Found On Site ✓				
Type A Flora (list below)	Found on Site – records below				Not Found On Site ✓				
Orchidaceae sp. (Orchids)	*Xanthorrhoea sp.* (Grass trees	*Myrmecodia sp.* (Ant plants)	*Cycadaceae sp.* (Cycads)	*Zamiaceae sp.* (Cycads)	*Huperzia sp.* (Lace plants)	*Platycerium sp.* (Staghorns)	*Brachychiton sp.* (Bottle trees)	*Livistona sp.* (Cabbage palms)	*Hydnophytum sp.* (Ant plants)
Weed infestations	Found on Site – records below				Not Found On Site				

Threatened Flora, Type A Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; If confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	NE	Start Easting	0221519		End Easting	0221563			
		Start Northing	7066575		End Northing	7066584			
Stratum	E	T1		T2	T3	S1		S2/Seedlings	
Height range (m)	/ /	7	12			1	2	0.1	1
Canopy cover (%)		20		1		1		–	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalypt Pdpuna		2		11				
Callitris Glaucophylla		32		++++ ++++ ++++ ++++ ++++			++++ 11	
Allocasurina luehmanni		20		++++ ++++ 1			++++ 1111	
Acacia kocdyx		5			11		111	
Gahnia aspera								
Aristida capty-medusae								
Chrysocephalum apiculatum								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	130	131	132	133	134	
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	30%	30%	40%	30%	5%	
Rock						
Bare ground	70%	70%	60%	70%	95%	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	N/A Remnant 11.5.1	LC	Non-remnant	Non-remnant
Survey result	HRV 11.5.1	L.C		
Agree with mapped RE? If no, provide justification from field data	No, vegetation is in a state of advantage to be considered as HRV RE. 11.5.1 (up to 12m of Key trees)			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	1m	No. of logs (>10cm)	1
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Koala, Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	Any tree/shrub clearing
Ecologist	Yes	(No)	
Species Management Plan	(Yes)	No	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	(Yes) / No		Is the clay content > 20%?
	Yes / (No)		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Survey was post fire, ground vegetation not present. Remainder burnt but will rejuvenate.

Limited

See field Notes 28.02-01.03 TM



North face of transect



East face of the transect

South face of the transect

West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween - WP 154	**Date:**	11 APR 2023
Tenure:	491	**Assessor(s):**	Triage Mines

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	0221617
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7065932
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 22		#	
East	# 23		#	
South	# 24		#	
West	# 25		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly ✓	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N ✓	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark ✓	Mottled				
Soil (field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam' ✓	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent ✓	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance	
Dieback	0%	1-25% ✓	26-75%	>76%	n/a		
Site condition	Very good	Good ✓	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)** 1
Disturbance notes	Many ago						

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**

Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).

Ecologically dominant layer (EDL)	T1	T2 ✓	S1	S2	G
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	18.2	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% ✓ (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense ✓	Sparse	Very sparse	Absent

Threatened Flora, Type A Flora and Weeds (declared and locally significant)									
Threatened Flora	Found on Site – records below					✓ Not Found On Site			
Type A Flora (list below)	Found on Site – records below					✓ Not Found On Site			
Orchidaceae sp. (Orchids)	*Xanthorrhoea sp.* (Grass trees	*Myrmecodia sp.* (Ant plants)	*Cycadaceae sp.* (Cycads)	*Zamiaceae sp.* (Cycads)	*Huperzia sp.* (Lace plants)	*Platycerium sp.* (Staghorns)	*Brachychiton sp.* (Bottle trees)	*Livistona sp.* (Cabbage palms)	*Hydnophytum sp.* (Ant plants)
Weed infestations	Found on Site – records below					Not Found On Site			

Threatened Flora, Type A Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
N/A	N/A	N/A			

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	221630			End Easting	221605				
		Start Northing	7065954			End Northing	7065910				
Stratum	E	T1		T2		T3	S1		S2/Seedlings		
Height range (m)	/	9	14	7	9	/	1	2	01	1	
Canopy cover (%)	/	10		30		/	5		10		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus crebra		14		⊠L	⊠1			
Allocassuarina luehmannii		27			⊠⊠⊠⊠L			
Acacia leiocalyx		5					⊠	
Chrysocephalum apiculatum								
Murdannia graminea								
Eragrotis ciliaensis								
Aristida caput-medusae								
Cheilathes sieberi								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	30	29	28	27	26	
Native perennial grass	40	60			30	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	10				10	
Non-native grass						
Non-native forbs and shrubs						
Litter	10	20	30	20	10	
Rock						
Bare ground	20	20	70	80	50	
Cryptogams	10					
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Regrowth 11.7.4	LC	LC	LC
Survey result	Reg 11.7.4	LC	LC	LC
Agree with mapped RE? If **no**, provide justification from field data	yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent	Scattered ✓	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered ✓	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered ✓	Common	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered ✓	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common ✓	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered ✓	Common	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Tyres					
logs					
Rubbish					

E	Endangered	**Special Least Concern Species** Koala, Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	Clearing weed and grassland
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	~~Yerenga~~ 104 WELL PAD 101	Date:	28/02/2023
Tenure:	491	Assessor(s):	NU/TH/HM

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	221656
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7067281
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 158		#	
East	# 159		#	
South	# 160		#	
West	# 161		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	30				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			70			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	NE	Start Easting	221648	End Easting	221665
		Start Northing	7067255	End Northing	7067301

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		7 | 10	2 | 7		1 | 2	0.1 | 1.0
Canopy cover (%)		20	15		90	–

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Caltris glaucophylla		31		31				
Eucalyptus crebra		23			23	29		
Acacia leiocalyx		29				~~29~~	29	

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	162	163	164	165	166	
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	30	20	35	30	25	
Rock						
Bare ground	70	80	65	70	75	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non. Remnant			
Survey result	11.5.1	LC	LC	NC
Agree with mapped RE? If no, provide justification from field data	No. Dense vegetation composed by Eucalyptus cubea as dominant species and Callitris glaucophylla with a formation of a woodland (>10m) is characteristic of RE 11.5.1			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)		No. of logs (>10cm)	
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	N/A	No. of trees with hollows (>30cm)	N/A

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Any vegetation cleaning
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes	Bush fired area		

Area surveyed affected by bush fire

See 28.02.01.03 field Notes TM



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween Central	**Date:**	19/05/23
Tenure:	infra 2	**Assessor(s):**	HM B NU

Warehouse/office

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	221697
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7065395
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

* Warehouse

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 9415		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%		26-75%	>76%		n/a
Site condition	Very good	Good		Moderate	Poor		Degraded
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** 1m
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	18-22m 12		**Avg DBH (cm) of EDL**	18	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	221705	End Easting	221693
		Start Northing	7065422	End Northing	7065373

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		15 ~~22~~ 18	6 | 15		2 | 64	0.1 | 0.2
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra		4		1	III			
A. leuhmanni				8			~~HH~~ III+8+12	
A. ixiophylla					1		1	
A. semilunata							~~HHHHH~~ ~~HH~~ I	
Eremochloa bimaculata								
Chrysocephalum apiculatum								
Hakea sp								
Fimbristillis sp.								
Chrysopogon fallax								
Aristida caput-medusa								
Eulalia aurea								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	9410 →					
Native perennial grass	90		10	75	80	
Native other grass (if relevant)						
Native forbs and other species (non-grass)			5		5	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter		10	5	5	5	
Rock						
Bare ground	10	90	80	20	10	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	cleared	N/A	N/A	N/A
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		**No. of hollow logs**		**Total length of logs (>10cm)**		**No. of logs (>10cm)**	
Per hectare (x 20)		**Per hectare (x 20)**		**Per hectare (x 20)**		**Per hectare (x 20)**	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Solar Panel farm 2,	SITE IDENTIFICATION		
Site Name:	~~Solar Farm 2~~	Date:	28/02/23
Tenure:	491	Assessor(s):	TM/NH/HM

DEVELOPMENT TYPE & LOCATION

Development Type			Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility		Easting (E)	221847
☐ Pilot Well + Dam	☐ Dam		Northing (N)	7067016
☐ Monitoring	☐ Pipeline		Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line		Other description	~~Solar Farm~~ / Solar Panel
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 146		#	
East	# 147		#	
South	# 148		#	
West	# 149		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)

Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)

Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	6				
Disturbance notes	Fire Recent Bushfire											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL			**Avg DBH (cm) of EDL**	8.0	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora, Type A Flora and Weeds (declared and locally significant)									
Threatened Flora	Found on Site – records below					Not Found On Site			✓
Type A Flora (list below)	Found on Site – records below					Not Found On Site			✓
Orchidaceae sp. (Orchids)	*Xanthorrhoea sp.* (Grass trees)	*Myrmecodia sp.* (Ant plants)	*Cycadaceae sp.* (Cycads)	*Zamiaceae sp.* (Cycads)	*Huperzia sp.* (Lace plants)	*Platycerium sp.* (Staghorns)	*Brachychiton sp.* (Bottle trees)	*Livistona sp.* (Cabbage palms)	*Hydnophytum sp.* (Ant plants)
Weed infestations	Found on Site – records below					Not Found On Site			

Threatened Flora, Type A Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; If confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	221852	End Easting	0221849
		Start Northing	7066991	End Northing	7067040

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		8 / 15	6 / 8		1 / 2	0.1 / 1
Canopy cover (%)		30	10		1	1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Callitris glaucophila		74		⊠⊠⊠⊠⊠	⊠⊠ L		L	
Eucalyptus cerea		2		F				
Allocasuarina lehm.		44		⊠⊠L	□		⊠U	
Acacia aspera		3					□	
Acacia leiocalyx		3					□	
Acacia semimulata		1						
Eucalyptus polyanea		2		L				
Eucalyptus decacticans		3		U				
Chrysopogon fallax								
Hakea sp.								
Gahnia aspera								
Aristida ceptu-medusae								
Erogrotis sp.								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	137	138	139	140	141	
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	40	30	40	30	20	
Rock						
Bare ground	60	70	60	70	80	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4	LC	LC	n/c
Survey result	11.7.4	LC	LC	n/c
Agree with mapped RE? If no, provide justification from field data	yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	L	No. of logs (>10cm)	L
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	40	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					
Burrows					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Koala, Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	. Clearing vegetation
Ecologist	Yes	(No)	
Species Management Plan	(Yes)	No	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	(Yes) / No		Is the clay content > 20%?
	Yes / (No)		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Area surveyed affected by bushfire.

See field Notes 28.02 - 01.03 TM



North face of transect



East face of the transect

35_148_Girrahween FCS_South.DNG

South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Stimson	**Date:**	Fri 05/05/23
Tenure:	WP122	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	222014
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7061373
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	#8951		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	(Grey)	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	(Clay loam')	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	10m				
Disturbance notes	Very severe fire burn											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	30m		**Avg DBH (cm) of EDL**	50cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Prickly pear (Opuntia Stricta)	scattered				

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	222003		End Easting	222020			
		Start Northing	7061350		End Northing	7061396			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)		20	30	8	20			1	8	0.1	1
Canopy cover (%)									

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. Fibrosa				卌	卌 ||| +8			
A. leiocalyx							卌 2+11	
A. semilunata					|		卌 ~~11~~ +12	
A. triptera							|	
A. leuhmanni					||||		|	
							||	
Eremochloa bimaculata								
* ~~Grass sample~~								
Chrysopogon fallax								
Eragrostis sororia								
Aristida caput-medusa								
Fimbristylis sp.								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8946 →					
Native perennial grass	15					
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	35	80	10	20	5	
Rock						
Bare ground	50	20	90	80	95	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1/11.7.7	NA	LC/LC	NCAP/NCAP
Survey result	11.5.1/11.7.7	NA	LC/LC	NCAP/NCAP
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	No. of hollow logs	0	Total length of logs (>10cm)	9	No. of logs (>10cm)	3
Per hectare (x 20)	20	Per hectare (x 20)	0	Per hectare (x 20)	180	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	3	No. of trees with hollows (>30cm)	3

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween Central	**Date:**	15/05/23, Mon
Tenure:	Infra 3 - laydown Pipeyard	**Assessor(s):**	HM & NV

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	222126
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7064676
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☑ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 9191	9192	#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1.5m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1				T2		S1			S2		G
Avg height (m) of EDL	12m						**Avg DBH (cm) of EDL**			20cm		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	NE	Start Easting	222103	End Easting	222149
		Start Northing	7064670	End Northing	7064682

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		15 25	10 15	5 10	1 5	0.1 1
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra				~~4+5~~	4+5+9	~~4+5~~ 10+5		
A. leuhmanni								
A. triptera							1	
Leucopogon biflorus								
Eragrostis sororia								
Goodenia								
Aristida-caput medusa								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

9187

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9186					
Native perennial grass	15		10			
Native other grass (if relevant)						
Native forbs and other species (non-grass)			10			
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	50	10	50	30	10	
Rock						
Bare ground	35	90	30	70	90	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (Ecosmart)	Reg(11.5-1)	N/A	LC	N/AP
Survey result	"	N/A	"	"
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	/	Per hectare (x 20)	/	Per hectare (x 20)	/	Per hectare (x 20)	/

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

subject to recent fire



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween 227 222	**Date:**	12 Apr. 23
Tenure:	491	**Assessor(s):**	Image Moved

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	322371
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7476666
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 78		#	
East	# 79		#	
South	# 80		#	
West	# 81		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N ✓	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale	Dark ✓	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓	T2	S1	S2	G							
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	22								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% ✓ (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse ✓	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Weed infestations	Found on Site – records below	Not Found On Site ✓

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	222380			End Easting	222378				
		Start Northing	706646 6636			End Northing	7066689				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)	/	7	12					1	2	01	1
Canopy cover (%)	/										

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Allocasuarina luehmannii		14		▨▨▨▨	4			
Eucalyptus cubra		12		▨▨L				
Acacia triphalia		1					1	
Acacia seminulata		3					4	
Acacia leiocalyx		5			▨			
Callitris glaucophylla		2		L				
Fimbristylis dichotoma								
Themeda triandra								
Murdannia graminea								
Chrysocephalum apiculatum								
[illegible]								
[illegible]								
[illegible]								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	86	85	84	83	82	
Native perennial grass	10	10		10	30	
Native other grass (if relevant)						
Native forbs and other species (non-grass)			10	10	20	
Native shrubs (<1m)					10	
Non-native grass						
Non-native forbs and shrubs						
Litter	40		10	50	10	
Rock						
Bare ground	50	90	80	30	30	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.5.1	N/A	LC	NCAP
Survey result	11.51	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	-	**No. of hollow logs**	-	**Total length of logs (>10cm)**	-	**No. of logs (>10cm)**	-
Per hectare (x 20)	-	**Per hectare (x 20)**	-	**Per hectare (x 20)**	-	**Per hectare (x 20)**	-

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent	Scattered ✓	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common ✓	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered ✓	Common	Abundant
Termite mounds (>50cm)	Absent ✓	Scattered	Common	Abundant
Rock piles	Absent ✓	Scattered ✓	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Tree hollows					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	✓ Yes / No ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

(2)

target zero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Birrahween Central Pt-1	Date:	31 MAY 2023
Tenure:	PL 491	Assessor(s):	NU

Facilities Infrastructure: Proposed Quarry option

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	222432
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7067529
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☑ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 9707		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion		(Absent)	Scattered		Frequent			
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	5
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	10	**Avg DBH (cm) of EDL**	12									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	N	Start Easting	222420			End Easting	222439						
		Start Northing	7067507			End Northing	7067550						
Stratum	E	T1		T2		T3		S1		S2/Seedlings			
Height range (m)		16	20	8	12	6	8	2	4	2	0'1		
Canopy cover (%)													

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra		1		1				
Callitris glaucophylla		38			27	11		
Calytrix carthamanii		29			21	8		
A. ixiophylla		21					21	
A. leiocalyx		3					3	
Panicum decompositum								
Aristida dichotoma								
Chrysocephalum apiculatum								
Aristida spp.								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9702	→	→	→	→	
Native perennial grass	5	70	30	60	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)					15	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	15	10	20	20	40	
Rock						
Bare ground	80	20	50	20	35	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.5.1	N/A	LC	NCAP
Survey result	11.5.1	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)	36	No. of logs (>10cm)	12
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	720	Per hectare (x 20)	240

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	X	No. of trees with hollows (>30cm)	X

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

Subject to recent fire.



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	WP 156 R	**Date:**	17.04.23 (Mon)
Tenure:	Rees, ISA038	**Assessor(s):**	HM & NV

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	0222491
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7064333
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	#	8276	#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	11m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	10-12m		**Avg DBH (cm) of EDL**	20cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	0222498	End Easting	0222491
		Start Northing	7064354	End Northing	7064312

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		9 | 12		~~3~~4 | 6	1 | 2	0.1 | 1
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra				3				
Allocasarina luehmanii							5	
Acacia ixiophyla							30+10	+20
Triangularis d'								
Nomandra patens								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	6270				→	
Native perennial grass	60	30	40	10	20%	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)		60				
Non-native grass						
Non-native forbs and shrubs						
Litter	10	10	20	10	10	
Rock						
Bare ground	30		40	80	70	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4/11.7.7/11.7.5/11.7.2	LC	L	NC
Survey result	11.5.1	LC	LC	NC
Agree with mapped RE? If no, provide justification from field data	consistent with Ecosmart + 3D mapping.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)	4m	No. of logs (>10cm)	1
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	~~Yes~~ / No ~~Yes~~ / No ~~Yes~~ / No ~~Yes~~ / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Subject to recent fire.



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 120	**Date:**	08 May 2023
Tenure:	PL 305	**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 222693					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7060849					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☒	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	1			
East	2			
South	3			
West	4			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☒Downs – open, rolling, ashy, pebbly	☐Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☐Level (<1%)	☒Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☐NE	☐NW	☒SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☐Brown	☐Red			
	☐Black	☐Grey	☒Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content**)	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☒'Sandy clay Loam'	☐'Clay loam'	☐'Clay loam sandy'	☒'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☒Grazing	☒Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☒Clearing	☐Cultivation	☐Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☒1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☒Good	☐Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	8
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	☐**CEST** ☐**Rf** ☐**H** ☐**FOR** ☒**WDL** ☐**GRL** ☐**IMP** ☐**LKE** ☐**RIP** ☐**SHR** ☐**SW** ☐**DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	31.2	
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☐10-30% (sparse)	☒<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☒Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	SE		Start Easting	56J 222692			End Easting	56J 222690					
			Start Northing	7060871			End Northing	7060827					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)			8	17	4	7			1	2	0.1	1	
Canopy cover (%)			15		5				5		5		

Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		Total						
Eucalyptus crebra		18		11	4		3	
Allocassuarina luehmanni		20			10		4	6
Acacia semilunata		6					5	1
Acacia leiocalyx		7			6			1

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Dodonea triangularis								
Eragrostis cilianensis								
Austrostipa scabra								
Fimbristylis dichotoma								
Gahnia aspera								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	9	8	7	6	5	
Native perennial grass			10	10		
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	20	20	20	10	
Rock						
Bare ground	90	80	70	70	90	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.5.1 (3D EcoSmart)	NA	LC	NCAP
Survey result	11.5.1	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	00
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☐Common	☒Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☐Common	☒Abundant
Potential for **seeding grass cover**	☐Absent	☒Scattered	☐Common	☐Abundant
Dense shrub/grass shelter	☒Absent	☐Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☐Scattered	☒Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☐Scattered	☒Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☒Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☐Absent	☒Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☐Scattered	☒Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☐Common	☒Abundant
Mistletoe/Epiphytes	☐Absent	☐Scattered	☒Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	NA	**No. of trees with hollows (>30cm)**	NA

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			

Ground vegetation is regrowing after bushfire affected it.



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 143	**Date:**	09 May 2023
Tenure:		**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 222684					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7059053					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	37			
East	38			
South	39			
West	40			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☐Downs – open, rolling, ashy, pebbly	☒Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☐Level (<1%)	☒Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☐NE	☐NW	☐SE	☒SW	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☐Brown	☐Red			
	☐Black	☐Grey	☐Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☐'Sandy clay Loam'	☐'Clay loam'	☒'Clay loam sandy'	☐'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☒Grazing	☒Forestry	☐Cropping	☐Conservation	☐Mining	☐Other: Rubbish deposit		
Evidence	☒Clearing	☐Cultivation	☒Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☒1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☐Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	7
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	**☐CEST ☐Rf ☐H ☐FOR ☒WDL ☐GRL ☐IMP ☐LKE ☐RIP ☐SHR ☐SW ☒DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL		**Avg DBH (cm) of EDL**			
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☒10-30% (sparse)	☐<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☒Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	SE		**Start Easting**	56J 222703			**End Easting**	56J 222666					
			Start Northing	7059071			**End Northing**	7059031					
Stratum	**E**		**T1**		**T2**		**T3**		**S1**		**S2/Seedlings**		
Height range (m)			10	15	4	8			1	2	0.1	1	
Canopy cover (%)			10		5				5		55		

Common name / Collection name	**Species name**	**Sample (Field No.)**	**Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed**					
NB: Record ground cover species within 50m x 10m transect			**E**	**T1**	**T2**	**T3**	**S1**	**S2**
		Total						
Eucalyptus fibrosa		**7**		5			2	
Corymbia trachyphloia		**1**		1				
Acacia leiocalyx		**24**			12		5	7
Callitris glaucophylla		**15**		5			7	3

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			**E**	**T1**	**T2**	**T3**	**S1**	**S2**
		TOTALS						
Laxmannia gracilis								
Fimbristylis dichotoma								
Dichanthium sericeum								
Entereopogon ramosus								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	45	44	43	42	41	
Native perennial grass		10	10		20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	15			5	5	
Non-native grass						
Non-native forbs and shrubs						
Litter	40	60	30	40	10	
Rock						
Bare ground	45	30	60	55	65	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.7 (3D EcoSmart)	NA	LC	NCAP
Survey result	11.7.7	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☒Common	☐Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☒Common	☐Abundant
Potential for **seeding grass cover**	☐Absent	☐Scattered	☒Common	☐Abundant
Dense shrub/grass shelter	☐Absent	☒Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☒Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☐Absent	☐Scattered	☒Common	☐Abundant
Termite mounds (>50cm)	☐Absent	☒Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☐Scattered	☒Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☒Common	☐Abundant
Mistletoe/Epiphytes	☐Absent	☒Scattered	☐Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	**No. of trees with hollows (>30cm)**	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween – 11.3.4	**Date:**	12. Apr. 23
Tenure:	491	**Assessor(s):**	T.M

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	222782
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7006954
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 62		#	
East	# 63		#	
South	# 64		#	
West	# 65		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark ✓	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance ✓						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓	T2	S1	S2	G							
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	40								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense) ✓	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse ✓	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Weed infestations	Found on Site – records below	Not Found On Site ✓

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	122757			End Easting	122806				
		Start Northing	7065577			End Northing	7065539				
Stratum	E		T1		T2		T3		S1		S2/Seedlings	
Height range (m)	20	25	7	10					1	2	0.1	1
Canopy cover (%)												

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus camaldulensis		21	01	04				
Angophora leiocarpa		13	1	01				
Acacia semilunata		3		1			1	
Eucalyptus crebra		1		1				
Chrysocephalum apiculatum								
Gahnia aspera								
Cheilanthes sieberi								
Eragrostis ciliaris								
Aristida caput-medusae								
Fimbristylis dichotoma								
[illegible]								
[illegible]								
[illegible]								
[illegible]								
[illegible]								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	61	60	59	58	57	
Native perennial grass		80	30	10	10	
Native other grass (if relevant)					10	
Native forbs and other species (non-grass)			10	10		
Native shrubs (<1m)			10			
Non-native grass						
Non-native forbs and shrubs		10				
Litter	80	10	30	30	10	
Rock						
Bare ground	20		20	60	70	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE				
Survey result				
Agree with mapped RE? If no, provide justification from field data				

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	/	No. of hollow logs	-	Total length of logs (>10cm)	-	No. of logs (>10cm)	-
Per hectare (x 20)	/	Per hectare (x 20)	-	Per hectare (x 20)	-	Per hectare (x 20)	-

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant ✓
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant ✓
Potential for seeding grass cover	Absent	Scattered	Common	Abundant ✓
Dense shrub/grass shelter	Absent	Scattered ✓	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant ✓
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common ✓	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered ✓	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered ✓	Common	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common ✓	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant ✓
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					
hollow					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment:	✓ Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween 102	**Date:**	12 Apr. 23
Tenure:	4/91	**Assessor(s):**	

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	222871
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7065855
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 66		#	
East	# 67		#	
South	# 68		#	
West	# 69		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly ✓	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark ✓	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Cleared						
Evidence	Clearing ✓	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76% ✓	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded ✓							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)**	7				
Disturbance notes	Bushfire											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS** ✓
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2 ✓		S1			S2		G	
Avg height (m) of EDL				7		**Avg DBH (cm) of EDL**			12.1			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a ✓	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent ✓	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Weed infestations	Found on Site – records below	Not Found On Site ✓

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N/E	Start Easting	222857		End Easting	222881					
		Start Northing	7065835		End Northing	7065876					
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)	/			/		/		/		0.1	1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #						
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter						
Rock						
Bare ground	100	100	100	100	100	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4	LC	L.C	L.C
Survey result	Cleared			
Agree with mapped RE? If **no**, provide justification from field data	No. The area shows sign of deforestation with small dead remnants of Callitris glaucophylla (2m) (affected by fires).			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	–	**No. of hollow logs**	–	**Total length of logs (>10cm)**	–	**No. of logs (>10cm)**	–
Per hectare (x 20)	–	**Per hectare (x 20)**	–	**Per hectare (x 20)**	–	**Per hectare (x 20)**	–

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent ✓	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent ✓	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent ✓	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent ✓	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent ✓	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent ✓	Scattered	Common	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent ✓	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent ✓	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent ✓	Scattered	Common	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent ✓	Scattered	Common	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent ✓	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent ✓	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	N/A	No. of trees with hollows (>30cm)	N/A

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No ✓	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment:	Yes / No ✓		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes ✓	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Acacium 11.3.4	SITE IDENTIFICATION		
Site Name:	Girrahween P2 GS Reassessment	**Date:**	24 Aug. 23
Tenure:	PL 305	**Assessor(s):**	Tiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	561223163
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7063823
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 117		#	
East	# 118		#	
South	# 119		#	
West	# 120		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SI ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale ✓	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other: Road; Gas pipeline		
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging ✓	Thinning	No disturbance		
Dieback	0%	1-25% ✓	26-75%	>76%	n/a			
Site condition	Very good	Good ✓	Moderate	Poor	Degraded			
Fire scars	Absent ✓	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	—
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1 ✓	T2	S1	S2	G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	25	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense) ✓	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse ✓	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero
► zero incidents ► zero injuries

50J 223191 7063813

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	~~SW~~ SE	Start Easting	50J 223141	End Easting	~~50J 223179~~
		Start Northing	7063844	End Northing	~~7063818~~

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)	20 | 25	10 | 17	4 | 6		~~1~~ | ~~2~~	01 | 1
Canopy cover (%)	5	30	10		5	<5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus urbig		9	L	☒L				
Eucalyptus tereticornis		5		☒				
Eucalyptus camaldulensis		15		☒☒1	☐			
Angophora hispidula		16		☒L	☒L		L	
Acacia cupreata		10					☒M	L
Eleocharis philippinensis								
Fimbristylis microcarya								
Heteropogon contortus								
Aristida obscura								
Bothriochloa bladhii								

target zero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	121	122	123	124	125	
Native perennial grass	20				20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10		10			
Native shrubs (<1m)			10		20	
Non-native grass						
Non-native forbs and shrubs						
Litter	30	40	60	10	50	
Rock						
Bare ground	60	60	30	90	10	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE Eco	11.3.4	NCAP	Of concern	Of concern
Survey result	11.3.4	NCAP	Of concern	Of concern
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	01	No. of logs (>10cm)	1
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	✓ Absent		Present	
Wetland / Swamp / Waterbody	✓ Absent		Present	
Waterway	✓ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	✓ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	✓ Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	✓ Abundant
Dense shrub/grass shelter	Absent	✓ Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	✓ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	✓ Common	Abundant
Large rocks (>30cm)	✓ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	✓ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	✓ Single layer	Multiple layers	Deep layers
Leaf litter coverage	✓ Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	✓ Absent	Scattered	Common	Abundant
Rock piles	✓ Absent	✓ Scattered	Common	Abundant
Trees with shedding bark	Absent	✓ Scattered	Common	Abundant
Soil cracks	Absent	Scattered	✓ Common	Abundant
Koala feed trees	Absent	Scattered	✓ Common	✓ Abundant
Mistletoe/Epiphytes	Absent	Scattered	✓ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	—	No. of trees with hollows (>30cm)	—

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Logs					
Stags					
Burrows					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	✓ Yes / No ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			

Watercourse photos 126 - 129

Presence of Eleocharis philippinensis → wetland Indicator Species.



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG ARW HLM

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Access track Girraween FCS 2	Date:	01/03/2022
Tenure:	305	Assessor(s):	TM/ NW/ HM

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	223167
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7065039
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 203		#	
East	# 204		#	
South	# 205		#	
West	# 206		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat), flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	(NE)	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	(Silty clay loam)	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)		Scattered		Frequent		
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

targetzero
► zero incidents ► zero injuries

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	6
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	12	**Avg DBH (cm) of EDL**	10.2									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)			
Threatened Flora	Found on Site – records below	Not Found On Site	✓
Weed infestations	Found on Site – records below	Not Found On Site	✓

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	NE	Start Easting	223147	End Easting	223187
		Start Northing	7065027	End Northing	7065047

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		7 | 16	5 | 7		1 | 2	0.1 | 1
Canopy cover (%)		10	30		1	10

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus fibrosa		12		12				
Acacia leiocalyx		27				27		
Callitris glaucophylla		17			17			
A. semilunata		5					5	
E. exserta		4			4			
A. aprepta		2					2	
Hakea spp								
Panicum decompositum								
Ehanic Aspera								
Dodonaea triangularis								
Eragostis pilosa								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	212	211	210	209	208	
Native perennial grass	5	15	25	20	5	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	40	25	60	40	35	
Rock						
Bare ground	55	60	15	40	60	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.5	LC	LC	NC
Survey result	11.7.5	LC	LC	NC
Agree with mapped RE? If no, provide justification from field data	yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	4	Total length of logs (>10cm)	8 m	No. of logs (>10cm)	3
Per hectare (x 20)	X	Per hectare (x 20)	80	Per hectare (x 20)	160	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

targetzero
► zero incidents ► zero injuries

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	N/A	No. of trees with hollows (>30cm)	N/A.

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Hollow log					
Logs					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	Any vegetation clearing
Ecologist	Yes	(No)	
Species Management Plan	(Yes)	No	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Ground vegetation affected by bushfire
See Field Notes. 28.02 - 01.03 - TM.



North face of the transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween 103	**Date:**	12 April 23
Tenure:	491	**Assessor(s):**	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	223165
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7066919
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 53		#	
East	# 54		#	
South	# 55		#	
West	# 56		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly ✓	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red	Black	Grey	Pale	Dark ✓	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**	**'Sandy clay loam'**	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**	**'Medium clay'**	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent ✓	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2 ✓		S1			S2		G	
Avg height (m) of EDL	12					**Avg DBH (cm) of EDL**			10.0			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% ✓ (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse ✓			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Weed infestations	Found on Site – records below	Not Found On Site ✓

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	St	Start Easting	223168	End Easting	223196
		Start Northing	7064948	End Northing	7064896

Stratum	E		T1		T2		T3		S1		S2/Seedlings	
Height range (m)	20	25	9	12	2	7			1	2	0.1	L
Canopy cover (%)	20		10		40				10			

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus fibrosa		40	I	U	[illegible]			
Acacia nigrolia		61			[illegible]		[illegible]	[illegible]
Acacia leiocalyx		7		U			F	I
Eragrostis lacunaria								
Fimbristylis dichotoma								
Chrysocephalum apiculatum								
Chloris gayana								
Aristida caput-medusae								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	52	51	50	49	48	
Native perennial grass	10	60	80	60	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10			10	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	80		10	30	10	
Rock						
Bare ground		30	10	10	10	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Cleared	–	–	–
Survey result	11.7.7	–	–	–
Agree with mapped RE? If no, provide justification from field data	No. Presence of Eucalyptus fibrosa and Eucalyptus citriodora. mid layer dominated by Acacia spp.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	–	Per hectare (x 20)	–	Per hectare (x 20)	–	Per hectare (x 20)	–

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent	Scattered ✓	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent ✓	Scattered	Common	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered ✓	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered ✓	Common	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common ✓	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant ✓
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓ ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Ocean track Girrahween FOS L	Date:	01. MAR. 23
Tenure:	305	Assessor(s):	TM/NH/HM

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	223253
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7065706
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 192		#	
East	# 193		#	
South	# 194		#	
West	# 195		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red	Black	Grey	Pale	Dark ✓	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent													
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank										

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	(Clearing)	Cultivation	(Regrowth)	Logging	Thinning	No disturbance				
Dieback	0%	(1-25%)	26-75%	>76%	n/a					
Site condition	Very good	(Good)	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	(Frequent)	**Time since**	(Recent)	Old	**Average Height (m)**	3		
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	(WDL)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**

Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).

Ecologically dominant layer (EDL)	(T1)	T2	S1	S2	G
Avg height (m) of EDL	7		**Avg DBH (cm) of EDL**	6.6	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	(10-30% (sparse))	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	(Sparse)	Very sparse	Absent

Threatened Flora, Type A Flora and Weeds (declared and locally significant)									
Threatened Flora	Found on Site – records below					Not Found On Site			✓
Type A Flora (list below)	Found on Site – records below					Not Found On Site			✓
Orchidaceae sp. (Orchids)	*Xanthorrhoea sp.* (Grass trees)	*Myrmecodia sp.* (Ant plants)	*Cycadaceae sp.* (Cycads)	*Zamiaceae sp.* (Cycads)	*Huperzia sp.* (Lace plants)	*Platycerium sp.* (Staghorns)	*Brachychiton sp.* (Bottle trees)	*Livistona sp.* (Cabbage palms)	*Hydnophytum sp.* (Ant plants)
Weed infestations	Found on Site – records below					Not Found On Site			

Threatened Flora, Type A Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; If confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SE	Start Easting	223235	End Easting	223275
		Start Northing	7065719	End Northing	7065696

Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)	/	4	7	2	5			1	2	0.1	1
Canopy cover (%)		10		30				5		1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus exerta		11	☒	☒1	☒			
Acacia apepta		42	☒	L	☒☒☒☒			
Mulga fern								
Panicum decompositum								
Grogratis sp								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	200	199	198	197	196	
Native perennial grass	10	30	5			
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter		55	85	70	10	
Rock	20		5	10	20	
Bare ground	65	10	5	20	70	
Cryptogams	5	5	1			
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1	Regrowth	Non-remnant	Non-remnant
Survey result	11.7.4		Least concern	No concern present
Agree with mapped RE? If no, provide justification from field data	No. The vegetation consists of the variety Eucalyptus spp., corymbia spp., Acacia spp. and Lysicaepus angustifolius.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)		No. of hollow logs		Total length of logs (>10cm)		No. of logs (>10cm)	
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for nectar / pollen	Absent	Scattered	Common ✓	Abundant
Potential for fleshy fruiting plants	Absent	Scattered ✓	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent ✓	Scattered	Common	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common ✓	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common ✓	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered ✓	Common	Abundant
Trees with shedding bark	Absent	Scattered ✓	Common	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Scats					
Trees					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Koala, Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes ✓	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	Yes / No ✓		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			

Fire - Area surveyed was totally affected by a recent bushfire. This has resulted in none ground vegetation ce very limited on survey date.

See field Notes - 20230228 - 20330301 - filded Notes TM.



North face of the transect



East face of the transect



South face of the transect

West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 139	**Date:**	08 May 2023
Tenure:		**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 0223420					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7059170					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	20			
East	21			
South	22			
West	23			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☒Downs – open, rolling, ashy, pebbly	☐Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☐Level (<1%)	☒Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☐NE	☒NW	☐SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☒Brown	☐Red			
	☐Black	☒Grey	☐Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content**)	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☐'Sandy loam'	☐'Loam'	☐'Silty loam'		
	☐'Sandy clay Loam'	☐'Clay loam'	☐'Clay loam sandy'	☐'Silty clay loam'	☐'Light clay'	☐'Light medium clay'		
	☐'Medium clay'	☐'Medium heavy clay'	☐'Heavy clay'	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☐Grazing	☒Forestry	☐Cropping	☐Conservation	☐Mining	☐Other:		
Evidence	☐Clearing	☐Cultivation	☒Regrowth	☒Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☒1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☐Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	10
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	☐**CEST** ☐**Rf** ☐**H** ☐**FOR** ☒**WDL** ☐**GRL** ☐**IMP** ☐**LKE** ☐**RIP** ☐**SHR** ☐**SW** ☐**DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	20	
Canopy cover (%) of EDL	☐>70% (dense/closed)	☒30-70% (mid-dense)	☐10-30% (sparse)	☐<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☐Sparse	☒Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	NW		Start Easting	56J 0223436			End Easting	56J 0223399					
			Start Northing	7059089			End Northing	7059127					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)			10	18	4	8			1	2	0.1	1	
Canopy cover (%)			20		5				5		10		

Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		Total						
Eucalyptus fibrosa		30		8	3			19
Acacia leiocalyx		37			15		23	

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Laxmannia gracillis								
Enteropogon ramosus								
Dichanthium sericeum								
Echinochloa colona								
Capillipedium spicigerum								
Dodonea triangularis								
Fimbristylis dichotoma								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	28	27	26	25	24	
Native perennial grass	10	5				
Native other grass (if relevant)						
Native forbs and other species (non-grass)				5		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	20		20	20	
Rock						
Bare ground	70	75	100	75	80	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.7 (3D EcoSmart)	NA	LC	NCAP
Survey result	11.7.7	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☐Common	☒Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☐Common	☒Abundant
Potential for **seeding grass cover**	☐Absent	☒Scattered	☐Common	☐Abundant
Dense shrub/grass shelter	☐Absent	☒Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☐Scattered	☐Common	☒Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☒Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☐Absent	☒Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☐Scattered	☒Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☐Common	☒Abundant
Mistletoe/Epiphytes	☐Absent	☐Scattered	☒Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	**No. of trees with hollows (>30cm)**	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			

Ground vegetation affected by fire. It is in regrowth process.



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	WP 176	**Date:**	18 04 23 (TUES)
Tenure:	Stiller, 14AU38	**Assessor(s):**	HM & NJ

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	223458
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7061113
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8339		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	(NW)	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	(Light clay)	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	16m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	16m		**Avg DBH (cm) of EDL**	25cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	223455	End Easting	223782
		Start Northing	7061132	End Northing	7061085

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		12 | 16			1 | 2	0.1 | 1
Canopy cover (%)		40%			<10%	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Euc. Fibrosa				~~IIII~~ I				
Acacia ixiophylla							~~III~~ III	~~IIII~~ ~~IIII~~
A. semilunata							I	III
Aristida caput-medusae								
Panicum sp.								
Purple lovegrass (eragrostis sororia)								
Dodonia triangularis								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8334	→	→	→	→	
Native perennial grass		10	20	10	2	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)		40				
Non-native grass						
Non-native forbs and shrubs						
Litter	10	40	30	80	8	
Rock						
Bare ground	90	10	50	10	90	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4/11.7.5/11.7.7	LIC	L	NC
Survey result	11.5.1	LC	LC	NC
Agree with mapped RE? If no, provide justification from field data				

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	No. of hollow logs	0	Total length of logs (>10cm)	4	No. of logs (>10cm)	6
Per hectare (x 20)	20	Per hectare (x 20)		Per hectare (x 20)	80	Per hectare (x 20)	120

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Bird nest	Small sp (wren)	NC	223468	7061105	
Bird nest	small/med sp	NC	223473	7061124	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes)	No	Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes)	No	Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Recent fire.



North face of transect



East face of the transect



South face of the transect



West face of the transect

Scaw

Ecological Field Survey

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Ginnaroon FCS	Date:	7 Dec 2022
Tenure:	PL ~~[illegible]~~ 305	Assessor(s):	Teresa carvalho, Thiago Moura Petel Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	223671
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7065408
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	Field compressor station / Power station
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 25		#	
East	# 26		#	
South	# 27		#	
West	# 28		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	(Silty loam)		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	(Regrowth)	Logging	Thinning	No disturbance		
Dieback	0%	(1-25%)		26-75%	>76%		n/a	
Site condition	Very good	(Good)		Moderate	Poor		Degraded	
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**(FOR)**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	(T1)	T2	S1	S2	G
Avg height (m) of EDL	8		**Avg DBH (cm) of EDL**	14	
Canopy cover (%) of EDL	>70% (dense/closed)	(30-70% (mid-dense))	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	(Very sparse)	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	Found on Site – records below	(Not Found On Site)

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)												
Transect Start compass bearing	S	Start Easting	223657		End Easting	223629						
		Start Northing	7065428		End Northing	7065888						
Stratum	E		T1		T2		T3		S1		S2/Seedlings	
Height range (m)	16	16	2	9					1	2	0.1	1
Canopy cover (%)	2%		50%						1%		1%	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia leiocalyx		48		43				5
A. aprepta		4	2	1				1
Eucalyptus exserta		3	2	1				
Acacia ixiophylla		1					1	
Aristida caput-medusae								
Dodonaea triangularis								
Goodenia sp.								
Panicum decompositum								
Eragrostis sp.								
Lomandra asperula								
Avena spp.								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	29	30	31	32	33	
Native perennial grass	1			10	85	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		2	1			
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	1	48	89	90	15	
Rock						
Bare ground	98	50	10			
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	HVR 11.5.1	NA	LC	NCAP
Survey result	HVR 11.7.4	NA	LC	NCAP.
Agree with mapped RE? If no, provide justification from field data	No E. crebra and Callitris glaucophylla not common. Areas of mottled Rock indicate LZ7. E. fibrosa nearby.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					
Termite mounds					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees mounds
Ecologist	Yes	(No)	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	Not a lease.
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Gilruhwuen 229	**Date:**	12 12. APR. 23
Tenure:	491	**Assessor(s):**	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	223705
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7066166
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 92		#	
East	# 93		#	
South	# 94		#	
West	# 95		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S ✓	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black ✓	Grey	Pale	Dark ✓	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)**	8				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓	T2	S1	S2	G							
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	27.3								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% ✓ (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse ✓	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Weed infestations	Found on Site – records below	Not Found On Site ✓

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)									
Transect Start compass bearing	S	Start Easting	0223711		End Easting	2223699			
		Start Northing	7067493		End Northing	7067437			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)	/	10	15	3	6			1	2	0.1	1
Canopy cover (%)	/	20		5				1		1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus exserta		1			1			
Callitris glaucophyla		23		L	▨▨▨▨1			
Corymbia clacksoeria		5		▨				
Eucalyptus ischia		3		⊔				
Eucalyptus chlorodata		4		□				
Cheilanthes sieberi								
Mundania graminea								
Gahnia aspera								
Eragrostis lacunaria								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	91	90	89	88	87	
Native perennial grass	10					
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10		10			
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	30	20	30	10	10	
Rock						
Bare ground	60	80	60	90	90	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7	N/A	LC	NCAP
Survey result	11.7.7	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	/	No. of hollow logs	/	Total length of logs (>10cm)	/	No. of logs (>10cm)	/
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered ✓	Common	Abundant
Dense shrub/grass shelter	Absent ✓	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common ✓	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent ✓	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent ✓	Scattered	Common	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered ✓	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	3

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					
Below					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓ ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girraween 155	**Date:**	12 Apr 23
Tenure:	491	**Assessor(s):**	Twiggy Moore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	223603
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7066491
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 39		#	
East	# 40		#	
South	# 41		#	
West	# 42		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly ✓	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S ✓	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale	Dark ✓	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent ✓	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2 ✓		S1		S2		G			
Avg height (m) of EDL	7				**Avg DBH (cm) of EDL**		10.0					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense) ✓		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse ✓		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Weed infestations	Found on Site – records below	Not Found On Site ✓

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	223790	End Easting	223816
		Start Northing	7064514	End Northing	7064473

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)	/	10 – 17	3 – 10		1 – 2	0.1 – 1
Canopy cover (%)	/	10	60		5	5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia semilunata		50		1	[illegible]			
Eucalyptus fibrosa		2		1				
Acacia leiocalyx		3			1		1	
Acacia ixiophylla		3			1		1	
Eucalyptus crebra		1			1			
Brachychiton populneus		1		1				
Chrysocephalum apiculatum								
Chloris gayana								
Eragrostis spectabilis								
Mulga grass								
Aristida caput-medusae								
Dodonea triangularis								
Gahnia sp.								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	47	46	45	44	43	
Native perennial grass	30	30	10	70	30	
Native other grass (if relevant)		10				
Native forbs and other species (non-grass)	10		10		10	
Native shrubs (<1m)	10	30		10		
Non-native grass						
Non-native forbs and shrubs						
Litter	30	30	30	10	10	
Rock						
Bare ground	20	20	50	10	10	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Cleared	-	-	-
Survey result	11.7.7	LC	LC	LO
Agree with mapped RE? If no, provide justification from field data	No. Presence of Eucalyptus fibrosa and Corymbia citriodora formed a distinct but discontinuous open fourth to woodland canopy.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	No. of hollow logs	1	Total length of logs (>10cm)	1	No. of logs (>10cm)	1
Per hectare (x 20)	20	Per hectare (x 20)	20	Per hectare (x 20)	20	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent	Scattered ✓	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common ✓	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered ✓	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent ✓	Scattered	Common ✓	Abundant
Trees with shedding bark	Absent	Scattered	Common ✓	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	—	No. of trees with hollows (>30cm)	—

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
trees					
logs					
below					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Quarry	SITE IDENTIFICATION		
Site Name:	Girrahween Pl, Quarry	**Date:**	25 Aug 23
Tenure:	PL-491	**Assessor(s):**	Tanaya M

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☑ Gas Processing Facility	**Easting (E)**	223859
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7016129
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	Quarry
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 134		#	
East	# 135		#	
South	# 136		#	
West	# 137		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly ✓	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E ✓	W	NE	NW	SI	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75% ✓	>76%	n/a							
Site condition	Very good	Good	Moderate ✓	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	5				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			23			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse) ✓			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent ✓	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

target zero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	561223853	End Easting	561223889
		Start Northing	7066123	End Northing	7066136

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)	/	9 15	4 6		1 2	0.1 1
Canopy cover (%)	/	30	10		5	<5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus fibrosa		30		𝍸𝍸𝍸	𝍸𝍸			
Eucalyptus sideroxylon		15		𝍸	𝍸			
Callitris glaucophylla		13		𝍸	𝍸		𝍸	
Acacia Shirley		3		1	1			
Rutidosis lanata								
Murdannia graminea								
Brachyscome microcarpa								
Chorizema parviflorum								
Hakea purpurea								
Rutidosis lanata								
Aristida obscura								
Eriochne mucronata								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	138	139	140	141	142	
Native perennial grass	10	10	10		20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10		20	20		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter						
Rock	30	40	40	60	50	
Bare ground						
Cryptogams	60	50	30	20	30	
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE Eco	11.7.7	N/CAP	LC	LC
Survey result	11.7.7			
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	2	No. of logs (>10cm)	2
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	40	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	√ Absent		Present	
Wetland / Swamp / Waterbody	√ Absent		Present	
Waterway	√ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	√ Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	√ Abundant
Potential for **seeding grass cover**	Absent	√ Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	√ Scattered	√ Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	√ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	√ Absent	Scattered	√ Common	Abundant
Large rocks (>30cm)	√ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	√ Absent	Scattered	Common	Abundant
Leaf litter depth	√ Absent	√ Single layer	Multiple layers	Deep layers
Leaf litter coverage	√ Absent	√ Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	√ Scattered	Common	Abundant
Rock piles	√ Absent	Scattered	√ Common	Abundant
Trees with shedding bark	√ Absent	Scattered	√ Common	Abundant
Soil cracks	√ Absent	Scattered	Common	√ Abundant
Koala feed trees	Absent	Scattered	√ Common	√ Abundant
Mistletoe/Epiphytes	Absent	Scattered	√ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	6

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Scats					
Burrows					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	✓ Yes / No ✓ ✓ Yes / No ✓ Yes / No ✓ Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Rees	**Date:**	19.04.23 (Wed)
Tenure:	WP169	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	224002
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7063235
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 6459		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	25				
Disturbance notes	Recent fire scars frequent.											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	~~25~~ 20		**Avg DBH (cm) of EDL**	~~80~~ m 32	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)												
Transect Start compass bearing	N	Start Easting	224000			End Easting	224010					
		Start Northing	7063210			End Northing	7063257					
Stratum	E		T1		T2		T3		S1		S2/Seedlings	
Height range (m)	25	30	~~10~~	~~25~~	~~5~~	10			1	5	0.1	1
Canopy cover (%)			18	22	8							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. Fibrosa			I	16+III	II			
C. Glaucophylla					IIII			
A. Semilunata					IIII		~~IIII~~	~~IIII~~ I
A. Binata							I	I
A. ixiophylla							III	~~IIII~~ II
A. leuhmanni					I	[illegible]		
Panicum paludosum								
Eulalia aurea								
Aristid caput-medusa								
Dodenia triangularis								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	8454	→				
Native perennial grass	5	5	10		2	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	15	5	10	5	90	
Rock						
Bare ground	80	90	90	95	8	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE (3D)	11.5.1	N/A	LC	NCAP
Survey result	✓	11	11	11
Agree with mapped RE? If **no**, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	**No. of hollow logs**	1	**Total length of logs (>10cm)**	12	**No. of logs (>10cm)**	3
Per hectare (x 20)	20	**Per hectare (x 20)**	20	**Per hectare (x 20)**	240	**Per hectare (x 20)**	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	Yes / (No)		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

severely fire damaged.



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

FORM: 99-H-FM-00110
REV: 2
STATUS:IFU
Issue Date: 5/11/2013
Review Date: 5/11/2015
DOC OWNER: Corp. Env. Manager

SITE IDENTIFICATION			
Site Name:	Pipeline FCS	**Date:**	03/09
Tenure:	305	**Assessor(s):**	TM/NH/HM

DEVELOPMENT TYPE & LOCATION

Development Type			Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility		**Easting (E)**	224339
☐ Pilot Well + Dam	☐ Dam		**Northing (N)**	7665580
☐ Monitoring	☑ Pipeline		**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line		**Other description**	
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 218		#	
East	# 219		#	
South	# 220		#	
West	# 221		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)

Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)

Slope	Level (<1%) ✓	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE ✓	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale ✓	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**

Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	60	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora, Type A Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site ✓
Type A Flora (list below)	Found on Site – records below	Not Found On Site ✓

Orchidaceae sp. (Orchids)	*Xanthorrhoea sp.* (Grass trees	*Myrmecodia sp.* (Ant plants)	*Cycadoceae sp.* (Cycads)	*Zamiaceae sp.* (Cycads)	*Huperzia sp.* (Lace plants)	*Platycerium sp.* (Staghorns)	*Brachychiton sp.* (Bottle trees)	*Livistona sp.* (Cabbage palms)	*Hydnophytum sp.* (Ant plants)

Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora, Type A Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	NE	Start Easting	224335			End Easting	224360				
		Start Northing	7065563			End Northing	7065598				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		7	15	3	7			1	2	0,1	1
Canopy cover (%)		40		10		-		5		-	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia semilunata		1					1	
Calitris glaucophila		10		L	⊠M			
Eucalyptus exeuta		13		⊠⊠L	[illegible]		1	
Acacia leiocalyx		2			Γ			
Acacia ~~xiophylla~~ conferta		6			⊠1			
Eucalyptus tereticornis		1		1				
Xylomelum cunninghamianum							1	
Erogrostis sp.								
Aristida capta-medusae								
Panicum decompositum								
Chrysocephalum apicum								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	217	216	215	214	213	
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)	1					
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	30	30	20	10	16
Rock						
Bare ground	89	70	70	80	90	96
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.3.25	least concern	LC	NCAP
Survey result	11.3.14	least concern	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	No. Presence of Eucalyptus spp., Angophora leiocarpa, Callitris glaucophylla. Shrub layer with Xylomelum cunninghamianum and Acacia confecta and			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	—	No. of hollow logs	1	Total length of logs (>10cm)	1	No. of logs (>10cm)	1
Per hectare (x 20)	—	Per hectare (x 20)	1	Per hectare (x 20)	20	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for nectar / pollen	Absent	Scattered	Common ✓	Abundant
Potential for fleshy fruiting plants	Absent	Scattered ✓	Common	Abundant
Potential for seeding grass cover	Absent	Scattered ✓	Common	Abundant
Dense shrub/grass shelter	Absent ✓	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent ✓	Scattered	Common	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent ✓	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent ✓	Scattered	Common	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent ✓	Scattered	Common	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent ✓	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Scats					
Burrows					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Koala, Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes ✓	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓Yes / No		Is the slope < 5%?
	✓Yes / No		Is the clay content > 20%?
	Yes / No ✓		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			

FM Ground vegetation limited by bush fire.
See field Notes. 28.02.01.03. TM.



North face of the transect



East face of the transect



South face of the transect



West face of the transect

targetzero

11-5-21

SITE IDENTIFICATION			
Site Name:	Stiller 14AU38	**Date:**	18.04.23 (tues)
Tenure:	WP 177	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	224527
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060991
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8401		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	(White)	Yellow	Orange	Brown	Red			
	Black	(Grey)	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	('Sand')	'Loamy sand'	('Clayey sand')	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	16m				
Disturbance notes	Dominated by Xanthorrhoea johnsonii.											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	13				**Avg DBH (cm) of EDL**		16					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	224524			End Easting	224532				
		Start Northing	7060967			End Northing	7061012				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		16	20	10	16	5	~~16~~ 9	1	5	0.1	1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Corimbia Trachyfloa				III	~~IIII~~ +II	12+		
Callitrus Glaucophylla						1	III	~~[illegible]~~
Woody pear (Xylomelum Cunninghamianum)							III	10+
Eragrostis sororia								
Aristada Caput-medusae								
Woody pear (Xylomelum Cunninghamianum)								
Grass tree (Xanthorrhoea)							III	30+

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8396	→	→	→	→	
Native perennial grass	5	20	5			
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)				10		
Non-native grass						
Non-native forbs and shrubs						
Litter	20	10	5	10	10	
Rock						
Bare ground	75	70	90	80	90	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D) 11.5.1	11.7.4/11.7.7/11.7.5/11.7.2	LC N/A	LC	NCAP
Survey result	11.5.1	LC N/A	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	/	No. of hollow logs	/	Total length of logs (>10cm)	3m	No. of logs (>10cm)	1
Per hectare (x 20)	/	Per hectare (x 20)	/	Per hectare (x 20)	60	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes Yes / No Yes		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Girrahween 223	**Date:**	12 APR 23
Tenure:	491	**Assessor(s):**	TM

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	224702
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	706 7404
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 101		#	
East	# 102		#	
South	# 103		#	
West	# 104		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE ✓	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red			
	Black	Grey	Pale	Dark ✓	Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content**)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'** ✓	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25% ✓	26-75%	>76%	n/a							
Site condition	Very good	Good ✓	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent ✓	Old	**Average Height (m)**	7				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1 ✓	T2	S1	S2	G							
Avg height (m) of EDL	10		**Avg DBH (cm) of EDL**	23.1								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse) ✓	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse ✓	Absent							

Threatened Flora and Weeds (declared and locally significant)			
Threatened Flora	Found on Site – records below	Not Found On Site	✓
Weed infestations	Found on Site – records below	Not Found On Site	✓

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey (inc. ARW ITAM Fire Utility)

target zero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SE	Start Easting	224686	End Easting	224686 224659
		Start Northing	7067424	End Northing	7067389

Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		10	15	5	9	5	9	1	2	0.1	1
Canopy cover (%)		30		10							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia wotherieana		12		IIII	L			
Callitris glaucophylla		21		IIII IIII	IIII		1	
Acacia ixiophyla		4		IIII			1	
Eremophila leucocarpa		3		III				
Dodonaea lanceolata		3			III			
Eucalyptus chlorocalyx		3		III				
Eucalyptus camaldulensis		3		III				

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	100	99	98	97	96	
Native perennial grass	30	10	30	30	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	10	10	10	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	30		10	30	
Rock						
Bare ground	50	50	60	50	50	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1	NA	LC	NCAP
Survey result	11.5.1	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	✓	No. of hollow logs	✓	Total length of logs (>10cm)	✓	No. of logs (>10cm)	✓
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent ✓		Present	
Wetland / Swamp / Waterbody	Absent ✓		Present	
Waterway	Absent ✓		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common ✓	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common ✓	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common ✓	Abundant
Dense shrub/grass shelter	Absent ✓	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common ✓	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common ✓	Abundant
Large rocks (>30cm)	Absent ✓	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent ✓	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer ✓	Multiple layers	Deep layers
Leaf litter coverage	Absent ✓	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent ✓	Scattered	Common	Abundant
Rock piles	Absent ✓	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common ✓	Abundant
Soil cracks	Absent ✓	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common ✓	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common ✓	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
T.					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	WP174	**Date:**	18.04.23 (tues)
Tenure:	Stiller, 14AU38	**Assessor(s):**	HM & NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	224890
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7062547
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8381		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	18m				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	18m		**Avg DBH (cm) of EDL**	15cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	224874	End Easting	224906
		Start Northing	7062529	End Northing	7062565

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		15 | 20	8 | 15		1 | 8	0-1 | 1
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
A. leucarpa				1	1		𝍸	
C. trachyfolia				𝍸 1			𝍸	
A. leuhmannii				𝍸	𝍸 𝍸		𝍸	
C. Glaucophylla				𝍸	𝍸 𝍸		𝍸	
Panicum sp								
Caput-medusa								
grass tree (Xanthorrhoea)								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	8376	→	→	→	→	
Native perennial grass	20	5	10	60	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	5	10	10	10	
Rock						
Bare ground	60	90	80	30	80	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4/11.7.7 / 11.7.5/11.7.2	LC	L	NC
Survey result	11.5.1	LC	LC	NC
Agree with mapped RE? If **no**, provide justification from field data				

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	**No. of hollow logs**	–	**Total length of logs (>10cm)**	5M	**No. of logs (>10cm)**	7
Per hectare (x 20)		**Per hectare (x 20)**		**Per hectare (x 20)**		**Per hectare (x 20)**	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-

SITE IDENTIFICATION			
Site Name:	Well Pad 181	**Date:**	09 May 2023
Tenure:		**Assessor(s):**	***Thiago Moura***

DEVELOPMENT TYPE & LOCATION										
Development Type				**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**						
☒	Well Pad	☐	Gas Processing Facility	**Easting (E)**	56J 225707					
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	7057613					
☐	Monitoring	☐	Pipeline	**Datum**	☐GDA94	☐MGA	Zone	☐55	☒56	
☐	Roads & Tracks	☐	Seismic Line							
☐	Work over	☐	Property (area) wide							

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	61			
East	62			
South	63			
West	64			

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	☒Downs – open, rolling, ashy, pebbly	☐Alluvial plain or flat, flood plain	☐Inland clay pan, salt flat, salt pan	☐Coastal tidal flat or salt flat	☐Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	☐Slope or hill not specified	☐Clift, steep rock, rocky ledge, rocky outcrop, scarp, crevice	☐Coastal rocky headland	☐Top, crest of mountain or ridge	☐Jump-up, mesa, tableland, plateau
Dunes	☐Fossil coastal dune, high dune		☐Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		☐Inland dune, inland sand hill
Streams	☐Permanent lake, river, stream, watercourse, levees and/or their banks		☐Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		☐Inland channel country, stream distributary system, intermittently
Water	☐Freshwater lake, lagoon, spring	☐Freshwater swamp, marsh, soak, seepage area		☐Gligai, melon hole, sinkhole	☐Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	☐Level (<1%)	☒Gently sloping (1-4%)	☐Moderately Sloping (5-10%)	☐Strongly sloping (11-24%)				
	☐Moderately steep (25-38%)	☐Steep (39-55%)	☐Very steep (56-100%)	☐Slope > 100% (45^0)				
Aspect	☐N	☐S	☐E	☐W	☐NE	☐NW	☒SE	☐WE	☐Nil
Soil colour	☐White	☐Yellow	☐Orange	☒Brown	☐Red			
	☐Black	☐Grey	☒Pale	☐Dark	☐Mottled			
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	☐'Sandy'	☐'Loamy sand'	☐'Clayey sand'	☒'Sandy loam'	**☐'Loam'**	**☐'Silty loam'**		
	☐'Sandy clay Loam'	**☐'Clay loam'**	**☐'Clay loam sandy'**	**☒'Silty clay loam'**	**☐'Light clay'**	**☐'Light medium clay'**		
	☐'Medium clay'	**☐'Medium heavy clay'**	**☐'Heavy clay'**	☐(Saline mud)				
Erosion	☒Absent	☐Scattered	☐Frequent					
Erosion Type	☐Tunnelling	☐Sheet	☐Rill	☐Gully	☐Mass failure	☐Streambank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	☐Grazing	☒Forestry	☐Cropping	☐Conservation	☐Mining	☒Other:		
Evidence	☐Clearing	☐Cultivation	☒Regrowth	☐Logging	☐Thinning	☐No Disturbance		
Dieback	☐0%	☒1-25%	☐26-75%	☐26-27%	☐>76%	☐NA		
Site condition	☐Very Good	☐Good	☒Moderate	☐Poor	☐Degraded			
Fire Scars	☐Absent	☐Scattered	☒Frequent	**Time Since**	☐Recent	☒Old	**Average Height (m)**	1
Disturbance								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)					
Macrohabitat(s) present	☐**CEST** ☐**Rf** ☐**H** ☐**FOR** ☒**WDL** ☐**GRL** ☐**IMP** ☐**LKE** ☐**RIP** ☐**SHR** ☐**SW** ☒**DIS**				
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).					
Ecologically dominant layer (EDL)	☒T1	☐T2	☐S1	☐S2	☐G
Avg height (m) of EDL	8	**Avg DBH (cm) of EDL**	10		
Canopy cover (%) of EDL	☐>70% (dense/closed)	☐30-70% (mid-dense)	☐10-30% (sparse)	☒<10% (very sparse)	☐N/A
Functional shrub layer density (<2m)	☐Dense/closed	☐Mid-dense	☒Sparse	☐Very sparse	☐Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	☐Found on Site – records below	☒Not Found On Site
Weed infestations	☐Found on Site – records below	☒Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start Compass bearing	SE		Start Easting	56J 225688			End Easting	56J 0225732					
			Start Northing	7057626			End Northing	7057612					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)			4	8	2	3					0.1	1	
Canopy cover (%)			5		20						5		

Common name / Collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or 5m x 2m plot for dense cover in S1 and S2) – Denote type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		Total						
Eucalyptus decorticans				1				
Acacia ixipholia					10			3
Eucalyptus crebra				1				

Ecological Field Survey ORG-ARW-HSM-FOR-00067

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Laxmannia gracillis								
Echinochloa colona								
Aristida captu-medisae								
Eragrostis cilianensis								
Aistrostipa scabra								
Panicum decompositum								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	69	68	67	66	65	
Native perennial grass	10		40	30	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	40	20	10	10	25	
Rock						
Bare ground	50	80	50	70	55	
Cryptogams						
Total	**=100%**	**=100%**	**=100%**	**=100%**	**=100%**	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4 (3D Ecosmart)	NA	LC	NCAP
Survey result	11.7.4	NA	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	☒Absent		☐Present	
Wetland / Swamp / Waterbody	☒Absent		☐Present	
Waterway	☒Absent		☐Present	
Potential for **nectar / pollen**	☐Absent	☐Scattered	☒Common	☐Abundant
Potential for **fleshy fruiting plants**	☐Absent	☐Scattered	☒Common	☐Abundant
Potential for **seeding grass cover**	☐Absent	☐Scattered	☒Common	☐Abundant
Dense shrub/grass shelter	☐Absent	☒Scattered	☐Common	☐Abundant
Large Eucalypts (>30cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large Non-Eucalypts (>20cm DBH)	☐Absent	☒Scattered	☐Common	☐Abundant
Large rocks (>30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Small rocks (10-30cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Leaf litter depth	☐Absent	☒Single layer	☐Multiple layers	☐Deep layers
Leaf litter coverage	☒Absent	☐Scattered	☐Common	☐Abundant
Termite mounds (>50cm)	☒Absent	☐Scattered	☐Common	☐Abundant
Rock piles	☒Absent	☐Scattered	☐Common	☐Abundant
Trees with shedding bark	☐Absent	☐Scattered	☒Common	☐Abundant
Soil cracks	☒Absent	☐Scattered	☐Common	☐Abundant
Koala feed trees	☐Absent	☐Scattered	☒Common	☐Abundant
Mistletoe/Epiphytes	☐Absent	☒Scattered	☐Common	☐Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	NA	**No. of trees with hollows (>30cm)**	NA

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	☒Yes	☐No	
Ecologist	☐Yes	☒No	
Species Management Plan	☐Yes	☒No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	☐Yes	☒No	Is the vegetation suitable for slashing only?
	☒Yes	☐No	Is the slope < 5%?
	☒Yes	☐No	Is the clay content > 20%?
	☒Yes	☐No	Are gilgais absent?
Suitable for minimal disturbance?	☐Yes	☒No	
Notes			

Well pad should be moved further East to avoid Offsets.



North face of transect



East face of the transect



South face of the transect



West face of the transect

948

targetzero

SITE IDENTIFICATION			
Site Name:	WP 242, Girrhwa Pl	Date:	05.04.2023
Tenure:	PL 491	Assessor(s):	NH

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	225912
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7026868
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 8036		#	
East	# 37		#	
South	# 58		#	
West	# 39		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	12				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	10					**Avg DBH (cm) of EDL**			20			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	225918			End Easting	225913				
		Start Northing	7066850			End Northing	7066893				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		10	15	5	8			1	2	0.1	1
Canopy cover (%)		30		10				10			
Common name/collection name	Species name	Sample (Field No.)	Stem Count (S0m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
E. crebra				13	3						
Angophora laiocarpa				1							
A semilunata							6				
A spp.							15				
Aristida stricta											

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	8040	8041	8042	8043	8045	
Native perennial grass	5	10	10	1		5
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	20	15	15	20	14
Rock						
Bare ground	85	70	75	84	80	79
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.7.7	N/A	LC	NCAP
Survey result	11.7.7	N/A	"	"
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	X	No. of logs (>10cm)	X
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	x	No. of trees with hollows (>30cm)	x

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	Special Least Concern Species Echidna, Platypus, Migratory Species	
V	Vulnerable		
NT	Near Threatened		
SLC	Special Least Concern	Colonial Breeding Species Microbats, wetland birds	
CBS	Colonial Breeding Species		

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Subject to report findings



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 229	**Date:**	22/07/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	1493 226615
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7056208
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~290~~ 292		#	
East	# ↓		#	
South	#		#	
West	# ~~293~~ 295		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	~~Level (<1%)~~	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)	Scattered	Frequent
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Seismic line		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76% in T1	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		15	**Avg DBH (cm) of EDL**	35	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia Tomentosa	Scattered	Throughout property			

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting	1494	226638	End Easting	1492	226590				
		Start Northing		7056202	End Northing		7056212				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		15	20	8	10	2	4			0	1
Canopy cover (%)		5		5		70					

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Weeping bamboo	Arundinella nepalensis							
Paspalidium distans								
Hibiscus sturtii								
Sida corrugata								
Eragrostis leptostachya								
Valvalleya subxerophila								
Aristida caput-medusae								
Digitaria brownii								
Mulga grass	Thyridolepis mitchelliana							
Panicum effusum								
Cheilanthes sieberi								
Eragrostis sororia								
* Sh Malvastrum americanum								
Lomandra filiformis								
Chenopodium desertorum								
Eucalyptus fibrosa								
Dodonaea triangularis								
Acacia semilunata		4				11 (2)		11 (2)
Eucalyptus woodsiana		1				(1)		
Acacia tetrodyx		39				++++ ++++ ++++ ++++ 111 (33)		++++ 1 (6)

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	296	→	→	→	300	
Native perennial grass	100	70	5	2	30	41.4
Native other grass (if relevant)						
Native forbs and other species (non-grass)			3	3		1.2
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs					20	4
Litter		30	92	65	40	45.4
Rock				30		6
Bare ground					10	2
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE 3D	11.5.1	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect (24.5)							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	2+5+4+3+9+13.5	**No. of logs (>10cm)**	11
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	490	**Per hectare (x 20)**	140

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

Bellevue Part 1

SITE IDENTIFICATION			
Site Name:	Alderby 111	Date:	4 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	226695
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7050899
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
469 North	# 472		#	
East	# 473		#	
South	# 474		#	
West	# 475		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	15 m		**Avg DBH (cm) of EDL**	20	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	226702	End Easting	276695
		Start Northing	7050918	End Northing	7050868

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 | 18	2 | 6		1 | 2	0.1 | 1
Canopy cover (%)		22%	10%		~~5~~ 10%	1%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus crebra		12		11	1			
P Hakea longiflora	Hakea lorea	2			2			
Acacia concurva	Acacia contorta	43					27	16
Petalostigma pubescens		2					2	
Angophora leiocarpa		5		1	1		3	
Corymbia clarksoniana		1		1				
Psydrax s.l.	Psydrax buxifolia	1					1	
Acacia leiocalyx		10		1	4		5	
Enteleia stricta								
Cohnia sieberi	Bahnia aspera							
Sida spicata								
Evolvulus alsinoides								
Pycnosorus	Chrysocephalum apiculatum							
pink sida	Hibiscus sturtii							
Melinis repens								
Aristida caput medusae								

NK1
T1 T2
A. con
S1 S2
SMA
T2 S1 T1
PBW
T1
4 Low
T1 T2 S1
MCP
T1

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

473

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	476	477	478	479	480	
Native perennial grass	~~10~~ 15	10	10	20	20	
Native other grass (if relevant)	15	70			50	
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	50	20	30	30	15	
Rock						
Bare ground	20		60	50	15	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4			
Survey result	11.7.4			
Agree with mapped RE? If no, provide justification from field data				

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	5	No. of logs (>10cm)	1
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	Absent		~~Present~~	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	~~Common~~	Abundant
Potential for **fleshy fruiting plants**	~~Absent~~	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	~~Abundant~~
Dense shrub/grass shelter	~~Absent~~	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	~~Scattered~~	Common	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	~~Scattered~~	Common	Abundant
Soil cracks	~~Absent~~	Scattered	~~Common~~	Abundant
Koala feed trees	Absent	Scattered	~~Common~~	Abundant
Mistletoe/Epiphytes	Absent	Scattered	~~Common~~	Abundant

1 of 2

targetzero
► zero incidents ► zero injuries

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Tree					
hole					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	large trees
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11.3.25-1	**Date:**	14/02/22
Tenure:	PL402	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	1372 226721
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060 589
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	#		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	(1-25%)	26-75%	>76%	n/a			
Site condition	(Very good)	Good	Moderate	Poor	Degraded			
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	(WDL)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	(T1)	T2	S1	S2	G
Avg height (m) of EDL	23		**Avg DBH (cm) of EDL**	40	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	(10-30% (sparse))	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	(Very sparse)	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered				

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)								
Transect Start compass bearing	~~NE~~ SW	Start Easting	1371 #226742		End Easting	1373	226699	
		Start Northing	7060604		End Northing		7060576	
Stratum	E	T1	T2	T3	S1	S2/Seedlings		
Height range (m)		20 / 25	10 / 15	3 / 4				
Canopy cover (%)		10	20	~~5~~ 2				
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
* Megathyrsus maximus								
Dichanthium sericeum								
Lomandra longifolia								
Paspalidium distans								
Glycine ~~[illegible]~~ stenophita								
Wahlenbergia gracilis								
Sporobolus creber								
Reed grass Arundinella nepalensis								
Alternanthera denticulata								
~~Sporobolus~~ Eragrostis sororia								
Walwhalleya subxerophila								
Eucalyptus populnea		8			卌 ||| (8)			
Acacia semilunata		1				(1)		
Eucalyptus camaldulensis		21		||| (3)	卌 卌 (10)	卌 ||| (8)		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	10	11	12	13	14	
Native perennial grass	20	40	2	13	50	35
Native other grass (if relevant)						
Native forbs and other species (non-grass)	30	5	3	2	5	9
Native shrubs (<1m)	30					6
Non-native grass						
Non-native forbs and shrubs						
Litter	20	5	60	25	45	31
Rock						
Bare ground			35	60		19
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.3.4	N/A	OC	OC
Survey result	11.3.25	N/A	LC	OC
Agree with mapped RE? If **no**, provide justification from field data	No, fringing drainage lines, steep banks, not on alluvial plain.			

FAUNA HABITAT within 50m x 10m transect								
No. Of trees with hollows (>10cm)	3	No. of hollow logs	2	Total length of logs (>10cm)	10+7+6+10+5+11 (49)	No. of logs (>10cm)	10	
Per hectare (x 20)	60	Per hectare (x 20)	40	Per hectare (x 20)	980	Per hectare (x 20)	200	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

targetzero
► zero incidents ► zero injuries

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees - sighting					female

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) Yes / (No) Yes / (No) (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	~~1134~~ 1132-1	Date:	14/02/22
Tenure:	PL497	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E) ~~1314~~	226787
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7060500
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 15		#	
East	# ↓		#	
South	# ↓		#	
West	# 18		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	20		**Avg DBH (cm) of EDL**	35	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	E	Start Easting	1374	226763		End Easting	1375	226813			
		Start Northing		7060496		End Northing		7060507			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		18	20	6	10	2	3			0	0.5
Canopy cover (%)		10		15		5				1	
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1		T2		T3		S1	S2
		TOTALS									
Dichanthium sericeum											
Eragrostis parviflora											
Eragrostis sororia											
Centipeda minima											
Phyllanthus ~~(wide leaflets)~~ gunnii											
Enteropogon acicularis											
Alternanthera denticulata											
Eragrostis leptostachya											
Paspalidium distans											
Walwhalleya subxerophila											
Glycine tabacina											
~~Sedge photo~~ Juncus usitatus											
~~Reed grass~~ Arundinella nepalensis											
Eucalyptus woolsiana		12		III (3)		~~IIII~~ ~~IIII~~ III (8)		(1)			
Eucalyptus populnea		11		(1)		~~IIII~~ III (8)		II (2)			

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	19	20	21	22	23	
Native perennial grass	70	~~[illegible]~~ 80	75	70	100	79
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5	5	5		3
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	30	~~[illegible]~~ 15	20	25		18
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.3.4	N/A	OC	OC
Survey result	11.3.2	TEC	OC	OC
Agree with mapped RE? If no, provide justification from field data	No, dominated by E. populnea, not Tereticornis			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	13	No. of logs (>10cm)	3
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	260	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	~~Abundant~~
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other					
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**		**Other Information (e.g. age, collected, active/inactive)**
			Easting	**Northing**	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 248	**Date:**	14/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	377 226892
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060 340
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~529~~		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~537~~		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	3				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL			20		**Avg DBH (cm) of EDL**		45					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting 1376	226865	End Easting 1378	226913	
		Start Northing	7060335	End Northing	7060340	
Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		20 22	10 15	1.5 3		
Canopy cover (%)		5	15	25		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Fimbristylis dichotoma								
Eragrostis sororia								
Panicum effusum								
Eragrostis leptostachya								
Chiranthes sieberi								
Chrysopogon fallax								
Aristida ramosa								
~~Purpleinis (photo)~~ Murdannia graminea								
Walwhalleya subxerophila								
Digitaria brownii								
Callitris glaucophylla		1				1		
Alloeas hiehmanni		25			111 3	~~IIII IIII IIII IIII~~ 22		
Acacia semilunata		90				~~IIII IIII IIII~~ +32+27+16 90		
Eucalyptus ~~pop[illegible]~~ crebra		9		111 3	~~IIII~~ 1 6			

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

targetzero
► zero incidents ► zero injuries

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	~~19~~ 25	26	27	~~[illegible]~~ 33	~~23~~ 34	
Native perennial grass	40	75	80	55	80	66
Native other grass (if relevant)						
Native forbs and other species (non-grass)	~~10~~ 20	5	10	5		8
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	35	5	10	40	20	22
Rock						
Bare ground	5	15				4
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.4	N/A	~~N/A~~ LC	~~N/A~~ NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	3+3+8+7+4 (25)	No. of logs (>10cm)	~~[illegible]~~ (7)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	500	Per hectare (x 20)	140

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Sighting	Magpie lark				

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 123 option	Date:	15/03/22
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	1576 226936
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7051263
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 38		#	
East	# ↓		#	
South	# ↓		#	
West	# 41		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	(Moderately sloping (5-10%))	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam)	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion		(Absent)		Scattered			Frequent	
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

targetzero
► zero incidents ► zero injuries

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	~~Clearing~~	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1		S2		G		
Avg height (m) of EDL	~~18~~ 20					**Avg DBH (cm) of EDL**		30				
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		~~Sparse~~		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	S	Start Easting	1577	226946		End Easting	1575	226934			
		Start Northing		7051286		End Northing		7051239			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		15	20	5	6	2	3	0.5	1		
Canopy cover (%)		25		~~8~~ 10		10		5			
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Ancistrachne uncinulata											
Hibiscus sturtii											
Desmodium ? - whiteflowers photo	Desmodium varians										
* Melinis repens											
* Sida spinosa											
Digitaria brownii											
* Urochloa panicoides											
Thyridolepis mitchelliana											
Solanum esuriale											
Euphorbia tannensis											
Aristida calycina											
Digitaria diffusa											
Enneapogon gracilis											
* Cenchrus ciliaris											
Entolasia stricta											
Capparis lasiantha											
Jasminum didymum											
Paspalidium distans											
Geigera parviflora		3				(1)		11 (2)			
Eucalyptus crebra		1		(1)							
Acacia shirleyi		25		~~IIII~~ (5)	11 (2)			12+1+1+4 (18)			

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Calotis cuneifolia								
Chiffanthes sieberi								
Oxalis radicosa								
Evolvulus alsinoides								
Parsonsia eucalyptophylla								
Weeping rad grass	Arundinella nepalensis							
Eucalyptus decorticans		3		4	17 (3)			
Shrub/tree photo	Capparis canescens	1					(1)	

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	42	→	→	→	46	
Native perennial grass	20	55	70	90	85	64
Native other grass (if relevant)						
Native forbs and other species (non-grass)	20	5	5	5	5	8
Native shrubs (<1m)						
Non-native grass	10	15				5
Non-native forbs and shrubs	10				5	3
Litter	~~30~~ 20	25	25	5	5	20
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	11.7.4	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect 116 15+14+2+4+17							
No. Of trees with hollows (>10cm)	1	No. of hollow logs	0	Total length of logs (>10cm)	9+15+4+15+2+4	No. of logs (>10cm)	23
Per hectare (x 20)	20	Per hectare (x 20)	0	Per hectare (x 20)	2320	Per hectare (x 20)	440

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 201-203	Date:	14/03/22
Tenure:	PL ~~19~~ 492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	227200
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7054 433
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 1		#	
East	#		#	
South	#		#	
West	# 4		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ~~ESU or~~ 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	~~Dark~~	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL			15			**Avg DBH (cm) of EDL**			45			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting ~~1558~~	227204	End Easting 1558	227194
		Start Northing 1560	7054 453	End Northing	7054 404

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		12 | 20	4 | 7			0·5 | 1·5
Canopy cover (%)		25	40			10

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida jerichoensis								
~~Eragrostis~~	Eragrostis sororia							
Fimbristylis dichotoma								
Digitaria brownii								
Thyridolepis mitchelliana								
Borreria bipinnata								
Cheilanthes sieberi								
~~Eragrostis~~	Eragrostis leptostachya							
Paspalidium sp.								
Panicum effusum								
Lomandra longifolia								
Eucalyptus crebra		1			(1)			
Casuarina	Persoonia sericea	1						(1)
Leucopogon mitchellii		2						11 (2)
Micromyrtus sessilis		1						(1)
Acacia semilunata		16						~~IIII IIII~~ (16)
Acacia leiocalyx		8						~~III~~ (8)
Callitris glaucophylla		44			~~IIII IIII~~ (44)			
Allocasuarina luehmannii		13			11 (2)			~~IIII IIII~~ 1 (11)
Eucalyptus tetrodonta		8		III (3)	IIII (4)			(1)

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	5	6	7	8	9	
Native perennial grass	75	100	100	85	50	82
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20			15	20	11
Rock						
Bare ground	2				30	6.4
Cryptogams	3					0.6
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	11.7.7	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	11 (2)	No. of hollow logs	1 (2)	Total length of logs (>10cm)	13+5+2+4 (24)	No. of logs (>10cm)	IIII (8)
Per hectare (x 20)	40	Per hectare (x 20)	40	Per hectare (x 20)	480	Per hectare (x 20)	160

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

SITE IDENTIFICATION			
Site Name:	Disturbed RE 11.51	**Date:**	14/02/22
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	227230
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7059462
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~1047~~		#	
East	# ↓		#	
South	# ↓		#	
West	# 45		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL				10		**Avg DBH (cm) of EDL**			30		20	
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey [illegible]

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	S	Start Easting 1380	227229	End Easting 1387	227237		
		Start Northing	7059486	End Northing	7059436		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		8 | 10		3 | 5	1.5 | 2	0.5 | 1	
Canopy cover (%)		5		5	20		
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed				
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Phyllanthus virgatus								
Panicum effusum								
Eragrostis sororia								
Aristida ramosa								
Digitaria brownii								
~~Fuzzy glumes~~ Eriachne mucronata								
Brunoniella australis								
Cheilanthes sieberi								
Fimbristylis dichotoma								
Chrysopogon fallax								
S.								
~~Small triangular leaf~~ Podonaea biloba		12						12
Acacia semilunata		16					11	6
Eucalyptus populnea		3			2	1		
Eucalyptus crebra		7		4	3			
Allocasuarina luehmannii		10					4	6

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	39	40	~~39~~ 41	46	48	
Native perennial grass	60	60	35	40	95	58
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5		5			2
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	30	20	50	5	5	22
Rock						
Bare ground	5	20	10	55		18
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	Disturbed (11-51)	N/A	N/A	N/A
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0.5+6 12 (8.5)	No. of logs (>10cm)	~~HH~~ 5
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	170	Per hectare (x 20)	100

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 124	**Date:**	15/03/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	1579 227516
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7051427
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 47		#	
East	# ↓		#	
South	# ↓		#	
West	# 50		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion		Absent	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes	Evidence of blade-ploughing, left scattered trees							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	15	**Avg DBH (cm) of EDL**	35									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SE	Start Easting	580	227500	End Easting	578	227534				
		Start Northing		7051452	End Northing		7051413				
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)	10 | 15		4								0.5 | 1.5
Canopy cover (%)	10										5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Brunoniella australis								
Thyridolepis mitchelliana								
Cabtis cinerfolia								
Sida corrugata								
* Urochloa panicoides								
Aristida caput-medusae								
Eragrostis ~~brevipedata~~ leptostachya								
* Melinis repens								
* Sida spinosa								
Evolvulus alsinoides								
Chrysanthes sieberi								
Wide leaf grass photo Echinochloa colona								
* Solanum nigrum								
Euphorbia dallachyana								
Digitaria brownii								
Oxalis radicosa								
* Cenchrus ciliaris								
Eucalyptus decorticans		2	(1)					(1)
Petalostigma pubescens		1						(1)
Acacia shirleyi		6						6
Acacia semilunata		26						26

target zero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Chloris virgata	Chloris gayana							
Solanum elliptica								
Arcistrophe uncinulata								
* Clandularia aristigera								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	S1	→	→	→	S5	
Native perennial grass	20	10				6
Native other grass (if relevant)						
Native forbs and other species (non-grass)	60	10		40	65	35
Native shrubs (<1m)					10	2
Non-native grass			10	60	10	16
Non-native forbs and shrubs			90			~~14~~ 18
Litter	10	70			5	17
Rock						
Bare ground	10	10			10	6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D Ecosmart	Disturbed 11.5.1	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES, heavily disturbed by blade-ploughing			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	10+5+11+24	No. of logs (>10cm)	III 4
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	480	Per hectare (x 20)	80

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

targetzero
► zero incidents ► zero injuries

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Scattered trees >4m, logs
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) Yes / (No) (Yes) / No Yes / (No)		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Bellevue Pt

SITE IDENTIFICATION			
Site Name:	Alderly 104	Date:	3 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	227601
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7048925
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
439 North	# 442		#	
East	# 443		#	
South	# 444		#	
West	# 445		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)	
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	9				**Avg DBH (cm) of EDL**		25					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067 targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	270 AW	Start Easting	227630	End Easting	227574
		Start Northing	7048916	End Northing	7048927

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 / 12	2 / 6		1 / 2	0.1 / 1
Canopy cover (%)		15%	20%		2%	>1%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia apeepta		3		~~3~~	3			
Eucalyptus orebra		8		7				1
Acacia leiocalyx		11 ~~[illegible]~~			4			7
Corymbia clarksoniana		2					2	
Aristida caput-medusae								
A. Coalycina								
Chielanthes sieberi								
Sida spicata								
Sida sp (pink flowers)	Hibiscus sturtii							
Entolassia stricta								
Buffel Chenchrus ciliaris								
Gahnia sieberi Gahnia aspera								

A ap
T2
A lea
T2 S1
MRA
T1 PAW
S1
S2

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

443

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	446	447	448	449	450	
Native perennial grass	60	60	45	75	70	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	30			5		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	40	45	20	30	
Rock						
Bare ground			10			
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4			
Survey result	11.7.4			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	18.2	No. of logs (>10cm)	12
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

1+ 8.2 0.2 +2 +2 1.8 +1.2

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
	large tree				

E	Endangered	**Special Least Concern Species**
V	Vulnerable	Echidna, Platypus, Migratory Species
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species**
CBS	Colonial Breeding Species	Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	large tree
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	See above
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Bellevue Pt I

targetzero ► zero incidents ► zero injuries

Aldersly 107

SITE IDENTIFICATION			
Site Name:	Aldersly 107	Date:	3 November 2020
Tenure:	PL492	Assessor(s):	Bede Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	227640
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7049921
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
168 North	# 451		#	
East	# 452		#	
South	# 453		#	
West	# 454		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	6		**Avg DBH (cm) of EDL**	/ ←	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067 targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N 0°	Start Easting	227642		End Easting	227648			
		Start Northing	7049896		End Northing	7049949			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)		4	11	2	4			1 2	0.1 1
Canopy cover (%)		25		4				10	1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia shirleyii		120		24	11		51	34
E. cordata		1						
Aristida caput reduca								
A. calycina								
Sida spicata								
Eulalia ctirida								
Fourt grass Urochloa foliosa								

LW

T1 24 T2 9

S1 30 21 S2 34

NR1 T2

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

152

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	455	456	457	458	459	
Native perennial grass	65			40		
Native other grass (if relevant)						
Native forbs and other species (non-grass)				15	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	15	100	30	35	25	
Rock						
Bare ground	20		70	10	65	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4			
Survey result	11.7.4/11.7.2			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	15	No. of logs (>10cm)	9
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant



8 2 5

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
	large trees loss				

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	large trees loss
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-00057 targetzero zero incidents ► zero injuries

Bellevue Part 1

SITE IDENTIFICATION			
Site Name:	Alderly 102	Date:	3 Nov 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	227778
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7048124
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
429 North	# 432		#	
East	# 433		#	
South	# 434		#	
West	# 435		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL						**Avg DBH (cm) of EDL**						
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	0° N	Start Easting	227770	End Easting	227783
		Start Northing	7048099	End Northing	7048144

Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		6	15	2	6			1	2	0-1	1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Corymbia clarksoniana		12		12				
Pelargonium peltatum		1			1			
Hakea lorea	Hakea lorea	3			1			
Cenchrus glaucophylla		5		4	1			
Acacia aprepta		1		1				
A. leiocalyx	Acacia leiocalyx	5		2			4	1
Angophora leiocarpa		2						
Alphitonia excelsa		1						
Acacia concolor		3						2
Amyema quandong	Amyema quandong						1	2
Chiella tbl sieberi								
Eucalyptus alsophylla								
Astrida sp.								
A. caput medusae								
A. calycina								
~~Dianella concolor~~	Dianella longifolia							
Cahnia sieberi	Cahnia aspera							
Sida sp								
Sida spicata								
Melinis repens	Melinis repens							
buffel	Cenchrus ciliaris							

PML T1 ⊠ Ø

BCP T1 T2 0 : 6 6

MM T1 .

A lei S1 T2 4 : 1 2

SSA T1 . 0

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	436	437	438	439	440	
Native perennial grass	10	50	60	45	35	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10			15		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	70	35	35	35	65	
Rock						
Bare ground	10	15	5	5		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1			
Survey result	11.5.1			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	5	No. of logs (>10cm)	4
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	~~Scattered~~	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	~~Abundant~~
Dense shrub/grass shelter	Absent	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	~~Absent~~	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	~~Common~~	Abundant
Mistletoe/Epiphytes	Absent	Scattered	~~Common~~	Abundant

2 + 3

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
	large trees				
	10 SC				

E	Endangered	**Special Least Concern Species**
V	Vulnerable	Echidna, Platypus, Migratory Species
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species**
CBS	Colonial Breeding Species	Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	~~No~~	large trees 10 SC
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	See above
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11.3.25-2	**Date:**	15/02/22
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	391 227812
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7059484
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 624		#	
East	# ↓		#	
South	# ↓		#	
West	# 625		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1		S2		G		
Avg height (m) of EDL	25					**Avg DBH (cm) of EDL**		50				
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	SE	Start Easting	1392	227792		End Easting	1390	227830			
		Start Northing		7059498		End Northing		7059467			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		23-22	827	10	15	3	4	1	1.5		
Canopy cover (%)		5		10		50		20			
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Themeda triandra											
*Megathyrsus maximus											
*Glandularia aristigera											
Lomandra longifolia											
Setaria surgens											
Aristida caput-medusae											
~~Forb photo~~ Siegesbeckia orientalis											
Sida ~~photo~~ hackettiana											
Oxalis radicosa											
~~Weeping reed~~ Arundinella nepalensis											
Aristida calycina											
Black spear Heteropogon contortus											
Calotis ~~[illegible]~~ lappulacea											
Eragrostis leptostachya											
Chenopodium ~~[illegible]~~ desertorum											
Digitaria ~~(small)~~ diffusa											
Leptospermum ~~(photo)~~ polygalifolium		1					1				
Eucalyptus camaldulensis		6		III 3	III 3						
Acacia conferta		6					~~IIII~~ I 6				
Acacia semilunata		114				30+15+24+20 +17 106	~~IIII~~ III 8				
Acacia leiocalyx		57				IIII+61+ 4 45	~~IIII~~ II 12				

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	68	→	→	→	72	
Native perennial grass	5	~~1~~	80		20	21
Native other grass (if relevant)						
Native forbs and other species (non-grass)		15			2	3.4
Native shrubs (<1m)						
Non-native grass	30	40	5	40	30	29
Non-native forbs and shrubs	2	30	5	15	3	11
Litter	63	15	10	45	45	35.6
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.3.14	NA	LC	NCaP
Survey result	11.3.25	NA	LC	OC
Agree with mapped RE? If no, provide justification from field data	No, no Angophora species or secondary tree layer including Callitris or Allocasuarina.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	III (3)	No. of hollow logs	II (2)	Total length of logs (>10cm)	7+7 (14)	No. of logs (>10cm)	IIII (4)
Per hectare (x 20)	60	Per hectare (x 20)	40	Per hectare (x 20)	280	Per hectare (x 20)	80

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 7+ m, watercourse
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) Yes / (No) Yes / (No) (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 246	**Date:**	22/02/22
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)** 1483	227857
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7058193
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 2687		#	
East	# ↓		#	
South	# ↓		#	
West	# 2687 0		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	(W)	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		16	**Avg DBH (cm) of EDL**	30	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa & stricta	Scattered	throughout ESU			

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	1484 227837		End Easting	1482	227886
		Start Northing	7058197		End Northing		7058191
Stratum	E	T1	T2	T3	S1		S2/Seedlings
Height range (m)		15 | 20	7 | 8	3 | 4			0.5 | 1
Canopy cover (%)		15	10	30			5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida capit-medusae								
Panicum effusum								
Eragrostis sororia								
Digitaria brownii								
Phyllanthus ~~sara~~ occidentalis								
Cheilanthes sieberi								
Oxalis radicosa								
Malga grass Thyridolepis mitchelliii								
Fuzzy grass Enneachne mucronata								
* Melinis repens								
Amphibromus nervosus								
Evolvulus alsinoides								
Hibiscus sturtii								
Euphorbia dichotoma								
Sida corrugata								
Brachychiton populneus		2				II (2)		
Callitris glaucophylla		6			III (3)	III (3)		
Eucalyptus crebra		3		II (2)				(1)
Pointy leaf Leucopogon mitchellii		6						IIII (6)
Acacia ligulata		114				7+5+2+4+5+4+7+7+4+4+4

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	271	→	→	→	275	
Native perennial grass	70	100	100	60	30	72
Native other grass (if relevant)						
Native forbs and other species (non-grass)	20			20	20	12
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10			20	20	10
Rock						
Bare ground					30	6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3.D	11.7.7	NA	LC	NCaP
Survey result	11.7.4	"	"	"
Agree with mapped RE? If no, provide justification from field data	Disturbed, Lysicarpus scattered throughout ESU. No Eucalyptus fibrosa.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	~~2~~ 0	No. of hollow logs	11 (2)	Total length of logs (>10cm)	3+2.5+2 (7.5)	No. of logs (>10cm)	111 (3)
Per hectare (x 20)	0	Per hectare (x 20)	40	Per hectare (x 20)	150	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)	Other Information (e.g. age, collected, active/inactive)
			Easting / Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	Trees >4m, termite mounds
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Bellevue 3. WP 24/6 Reassessment	SITE IDENTIFICATION		
Site Name:	Reassessment - 02	**Date:**	23. Aug. 23
Tenure:	PL 492	**Assessor(s):**	Thiago Neves

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	50J 227829
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7058117
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56 J
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 15		#	
East	# 16		#	
South	# 17		#	
West	# 18		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW ✓	SI	SW	Nil
Soil Colour	White	Yellow	Orange	Brown ✓	Red				
	Black	Grey	Pale	Dark ✓	Mottled				
Soil (**'field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)**	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing ✓	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75% ✓	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor ✓	Degraded							
Fire scars	Absent	Scattered	Frequent ✓	**Time since**	Recent	Old ✓	**Average Height (m)**	4				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2 ✓		G			
Avg height (m) of EDL	0.5				**Avg DBH (cm) of EDL**		>1					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a ✓			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense ✓		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	NW	Start Easting	56J 0227848	End Easting	56J 0227811		
		Start Northing	7058096	End Northing	7058138		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)	/	/	/	/	/	01	1
Canopy cover (%)	/	/	/	/	/		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia leicolyx								>50
Acacia semilunata								01
Griachne mucronata								
Walwhalleya subxenophila								
Halgania brachyrhyncha								
Gahnia aspera								
Goodenia hederacea								
Glandularia aristigera								
Chrysocephalum apiculatum								

target zero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	10	11	12	13	14 ~~15~~	
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	20	10	10		
Native shrubs (<1m)		10	30	20	10	
Non-native grass						
Non-native forbs and shrubs						
Litter		10	10			
Rock						
Bare ground	90	60	50	70	90	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7 (Eco)	NA	LC	NCAP
Survey result	Non-remnant.			
Agree with mapped RE? If no, provide justification from field data	No. Area had been burnt out (less than 3 months). There is NO weed layer alive present. Ground vegetation is in a first stage of regeneration (>1m)			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	10	No. of logs (>10cm)	1
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	✓ Absent		Present	
Wetland / Swamp / Waterbody	✓ Absent		Present	
Waterway	✓ Absent		Present	
Potential for **nectar / pollen**	~~✓~~ Absent	Scattered	✓ Common	Abundant
Potential for **fleshy fruiting plants**	Absent	✓ Scattered	Common	Abundant
Potential for **seeding grass cover**	✓ Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	✓ Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	✓ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	✓ Scattered	Common	Abundant
Large rocks (>30cm)	✓ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	✓ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	✓ Single layer	Multiple layers	Deep layers
Leaf litter coverage	✓ Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	✓ Common	Abundant
Rock piles	✓ Absent	Scattered	✓ Common	Abundant
Trees with shedding bark	Absent	Scattered	✓ Common	Abundant
Soil cracks	Absent	✓ Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	✓ Common	Abundant
Mistletoe/Epiphytes	Absent	✓ Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	0	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
log					
Burrows					
Stag					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	Yes / No ✓		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero

SITE IDENTIFICATION			
Site Name:	WP 306, Girrahweenpl	**Date:**	05.04.2023
Tenure:	PL 492	**Assessor(s):**	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	227928
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7026481
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 8027		#	
East	# 8028		#	
South	# 8029		#	
West	# 8030		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**			
	'Sandy clay loam'	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**			
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	10				**Avg DBH (cm) of EDL**		8					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within S0m x 10m transect)

Transect Start compass bearing	N	Start Easting	227919	End Easting	227930
		Start Northing	7066462	End Northing	7066513

Stratum	E		T1		T2		T3		S1		S2/Seedlings	
Height range (m)			8	12	5	8			1	2	0.1	1
Canopy cover (%)												

Common name/collection name	Species name	Sample (Field No.)	Stem Count (S0m x 10m plot) or (S0m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Angophora leiocarpa				8				
E. cephalra					3			
A. Triphylla							45	
G. aspera								
Mulga grass								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (S0m x 10m plot) or (S0m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within S0m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	8022	8023	8024	8025	8026	
Native perennial grass	15		20		15	10
Native other grass (if relevant)						
Native forbs and other species (non-grass)	30				10	8
Native shrubs (<1m)		5	20	70		19
Non-native grass						
Non-native forbs and shrubs						
Litter	15	90	40	10	60	43
Rock						
Bare ground	40	5	20	20	15	20
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE (3D)	Regrowth 11.5.1	N/A	LC	NCAP
Survey result	11	N/A	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	Yes, vegetation (HVR regrowth)			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		**No. of hollow logs**		**Total length of logs (>10cm)**		**No. of logs (>10cm)**	
Per hectare (x 20)		**Per hectare (x 20)**		**Per hectare (x 20)**		**Per hectare (x 20)**	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	Special Least Concern Species Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	Colonial Breeding Species Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Cleared-1	Date:	14/03/22
Tenure:	PL402	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E) 1564	227959
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7055254
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 18		#	
East	# 19		#	
South	# 20		#	
West	# 21		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)			
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)			
Aspect	N	S	E	W	NE	NW	SE	(SW)	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	(Sandy loam')	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	(Absent)	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	(Clearing)	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%		26-75%	>76%		(n/a)	
Site condition	Very good	Good		Moderate	(Poor ecologically)	Degraded		
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	(**GRL**)	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	(G)
Avg height (m) of EDL	1		**Avg DBH (cm) of EDL**	—	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	(Very sparse)	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Eragrostis curvula	~~Rare~~ High (in patches)	1564	227959	7055254	22

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	N	Start Easting 1565	227954	End Easting 1563	227965		
		Start Northing	7055229	End Northing	7055277		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)					0.5 2		
Canopy cover (%)					5		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
* Eragrostis curvula								
* Melinis repens								
Eragrostis sororia								
Calotis (longleaves)	Calotis cuneata							
~~Lone centipede~~	Centipeda minima							
* Urochloa panicoides								
* Erigeron bonariensis								
* Glandularia aristigera								
* Sida spinosa								
* Stylosanthes scabra								
Wahlenbergia gracilis								
Aristida caput-medusae								
Eragrostis leptostachya								
Cheilanthes sieberi								
Fimbristylis dichotoma								
Walwhalleya subxerophila								
Angophora leiocarpa		1					1	
Allocasuarina luehmanii		2					11 2	
Acacia semilunata		16					~~IIII~~ ~~IIII~~ ~~IIII~~ 16	
Acacia leiocalyx		2					11 2	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	23	24	25	26	27	
Native perennial grass				~~4~~		
Native other grass (if relevant)						
Native forbs and other species (non-grass)			1	20	3	4.8
Native shrubs (<1m)						
Non-native grass	100	100	98	70	95	92.6
Non-native forbs and shrubs			1		~~[illegible]~~ 2	0.6
Litter						
Rock						
Bare ground				5		1
Cryptogams				5		1
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	Cleared	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 230	**Date:**	22/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION				
Development Type			**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility		**Easting (E)** 1498	228191
☐ Pilot Well + Dam	☐ Dam		**Northing (N)**	7056207
☐ Monitoring	☐ Pipeline		**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line		**Other description**	
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~303~~ 305		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~306~~ 308		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	~~Grazing~~	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1		
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	435	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	~~Not Found On Site~~
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa	Scattered	throughout well			

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	S	Start Easting 1499	228 194	End Easting 1497	228185		
		Start Northing	7056 232	End Northing	7056179		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		10 12	5 6	3 4	0.5 1.5		
Canopy cover (%)		10	10	20	5		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
* Malvastrum americanum								
Evolvulus alsinoides								
Ancistrachne uncinulata								
Digitaria ~~gc~~ diffusa								
Aristida caput-medusae								
Digitaria brownii								
Paspalidium distans								
~~Capparis~~ ~~[illegible]~~ Capparis mitchellii		3						III (3)
Sigesbackia orientalis								
Hibiscus sturtii								
~~Euphorbia (linear leaf)~~ Euphorbia tannensis subsp. eremophila								
Cap Carissa ovata		2						II (2)
Monkey rope (pronounced veins) Parsonsia lanceolata								
Lomandra filiformis								
Desmodium? (photo) Desmodium brachypodum								
Acacia ~~[illegible]~~ sparsiflora		11			(1)	~~IIII~~ I (6)		IIII (4)
Alphitonia excelsa		7						~~IIII~~ II (7)
Acacia fern leaf Acacia deanei		2				(1)		(1)
Eucalyptus crebra		3		II (2)	~~I~~	(1)		
Callitris glaucophylla		6			~~IIII~~ I (6)			
Acacia biocalyx		82				~~IIII~~ ~~IIII~~ ~~IIII~~ +28+22+3+1 (74)		~~IIII~~ III (8)

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Sida corrugata Glandularia								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	309	→	→	→	313	
Native perennial grass	60	65	70	10	65	54
Native other grass (if relevant)						
Native forbs and other species (non-grass)	20	5	10		30	13
Native shrubs (<1m)						
Non-native grass	~~#0~~					
Non-native forbs and shrubs	10			40		10
Litter	10	30	20	50	5	23
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.5.1	NA	LC	NCaP
Survey result	〃	〃	〃	〃
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect 60 (20+5+5+4)							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	1.5+4+3 +1.5+5+3	No. of logs (>10cm)	~~HHII~~ 10
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	1200	Per hectare (x 20)	200

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)	Other Information (e.g. age, collected, active/inactive)
			Easting / Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

Ecological Field Survey ARW-HSM-FOR-00067

Bellevue part 1

targetzero
► zero incidents ► zero injuries

8:07 Am

SITE IDENTIFICATION			
Site Name:	Aldoels 110	Date:	4 November 2020
Tenure:	PL492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	228215
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7050472
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
460 North	# 463		#	
East	# 464		#	
South	# 465		#	
West	# 466		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:					
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance					
Dieback	0%	1-25%	26-75%	>76%	n/a						
Site condition	Very good	Good	Moderate	Poor	Degraded						
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1.5			
Disturbance notes											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G		
Avg height (m) of EDL	17m				**Avg DBH (cm) of EDL**		35				
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SW	Start Easting	228232	End Easting	228197		
		Start Northing	7050486	End Northing	7050457		
Stratum	E	T1		T2	T3	S1	S2/Seedlings
Height range (m)		6	20	2 6		1 2	0.1 1
Canopy cover (%)		25%		10			

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus Libuosa		11		11				
Acacia shirleyi		59		2			17	40
Alisonia constricta		1					1	
P. Hosperum spinescens		2					2	
~~Anthobolus leptomeriodes~~		~~4~~					~~4~~	
Extolasia ctricta								
Sida spicata								
Gahnia sieberi Gahnia aspera								
Aristida calycina								
Rhaphia spec. Hibiscus stunxii								
~~Cordyline cf 8-7~~								
Pittosporum sp.								
Aristida caput-medusae								
Dodonaea triangularis								
~~AA~~ Anthobolus leptomeriodes		4					4	

Plots 458 - 459

Spec

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

464

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	467	468	469	470	471	
Native perennial grass	25	20	15		50	
Native other grass (if relevant)						
Native forbs and other species (non-grass)			15	~~10~~	10	
Native shrubs (<1m)				80	~~10~~ 20	
Non-native grass						
Non-native forbs and shrubs						
Litter	35	50	~~50~~	10	~~15~~	
Rock	30					
Bare ground	10	30	20	10	5	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4			
Survey result	11.7.4			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	6	Total length of logs (>10cm)	22	No. of logs (>10cm)	7
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for nectar / pollen	Absent	Scattered	~~Common~~	Abundant
Potential for fleshy fruiting plants	Absent	~~Scattered~~	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	~~Scattered~~	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	~~Common~~	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	~~Common~~	Abundant
Large rocks (>30cm)	Absent	Scattered	~~Common~~	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	~~Abundant~~
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	~~Absent~~	Scattered	Common	Abundant
Rock piles	Absent	Scattered	~~Common~~	Abundant
Trees with shedding bark	Absent	~~Scattered~~	Common	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	~~Abundant~~
Mistletoe/Epiphytes	Absent	Scattered	~~Common~~	Abundant

4 1 2 1 3 C 5

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
	large trees logs				

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	~~No~~	Large trees logs
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	Rocks large trees
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Cleared shrubby-1	Date:	16/03/2022
Tenure:	PL497	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	1588 228246
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7055227
☐ Monitoring	☑ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 68		#	
East	# ↓		#	
South	#		#	
West	# 71		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	(Pale)	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	(Sandy loam')	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)	Gravelly			
Erosion	Absent		Scattered		(Frequent)			
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

(scald)

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	2		**Avg DBH (cm) of EDL**	5	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	W	Start Easting 1589	228272	End Easting 1587	228222		
		Start Northing	7055223	End Northing	7055229		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)	~~7~~5 ~~8~~8				1 3	0 0.5	
Canopy cover (%)	5				40	5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Fuzzy glume Eriachne mucronata								
Aristida calycina								
Sida linear leaves Sida hackettiana								
Digitaria diffusa								
Aristida caput-medusae								
Thyridolepis mitchelliana								
* Melinis repens								
Chrysopogon fallax								
Eragrostis sororia								
Portulaca australis								
Aristida leptopoda								
Parsonsia? photo Parsonsia lanceolata								
Brunoniella australis								
Ceebung Persoonia sericea		3					1	1) 2
Acacia/Senna Senna sophera		3					111 3	
Eucalyptus fibrosa		3	1				1	1
Acacia leiocalyx		5					5	
Dodonaea tricangularis		7					1	6
Acacia semilunata		62					56	6

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	72		→	→	76	
Native perennial grass	5					1
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)			10	15		5
Non-native grass						
Non-native forbs and shrubs						
Litter		10		10		4
Rock	95	50	40	30	70	57
Bare ground		40	50	45	30	33
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	Cleared	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Scattered trees >4m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No Yes / (No) (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Gathering Sok Alderley 181	Date:	23/06/20
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	228568
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7051193
☐ Monitoring	☑ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 390		#	
East	# ↓		#	
South	# ↓		#	
West	# 393		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	('Loam')	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	(Clearing)	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	(0%)	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	(Poor)	Degraded					
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**			
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	(**SHR**)	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			(S1)		S2		G	
Avg height (m) of EDL	2.5					**Avg DBH (cm) of EDL**			3			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)		(<10% (very sparse))		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse		(very sparse)		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa	Scattered	throughout	pipeline		

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	228569	End Easting	228565
		Start Northing	7051210	End Northing	7051159

Stratum	E	T1	T2	T3	S1		S2/Seedlings	
Height range (m)					1.5	2	0.5	1
Canopy cover (%)					5		1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Cenchrus ciliaris								
* Unknown grass (photo 3856)	Digitaria eriantha							
Acacia (linear leaves ~2.5cm)	Acacia bivenosa	2						11 (2)
Acacia (sample)	Acacia senilimata	6					NIL (5)	1 (1)
Sporobolus (pyramidal)	Sporobolus actinocladus							
Urochloa panicoides								
Centipeda cunninghamii								
Euphorbia dallachyana								
Aristida capiti-medusae								
Aristida Glandularia arrestigera								
Aristida ramosa								
Portulaca pilosa								
Alphitonia excelsa		2					(3)	(1)

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	387	388	389	394	395	
Native perennial grass				10		2
Native other grass (if relevant)						
Native forbs and other species (non-grass)				5	5	2
Native shrubs (<1m)						
Non-native grass	50	45	60	40	60	51
Non-native forbs and shrubs						
Litter	10	25	35	5	20	19
Rock						
Bare ground	40	30	5	40	15	26
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non-remnant	NA	NA	NA
Survey result	11	11	4	11
Agree with mapped RE? If no, provide justification from field data	YES, cleared paddock			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	~~Scattered~~	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	~~Scattered~~	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	~~Abundant~~
Dense shrub/grass shelter	~~Absent~~	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	~~Scattered~~	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	~~Scattered~~	Common	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	~~Absent~~	Scattered	Common	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Timber piles	Reptiles / marsupials		228544	7051116	Tree hearing E/W Photo 383-384

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Timber piles
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
	Yes / (No)		Is the slope < 5%?
Suitable – if all 4 questions are yes	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

228517 7051356 = small patch of ironbark E. crebra



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey CSG-ENV-HSM-FOR-00067

targetzero
► zero incidents ► zero injuries

Bellevue Pt 1

SITE IDENTIFICATION			
Site Name:	Aldinga 101	Date:	5 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION					
Development Type				Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒	Well pad	☐	Gas Processing Facility	Easting (E)	228589
☐	Pilot Well + Dam	☐	Dam	Northing (N)	7048104
☐	Monitoring	☐	Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐	Roads & Tracks	☐	Seismic Line	Other description	
☐	Work over	☐	Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
512 North	# 515		#	
East	# 516		#	
South	# 517		#	
West	# 518		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	9		**Avg DBH (cm) of EDL**	18cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	S/L				

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	228584		End Easting	228594			
		Start Northing	7048076		End Northing	7048120			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)		4	12	2	4			1 2	6.1 1
Canopy cover (%)		15%		25%				5%	1%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
~~E. crebra~~								
Eucalyptus exsarta	E. exserta	2		2				
Callitris glaucophylla		4		3			1	
Acacia leiocalyx		19		2	15		2	
Eurobesens	Melichrus eurobbesens	3					3	
Petalostigma pubescens		4			3		1	
Brachychiton populnea		1		1				
Aristida caput-medusae								
A. calycina								
A. sp								
Glandularia aristigera								
Sida spicata								
Sida (pink flower)	Hibiscus sturtii							
Chielanthes sieberi								
Gahnia sieberi	Gahnia aspera							
Paspalidium sp.	Paspalidium rara							
Opuntia tomentosa								
Oxalis sp	Oxalis sp							

NB Pm
T1

BCP
T2 S1 T1
A lei
T2 S1 T1

Enriched
S1

G
T2
S1

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

516

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	519	520	521	522	523	
Native perennial grass	50	35	40		90	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	15	5	10	55		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	25	60	50	35	10	
Rock						
Bare ground	10			10		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1 / 11.7.4			
Survey result	11.5.1 / 11.7.4			
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	3	No. of logs (>10cm)	3
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for nectar / pollen	Absent	Scattered	~~Common~~	Abundant
Potential for fleshy fruiting plants	Absent	~~Scattered~~	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	~~Abundant~~
Dense shrub/grass shelter	Absent	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	Absent	~~Scattered~~	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	~~Abundant~~
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	~~Scattered~~	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	~~Common~~	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
	large trees				

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

(1)

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Bellevue Part 2, WP195	Date:	29/05/2023
Tenure:	PL 492	Assessor(s):	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	228701
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7055110
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9573		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	16				**Avg DBH (cm) of EDL**	24						
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	N	Start Easting	228711			End Easting	228690						
		Start Northing	7055089			End Northing	7055132						
Stratum	E	T1		T2		T3		S1		S2/Seedlings			
Height range (m)		14	18	8	12	4	6	2	4	0.1	0.2		
Canopy cover (%)													

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. fibrosa		6		6				
Callitris glaucophylla		28			7	21		
Casuarina leuhmannii		28				16	12	
A. tetragona		17					17	
Angophora leiocarpa		1		1				
A. semilunata		1					1	
Gahnia aspera								
Cheilanthes sieberi								
Hakea purpurea								
Melinis repens								
Eragrostis sororia								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9568	→	→	→	→	
Native perennial grass	30	30	60	5	50	
Native other grass (if relevant)	10	10	5	5	5	
Native forbs and other species (non-grass)						
Native shrubs (<1m)					5	
Non-native grass						
Non-native forbs and shrubs						
Litter	60	20	30	40	20	
Rock						
Bare ground		40	5	50	20	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.7.7.	N/A	LC	NCAP
Survey result	11.7.7	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	42	No. of logs (>10cm)	14
Per hectare (x 20)	X	Per hectare (x 20)	X	Per hectare (x 20)	840	Per hectare (x 20)	280

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	X	No. of trees with hollows (>30cm)	X

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	(Yes)	(No)	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 197	**Date:**	16/03/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)** 196	228 856
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7054 462
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 77		#	
East	# ↓		#	
South	# ↓		#	
West	# 80		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2.5
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	20	**Avg DBH (cm) of EDL**	40									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ANW-HSM-FOR-00067 targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	597	228857	End Easting	595	228842				
		Start Northing		7054439	End Northing		7054484				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		18	20	6	10			1	3	0	0.5
Canopy cover (%)		20		30				20		5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida vamosa								
Digitaria brownii								
Cheilanthes sieberi								
Eragrostis sororia								
Solanum ellipticum								
* Sida spinosa								
Solanum ferocissimum								
Waltheria subreniformis								
Euphorbia drummondii								
Yellow flower (photo)	Senna sophera							
Oxalis radicosa								
Evolvulus alsinoides								
* Melons repens								
Fimbristylis dichotoma								
Chrysopogon fallax								
Aristida capit.-mitchellii								
Leucopogon mitchellii		5						5
Eucalyptus crebra		27		11 (2)			III (3)	22
Alstonia constricta		1		1			1	
Callitris glaucophylla		11				11		
Acacia leiocalyx		75					50	25

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Thyridolepis mitchelliana								
Aristeas wariana luehmannii		1					(1)	
Prata Lobelia concolor								
Galmia aspera								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	81	→	→	→	85	
Native perennial grass	85	60	50	100	95	78
Native other grass (if relevant)						
Native forbs and other species (non-grass)	15	25	30		5	15
Native shrubs (<1m)			20			4
Non-native grass						
Non-native forbs and shrubs						
Litter		15				3
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	11.7.7/11.5.1	NA	LC	NCaP
Survey result	11.5.1	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES, on the boundary of 11.7.7.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	5	No. of logs (>10cm)	1
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	100	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	~~Abundant~~
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No (Yes) / No Yes / (No) (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

Bellvue Pt 1

targetzero ► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Alderly 148	Date:	5 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	228885
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7050360
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
544 North	# 547		#	
East	# 548		#	
South	# 549		#	
West	# 550		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E 90°	Start Easting	228861	End Easting	~~22809~~ 228903
		Start Northing	7050365	End Northing	7050348

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		7 / 17	2 / 7		1 / 2	0.1 / 1
Canopy cover (%)		20%	4%		6%	1%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus crebra		8		8				
Callitris glaucophylla		2		1			1	
Acacia leiocalyx		10		3	7			
Petalostigma pubescens	Petalostigma pubescens	16			1		10	5
Hakea lorantheides	Hakea lorea	4			3		1	
Alistonia constricta		1					1	
Pysdrax sp	Pysydrax buxifolia	2					2	
Entelassia stricta								
Aristida spp.								
Gahnia sieberi	Gahnia aspera							
Dianella sp.	Dianella longifolia							
Sida pink Rbm	Hibiscus struthii							

NR1
T1
BCP
S1 T1
A. la
T2 T1
Beetle Oak
T2 S1
Q
S1 S2
T2
Py
S1

548

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	551	552	553	554	555	
Native perennial grass	20	55	15	10	5	
Native other grass (if relevant)	20				10	
Native forbs and other species (non-grass)				5	5	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	60	30	35	50	80	
Rock						
Bare ground		15	40	35		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4			
Survey result	11.7.4			
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	10	No. of hollow logs	1	Total length of logs (>10cm)	16	No. of logs (>10cm)	3
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	~~Common~~	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	~~Common~~	Abundant
Potential for **seeding grass cover**	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	~~Scattered~~	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	~~Common~~	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	~~Scattered~~	Common	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	~~Abundant~~
Mistletoe/Epiphytes	Absent	Scattered	~~Common~~	Abundant

10 4 2



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 214	**Date:**	22/02/2022
Tenure:	PL498	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	503 228 873
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7056357
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 314		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~315~~ 317		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	(Absent)	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	4	**Avg DBH (cm) of EDL**	3									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	S	Start Easting 1504	228872	End Easting 1502	228882		
		Start Northing	7056383	End Northing	7056334		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)	8 | 12	2 | 4				0.5 | 1	
Canopy cover (%)	5	50				5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
* Malvastrum americanum								
Eragrostis leptostachya								
Aristida ramosa								
Digitaria brownii								
Evolvulus alsinoides								
Sagesbachia orientalis								
Oxalis radicosa								
Hibiscus sturtii								
Eragrostis sororia								
* Erigeron bonariensis								
Aristida caput-medusae								
* Melinis repens								
* Glandularia aristigera								
Fimbristylis dichotoma								
Micromyrtus sessilis		1						1
~~Heath spiney Leucopogon mitchellii~~		1						1
Spiney Leucopogon mitchellii		16						16
Corymbia trachyphloia		1		1				
Cultitris glaucophylla		40		39				1
Acacia leiocalyx		58		51				7

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #						
Native perennial grass	99	100	100	25	100	84.8
Native other grass (if relevant)						
Native forbs and other species (non-grass)	1					0.2
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter				10		2
Rock						
Bare ground				55		11
Cryptogams				10		2
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.5	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4	No. of logs (>10cm)	2,1
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	80	Per hectare (x 20)	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Alderley 149	**Date:**	23/06/20
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	228 929
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7055125
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 370		#	
East	# ↓		#	
South	#		#	
West	# 373		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	(NE)	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	(Pale)	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	(Silty loam)	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent			(Scattered)		Frequent		
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76%	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G
Avg height (m) of EDL		18			**Avg DBH (cm) of EDL**				~~30~~ 25		
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)			n/a	
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse			Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	228903	End Easting	228951
		Start Northing	7051127	End Northing	7051122

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		17 | 20	~~4~~ 9 | 12	3 ~~4~~ | 6	0.5 | 1	
Canopy cover (%)		15	5	~~20~~ 10	2	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS				67	33	
Acacia shirleyi		100		IIII (4)	I (1)			
Eucalyptus crebra		6		IIII (4)	II (2)			
Acacia (hairy wide short bark)	Acacia ixiophylla	1				1 (1)		
Alphitonia excelsa		7				IIII I (6)	I (1)	
* Oxalis (pimple)	Oxalis corniculata							
Solanum ferocissimum								
Sida (long leaf)	Sida hackettiana							
Mulga grass	Thyridolepis mitchelliana							
Aristida capit-medusae								
Aristida ramosa								
Sida corrifolia								
Chelianthes sieberi								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

targetzero
► zero incidents ► zero injuries

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	374					
Native perennial grass	25	80	5	25	20	31
Native other grass (if relevant)						
Native forbs and other species (non-grass)	15		15	20	10	12
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	55	20	15	50	40	36
Rock						
Bare ground	5		65	5	30	21
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non-remnant	NA	NA	NA
Survey result	11.7.7	"	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	No, remnant vegetation			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	2	Total length of logs (>10cm)	53	No. of logs (>10cm)	24
Per hectare (x 20)	0	Per hectare (x 20)	40	Per hectare (x 20)	1060	Per hectare (x 20)	480

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

- No koala signs
- Gathering to ~~East~~ West is same – photos 379 to 382 at 228549 7051007



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Cleared Bellevue Pipeline realignment	Date:	19/08/21
Tenure:	PPL 2048	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	1157 228932
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7047 478
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 152		#	
East	# ↓		#	
South	# ↓		#	
West	# 155		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	(Red)			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam)	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	(Frequent)					
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1-5				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	4				**Avg DBH (cm) of EDL**		15					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa	Scattered	throughout site			

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)								
Transect Start compass bearing	W	Start Easting 1158	228907		End Easting 1156		228958	
		Start Northing	7047472		End Northing		7047479	
Stratum	E	T1	T2	T3	S1		S2/Seedlings	
Height range (m)	[illegible]	[illegible]			4	6	0.5	2
Canopy cover (%)		25			25		[illegible]	15

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Fimbristylis dichotoma								
Digitaria ammophila								
Eragrostis leptostachya								
[illegible] Eriachne mucronata								
Dratia Lobelia concolor								
Cheilanthes sieberi								
Panicum effusum								
Aristida caput-medusae								
Hibiscus sturtii								
Eragrostis sororia								
Eucalyptus crebra		3						III (3)
Acacia (sample/photo) Acacia melvillea		4					III (3) (1)	
Calytrix tetragona		62						~~IIII IIII IIII~~ + 30 + 17 (62)
Acacia leiocalyx		35						~~IIII IIII IIII IIII IIII IIII~~ (35)

Ecological Field Survey

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	156	→	→	→	160	
Native perennial grass	60	50	25	35	50	44
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	20	5			7
Native shrubs (<1m)		10	60	40	~~30~~	28
Non-native grass						
Non-native forbs and shrubs						
Litter	10	15	5			6
Rock			5	5	15	5
Bare ground	20	5		20	5	10
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Regrowth 11.7.4	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES, very low quality, highly disturbed, dieback common.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 7Lm
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

	Regrowth 11-7-4-1 SITE IDENTIFICATION		
Site Name:	Bellevue pipeline realignment	**Date:**	19/08/21
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	228 979
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048 326
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 137		#	
East	# ↓		#	
South	# ↓		#	
West	# 140		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1		S2		G		
Avg height (m) of EDL	15					**Avg DBH (cm) of EDL**		30				
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
O. tomentosa					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	~~360~~ NE	Start Easting 151	228496	End Easting 149	228965
		Start Northing	7048305	End Northing	7048345

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		1.2 | 1.5	~~0.6~~ ~~0.8~~		1.5 | 2.5	0 | 0.5
Canopy cover (%)		5			2	1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Entolasia stricta								
Digitaria ammophila								
Aristida capit-medusae								
Panicum effusum								
Brunoniella australis								
Sida corrugata								
Hairy wide leaf	Phyllanthus occidentalis							
~~Sida corrugata~~								
Aristida vagans								
Hibiscus sturtii								
Oxalis sp.								
Cheilanthes sieberi								
Appressichloa imbricata								
Corymbia trachyphloia		2		~~IIII~~ (2)	~~II~~			
Alstonia constricta		2					II (2)	
Acacia leiocalyx		8		~~IIII~~ (5)				
Solanum torvissimum		1					I	(1)
Eucalyptus tiliaria		9	III (3)	IIII (4)			II (2)	
Acacia shirleyi		6		~~IIII~~ ~~III~~ (5)			(1)	

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	141	→	→	→	145	
Native perennial grass	25	~~55~~	80	85	50	59
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	5	10	5	20	9
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	70	40	10	10	30	32
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Regrowth 11.7.4	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	6+3+5+12+7 (35)	No. of logs (>10cm)	16
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	700	Per hectare (x 20)	320

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	~~Abundant~~
Potential for **fleshy fruiting plants**	Absent	~~Scattered~~	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	~~Abundant~~
Dense shrub/grass shelter	Absent	~~Scattered~~	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	Absent	~~Scattered~~	Common	Abundant
Small rocks (10-30cm)	Absent	~~Scattered~~	Common	Abundant
Leaf litter depth	Absent	Single layer	~~Multiple layers~~	Deep layers
Leaf litter coverage	Absent	~~Scattered~~	Common	Abundant
Termite mounds (>50cm)	~~Absent~~	Scattered	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	~~Common~~	Abundant
Mistletoe/Epiphytes	Absent	~~Scattered~~	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) Yes / (No) (Yes) / No Yes / (No)		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

target zero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Bellevue Par-12, WP190	Date:	29.05.2023
Tenure:	PL 492	Assessor(s):	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	229015
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7052565
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9559		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	(Sandy clay loam')	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)		Scattered		Frequent		
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL	11						**Avg DBH (cm) of EDL**			12		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	N	Start Easting	229019	End Easting	229004		
		Start Northing	7052592	End Northing	7052586		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		10 12	6 8		2 4	0.1 0.2	
Canopy cover (%)							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Callitris glaucophylla		147		81	66			
A. leiocalyx		157					157	
Psydrax odorata		2					2	
Paspalum urvillei								
Cheilanthes distans								
Eragrostis sororia								
Aristida caput-medusae								
Melinis repens								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9554 →					
Native perennial grass	20	60	70	35	60	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	15	5	10	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	70	25	25	55	30	
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.7.7	N/A	LC	NCAP
Survey result	11.7.7	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	6	No. of logs (>10cm)	3
Per hectare (x 20)	X	Per hectare (x 20)	X	Per hectare (x 20)	120	Per hectare (x 20)	30

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	X	No. of trees with hollows (>30cm)	X

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	(Yes)	No	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

* ground layer grass dominated.



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderdale 117 multi well pad	Date:	5 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	229050
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7049265
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
535 North	# 538		#	
East	# 539		#	
South	# 540		#	
West	# 541		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	(Nil)
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	(Sandy clay loam')	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing		Forestry		Cropping		Conservation		Mining		Other:	
Evidence	Clearing		Cultivation		Regrowth		Logging		Thinning		No disturbance	
Dieback	0%		1-25%		26-75%			>76%			n/a	
Site condition	Very good		Good		Moderate			Poor			Degraded	
Fire scars	Absent	Scattered		Frequent	**Time since**	Recent		Old	**Average Height (m)**			
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	15m		**Avg DBH (cm) of EDL**	12cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E. 90°	Start Easting	229027	End Easting	229080
		Start Northing	7049263	End Northing	7049256

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 17	2 6		1 2	0.1 1
Canopy cover (%)		25%	10%		5%	71%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
Acacia shirleyi		TOTALS						
A. leiocalyx		99		35	24		19	11
Eucalyptus crebra		8		7				1
Pysdrax sp. Pysdrax buxifolia		1					1	
Entolassia stricta								
Evoculus alsinoides								
Solanum ferrocissum	Salanum ferrocissimum							
Aristida caput-medusae								
Gahnia sieberi	Gahnia aspera							
Eragrostis sp.								
Sida spicata								

S2 446 S1 24410

LW T1 T2 N

NR W T1 SR

A. lei S1 T2 S2

Psy S1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

598

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	542	543	544	545	546	
Native perennial grass		5			20	
Native other grass (if relevant)	30			20	10	
Native forbs and other species (non-grass)					8	
Native shrubs (<1m)			5		2	
Non-native grass						
Non-native forbs and shrubs						
Litter	70	95	95	80	60	
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4			
Survey result	11.7.2/11.7.4			
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	31	No. of logs (>10cm)	8
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	(Absent)		Present	
Waterway	(Absent)		Present	
Potential for nectar / pollen	Absent	Scattered	(Common)	Abundant
Potential for fleshy fruiting plants	(Absent)	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	(Common)	Abundant
Dense shrub/grass shelter	Absent	(Scattered)	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	(Scattered)	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	(Common)	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	(Absent)	Scattered	Common	Abundant
Leaf litter depth	Absent	(Single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	(Abundant)
Termite mounds (>50cm)	(Absent)	Scattered	Common	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	(Common)	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	(Common)	Abundant
Mistletoe/Epiphytes	Absent	Scattered	(Common)	Abundant

7852319

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FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Hollow Log Trees					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No Yes / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 244	**Date:**	15/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)** ~~396~~	229109
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7058990
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~74~~ 81		#	
East	# ↓		#	
South	#		#	
West	# 82		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%		>76%	n/a	
Site condition	Very good	Good	Moderate		Poor	Degraded	
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** 1.5
Disturbance notes	Drought stressed						

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL				12		**Avg DBH (cm) of EDL**			~~20~~ 25			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting ~~1396~~	229085	End Easting ~~1364~~	229132
		Start Northing	7058990	End Northing	7058994

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		10 | 13	4 | 6	~~12~~	1.5 | 3	0 | 0.5
Canopy cover (%)		10	5		15	5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Panicum effusum								
~~Fimbristylis~~ Fimbristylis dichotoma								
Eragrostis leptostachya								
Waltheria subxerophila								
Aristida calycina								
Paspalidium distans								
~~Fuirena glome~~ Eriachne mucronata								
Enneapogon australis								
Cheilanthes sieberi								
Evolvulus alsinoides								
Sigesbeckia orientalis								
Chrysopogon fallax								
Cotinis aspera								
Eucalyptus								
Acacia leiocalyx		1						1
Eucalyptus populnea		6		11 (2)	1		1	11 (2)
Callitris glaucophylla		8			11 (8)		52	
Allocasuarina luehmannii		88			6			30
Grevillea striata		5			1		1111 (4)	

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	83	→	→	→	89	
Native perennial grass	90	65	75	685	35	64
Native other grass (if relevant)						
Native forbs and other species (non-grass)			5	10		3
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	5	15	25	10	15
Rock						
Bare ground		30	5		55	18
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.5.1	NA	LC	NCaP
Survey result	11.5.1a	"	"	"
Agree with mapped RE? If no, provide justification from field data	No, dominated by Eucalyptus populnea.			

FAUNA HABITAT within 50m x 10m transect 6x (8)							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	3.5+2.5 +3+3.5	No. of logs (>10cm)	IIII (6)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	560	Per hectare (x 20)	120

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4 m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Alderley 183	**Date:**	24/6/20
Tenure:	PL402	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	229110
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7051955
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 427		#	
East	# ↓		#	
South	# ↓		#	
West	# 430		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	(SE)	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	(Dark)	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank

target zero
► zero incidents ► zero injuries

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:			
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance			
Dieback	0%	1-25%	26-75%	>76%	n/a				
Site condition	Very good	Good	Moderate	Poor	Degraded				
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**		
Disturbance notes									

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).										
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G	
Avg height (m) of EDL	20				**Avg DBH (cm) of EDL**		25			
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	Throughout pad & gathering	V. sparse		

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting	229134	End Easting	229083
		Start Northing	7051959	End Northing	7051961

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		18 | 22	6 | 10	1.5 | 3	0.2 | 0.5	
Canopy cover (%)		15	5	5	2	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia leiocalyx		28			~~HH~~ (5)	~~HH~~ ~~HH~~ (10)	~~HH~~ (5)	
Calitris glaucophylla		19		~~HH~~ (6)	~~HH~~ III (8)	~~HH~~ (5)		
~~Callistemon~~ Melaleuca nodosa		4					IIII (4)	
Eucalyptus crebra		3		II (2)	(1)			
Capparis mitchellii		1				(1)		
Brachychiton populneus		1				(1)		
Solanum (Thompson stems)	Solanum elipticum							
Sida corrifolia								
Grahnia aspera								
Eragrostis sororia								
Aristida ramosa								
* Purple oxalis	Oxalis corniculata							
Paiwcum effusum								
Euphorbia dallachyana								
Mulga grass	Thyridolepis mitchelliana							
Aristida caput-medusae								
Chrysanthes sieberi								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	431	→	→	→	435	
Native perennial grass	30	20	60	15	15	28
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	5	5	10	5	7
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs				5	5	2
Litter	60	70	35	70	75	62
Rock						
Bare ground		5				1
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4/11.7.7/11.7.5/11.7.2	NA	LC	NCAP
Survey result	✱ 11.7.7	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

5+4+5+4+3+5 ✱✱11

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	21.5	No. of logs (>10cm)	7
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	430	Per hectare (x 20)	140

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

Bellevue Pt1

HDD Pad on Warrego Hwy

SITE IDENTIFICATION			
Site Name:	~~Bellevue~~ on Warrego Highway	**Date:**	5 November 2020
Tenure:	PL492	**Assessor(s):**	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	229194
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7047930
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
526 **North**	# 529		#	
East	# 530		#	
South	# 531		#	
West	# 532		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	(Clay loam sandy)	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1.2
Disturbance notes	On road reserve.							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL			**Avg DBH (cm) of EDL**	35								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia stricta					
O. tomentosa					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	229171	End Easting	229222
		Start Northing	7047942	End Northing	7047927

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 / 16	2 / 6		1 / 2	0.1 / 1
Canopy cover (%)		25%	10%		5% ~~15~~	1%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia shirleyi		37		9	~~3~~ 2		25	1
Allocasuarina leuhmannii		8			4		4	
Eucalyptus tibuna		4		2			2	
Petalostigma pubescens		1			1			
Eucalyptus ~~erythrocorys~~	Melichrus erubescens	1					1	
Acacia holocalyx		7			1		6	
Sida spicata								
Sclerandrium procumbens								
Enteleassia stricta								
Brunoniella	Brunoniella australis							
Evolvulus alsinoides								
Opuntia tomentosa								
Sida (with cloud)	Hibiscus sturtii							
Aristida ~~spp~~ queensl modulosa								
~~Plectranthus fruticosus~~	Plectranthus sp.							
Forest grass	Urochloa foliosa							
Aristida calycina	Aristida calycina							
Melinis repens	Melinis repens							

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

530

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	533	534	535	536	537	
Native perennial grass	20	15	40	20	60	
Native other grass (if relevant)						
Native forbs and other species (non-grass)			1		1	
Native shrubs (<1m)			30			
Non-native grass						
Non-native forbs and shrubs						
Litter	80	85	29	60	39	
Rock						
Bare ground				20		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	MuR 11.7.9			
Survey result	Reg 11.7.2			
Agree with mapped RE? If no, provide justification from field data	No area appears to be remnant No signs of disturbance. Acacia shirleyi dominant			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	23+	No. of logs (>10cm)	6
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	(Common)	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	(Common)	Abundant
Potential for **seeding grass cover**	Absent	Scattered	(Common)	Abundant
Dense shrub/grass shelter	Absent	(Scattered)	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	(Common)	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	~~Abundant~~
Large rocks (>30cm)	Absent	(Scattered)	Common	Abundant
Small rocks (10-30cm)	Absent	(Scattered)	Common	Abundant
Leaf litter depth	Absent	(Single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	(Common)	Abundant
Termite mounds (>50cm)	(Absent)	Scattered	Common	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	(Common)	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	(Common)	Abundant
Mistletoe/Epiphytes	Absent	Scattered	(Common)	Abundant

0 2 6 2 1.5 6 7 4 3

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Hollow tree					
Hollow log					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%? Not a well pad.
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

SITE IDENTIFICATION			
Site Name:	McNulty EWA southof Warrego HW	**Date:**	9/11/2020
Tenure:	PPL 2048	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	229175
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7047610
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	Extra Work area
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 2		#	
East	# 3		#	
South	# 4		#	
West	# 5		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	8					**Avg DBH (cm) of EDL**			25			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	229176	End Easting	229179
		Start Northing	7047586	End Northing	7047637

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		7 | 10	3 | 4		1 | 1·5	0 | 0·5
Canopy cover (%)		15	25		5	5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Thyridolepis mitchelliana								
Aristida caput-medusae								
Cheilanthes sieberi								
Sedge (sample)								
Oxalis radicosa								
Hibiscus sturtii								
Panicum effusum								
Aristida ramosa								
Acacia leiocalyx		3			1		1	1
Callitris glaucophylla		3		11 (2)	1			
Pointy leaf shrub		6						Nil (6)
Acacia burkittii Acacia sparsiflora		30			IIII IIII III (25)			III (5)

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	6	→	→	→	10	
Native perennial grass	75	55	10	20	75	47
Native other grass (if relevant)						
Native forbs and other species (non-grass)				15		3
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	40	20	50	20	30
Rock						
Bare ground	5	5	70	15	5	20
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4/11.7.7/11.7.5/11.7.2	NA	~~NC~~ LC	NCAP
Survey result	11.7.4	11	11	11
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	6	**No. of hollow logs**	0	**Total length of logs (>10cm)**	1	**No. of logs (>10cm)**	1
Per hectare (x 20)	6	**Per hectare (x 20)**	0	**Per hectare (x 20)**	20	**Per hectare (x 20)**	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)	Other Information (e.g. age, collected, active/inactive)
			Easting / Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No Yes / (No) (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

RE 11.7.4-1 SITE IDENTIFICATION			
Site Name:	Bellevue Pipe realignment	**Date:**	19/08/21
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	1147 229161
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048514
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 128		#	
East	# ↓		#	
South	# ↓		#	
West	# 131		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red	Black	(Grey)	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent		(Scattered)		Frequent			
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76%	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	25	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	throughout	ESU		

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	NE	Start Easting 1148	229177	End Easting 1146	229142		
		Start Northing	7048497	End Northing	7048534		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		10 | 15	3 | 5		1 | 2		
Canopy cover (%)		15	~~10~~ 10		10		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristrachne uncinulata								
Aristida caput-medusae								
Walwhalleya subxerophila								
* Sida spinosa								
Gahnia aspera								
Parsonsia eucalyptophylla								
Entolasia stricta								
~~Sida photo~~ Hibiscus sturtii								
Digitaria ammophila								
Sida corrugata								
Brunoniella australis								
Acacia leiocalyx		2			II (2)			
Acacia confusa		4			II (2)		II (2)	
Acacia shirleyi		11		~~IIII~~ I (6)	~~IIII~~ (5)			
Dodonaea - hairy triangle	Dodonaea triangularis	22					~~IIII IIII IIII IIII~~ (22)	
~~Bony photo~~ Psydrax oleifolia		6			~~IIII~~ I (6)			
Eucalyptus fibrosa		8		~~IIII~~ I (6)	~~II~~ II (2)	II		

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	132	133	134	135	136	
Native perennial grass	50	20	50	60	20	40
Native other grass (if relevant)						
Native forbs and other species (non-grass)		15		10	10	7
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs			10			2
Litter	50	60	20	30	70	46
Rock						
Bare ground		5	20			5
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	21 6+5+7 1+2	**No. of logs (>10cm)**	~~111~~ 117
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	420	**Per hectare (x 20)**	140

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation		
	Required?	If **required**, why?
Fauna spotter/catcher	Yes / No	Trees 74m
Ecologist	Yes / No	
Species Management Plan	Yes / No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No	Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes / No	
Notes		



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 192	Date:	16/03/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION				
Development Type			Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility		Easting (E) 7614	229237
☐ Pilot Well + Dam	☐ Dam		Northing (N)	7052863
☐ Monitoring	☐ Pipeline		Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line		Other description	
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 109		#	
East	# ↓		#	
South	# ↓		#	
West	# 112		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	15	**Avg DBH (cm) of EDL**	40		
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa	Scattered	1613 (throughout ESU)			

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting	16S 229261	End Easting	16Z 229214
		Start Northing	7052 859	End Northing	7052 864

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		~~10~~ 15 ~~15~~ 17	8 10		1.5 3	0 0.5
Canopy cover (%)		5	15		20	5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed

NB: Record ground cover species within 50m x 10m transect	E	T1	T2	T3	S1	S2
TOTALS						
Panicum effusum						
Digitaria brownii						
Aristida capit-medusae						
Evolvulus alsinoides						
Oxalis radicosa						
Chrysanthemum sieberi						
* Melinis repens						
Sida hackettiana						
Wahlenbergia gracilis						
Goodenia glabra						
Parsonsia eucalyptophylla						
Eragrostis sororia						
Sigesbeckia orientalis						
Thyridolepis mitchelliana						
Brachychiton populneus		3				III (3)
* Opuntia tomentosa		1				1
Hibiscus sturtii						
Acacia spondylophora		1			(54)	1
Acacia leiocalyx		62		9	~~IIII~~	~~IIII~~ III (8)
Callitris glaucophylla		13	~~III~~ (5)	~~IIII~~ I (6)	1	1
Eucalyptus crebra		6	III (3)	II (2)		1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Paspalidium constrictum								
Leucopogon mitchellii		1						1
* Carduus pycnocephalus								
Solanum ellipticum								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	113	→	→	→	117	
Native perennial grass	98	80	95	85	100	91.6
Native other grass (if relevant)						
Native forbs and other species (non-grass)	2	20	5	15		8.4
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter						
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	11.7.7	NA	LC	NCaP
Survey result	11.5.1	"	"	"
Agree with mapped RE? If no, provide justification from field data	No, no Eucalyptus fibrosa, no gravelly soils or slopes indicating Land zone 7.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	(1)	No. of hollow logs	11 (2)	Total length of logs (>10cm)	1r2 (3)	No. of logs (>10cm)	11 (2)
Per hectare (x 20)	20	Per hectare (x 20)	40	Per hectare (x 20)	60	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees >4m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	113.14-1	Date:	16/03/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	229286
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7054518
☐ Monitoring	☑ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 86		#	
East	# 1		#	
South	# ↓		#	
West	# 89		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent			Scattered		Frequent		
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	15	**Avg DBH (cm) of EDL**	40									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	1600	229287		End Easting	1598	229280			
		Start Northing		7054501		End Northing		7054546			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		12	17	5	7			2	3	0	1
Canopy cover (%)		15		20				~~20~~ 10		5	
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1		T2		T3		S1	S2
		TOTALS									
Eragrostis sororia											
Digitaria brownii											
Fimbristylis dichotoma											
Paspalidium distans											
Aristida jerichoensis											
Galmia aspera											
~~[illegible]~~ Centipeda minima											
Chrysocephalum apiculatum											
Lomandra filifolia											
Dianella caerulea											
Panicum effusum											
~~[illegible]~~ ~~Proteacea photo~~	Jacksonia scoparia	4							4		
~~[illegible]~~	Ozothamnus diotophyllus	13									13
Acacia leiocalyx		126				19			38		69
Callitris glaucophylla		23			6	1			2		14
Allocasuarina luehmanii		20				1			16		3
Angophora leiocarpa		4			1				1		2

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	90	→	→	→	94	
Native perennial grass	40	60	85	85	60	66
Native other grass (if relevant)						
Native forbs and other species (non-grass)	15	20	15			10
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	45	20		10	40	23
Rock						
Bare ground				5		1
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D EcoSmart	11.3.14	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect 1+4+16.5+6 (52)								(19)
No. Of trees with hollows (>10cm)	1	No. of hollow logs	1	Total length of logs (>10cm)	5+4+2+7.5+9+16	No. of logs (>10cm)	~~IIII IIII~~ III
Per hectare (x 20)	20	Per hectare (x 20)	20	Per hectare (x 20)	1040	Per hectare (x 20)	380

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs.					
Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other					
Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4m, hollow logs
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 133	**Date:**	11/11/20
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)** 571	229429
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048262
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 163		#	
East	# ↓		#	
South	# ↓		#	
West	# 166		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	18					**Avg DBH (cm) of EDL**			25			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting 572	229452	End Easting	229406		
		Start Northing	7048268	End Northing	7048264		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		15 / 20	8 / 10			0	0.3
Canopy cover (%)		25	25			1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Entolasia stricta								
Purple flower mallow	Hibiscus sturtii							
Aristida caput-medusae								
Sida (linear)	Sida cunninghamii							
Brunoniella australis								
Galenia aspera								
Paspalidium distans								
Panicum effusum								
Digitaria ammophila								
Aristida ramosa								
~~Lomandra~~ Phyllanthus (hairy)	Phyllanthus occidentalis							
Acacia (hairy bark)	Acacia burrowii	1			1			
Acacia leucolyx		37			~~IIII IIII IIII IIII~~ 35			II 2
Acacia shirleyi		4			IIII 4			
Eucalyptus fibrosa		5		III 3	II 2			

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	167	→	→	→	171	
Native perennial grass	45	60	75	5	25	42
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5		10	5	4
Native shrubs (<1m)		5				1
Non-native grass						
Non-native forbs and shrubs						
Litter	55	30	25	85	70	53
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4 11.7.7 11.7.5 11.7.2	NA	LC	NCAP
Survey result	11.7.7	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect (24)							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	2+5+3 +5+4	**No. of logs (>10cm)**	6
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	480	**Per hectare (x 20)**	120

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees >4m,
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) Yes / (No) (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 213	Date:	24/02/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E) 1550	229501
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7056996
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 4087		#	
East	# ↓		#	
South	#		#	
West	# 4088 10		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	(Orange)	Brown	Red				
	Black	Grey	Pale	(Dark)	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	(Sandy loam')	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent		(Scattered)		Frequent			
Erosion Type	Tunnelling	(Sheet) (scald)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4
Disturbance notes	-Emergent layer ~ 8m high - ~70% dieback (fire + scald) -Shrub layer in tact							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	0.75		**Avg DBH (cm) of EDL**	1	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	229505	End Easting	229500
		Start Northing	7057020	End Northing	7056972

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)	8 | 15			1.5 | 3	0.2 | ~~0.1~~	
Canopy cover (%)	10			20	80	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eragrostis sororia								
Ariotida jerichoensis								
Panicum effusum								
Fimbristylis dichotoma								
Digitaria brownii								
Aporophora leiocarpa		2				(1)	(1)	
Allocasuarina luehmannii		Outside stem count area						
Eucalyptus crebra		1				(1)		
Callitris glaucophylla		Outside stem count area						
Acacia leiocalyx		5				11 (2)	111 (3)	
~~Hesperantha~~ Homalocalyx	polyandra	~500 (~5 per m²)					58+4+44 ~500	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	407	→	→	→	411	
Native perennial grass	20	20			65	21
Native other grass (if relevant)						
Native forbs and other species (non-grass)				5		1
Native shrubs (<1m)	35	40	80	70	15	~~[illegible]~~ 8
Non-native grass						
Non-native forbs and shrubs						
Litter	35	~~[illegible]~~ 30	10	15	20	22
Rock						
Bare ground	10	10	10	10		8
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11-7-7	NA	LC	NCAP
Survey result	11.7.5	"	"	"
Agree with mapped RE? If no, provide justification from field data	No, shrubland NOT woodland.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	1.5	No. of logs (>10cm)	1
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	30	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Scattered Trees 7/4m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	Yes / (No)		Is the slope < 5%?
	Yes / (No)		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Well pad option	**Date:**	29/04/21
Tenure:	PL+92	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	229615
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7650769
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 102		#	
East	#		#	
South	#		#	
West	# 105		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	(Red)			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	22				**Avg DBH (cm) of EDL**		45					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	229595	End Easting	229647
		Start Northing	7050777	End Northing	7050765

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		22 25	12 15	3 5	1 2	0·2 0·5
Canopy cover (%)		15	20	~~10~~ 5	5	1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Lomandra longifolia								
Small grass (photo) Ottochloa?	Ottochloa gracillima							
Aristida ramosa								
Bamboo grass (vaping)	Austrostipa verticillata							
Dianella caerulea								
* Sida spinosa								
Aristida caput-medusae								
Paspalidium distans								
Cymbopogon refractus								
Hibiscus sturtii								
Panicum effusum								
Enneapogon gracilis								
Bothriochloa decipiens								
Eucalyptus exserta		3			1	III (3)		(1)
Acacia spectabilis		2					(1)	
Acacia conferta		9				(1)	IIII (7)	
Acacia melanoxylon		6				II (2)	III (3)	(1)
Brachychiton rupestris		1						(1)
Eucalyptus fibrosa		5		IIII (4)	(1)			
Eucalyptus crebra		1		(1)				
Callitris glaucophylla		8			IIII (6)	II (2)		

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Alphitonia excelsa		5					1	|||| 4
* Melinis repens								
Gahnia sieberiana								
Brachychiton ~~(photo 2)~~ populneus		1						1
Eremophila mitchellii		2					1	1
Solanum ~~(photo)~~ ellipticum								
Bootstrap otak Habea lorea		1					1	
Pittosporum angustifolius		2					|| 2	
~~Dichanthium (photo 2)~~ Digitaria ammophila								
~~Digitaria~~								
Thyridolepis mitchelliana								
Corymbia ~~small fruit~~ trachyphloia		3		1	|| 2			
Angophora leiocarpa		1			1			

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	106	→	→	→	110	
Native perennial grass	70	10	20	50	20	34
Native other grass (if relevant)						
Native forbs and other species (non-grass)	~~8~~ 10	~~40~~ 30	75	20	5	28
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs		40		20	~~40~~ 20	16
Litter	20	20	5	10	55	22
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7(3D)	NA	LC	NCAP
Survey result	11	11	11	11
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	11 (3)	Total length of logs (>10cm)	34 2+7+1+3+6+13+2	No. of logs (>10cm)	(9) 11 1111
Per hectare (x 20)	0	Per hectare (x 20)	60	Per hectare (x 20)	680	Per hectare (x 20)	180

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 7.4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

No watercourse present



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11.5.1-1	Date:	15/02/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	229575
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7058549
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# ~~88~~ 90		#	
East	# ↓		#	
South	#		#	
West	# ~~93~~		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	(Nil)
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL				8		**Avg DBH (cm) of EDL**			30			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	WSW	Start Easting 1395	229598	End Easting 1396	229511		
		Start Northing	7058559	End Northing	7058543		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		7 | 10	3 | 4			0.5 | 1.5	
Canopy cover (%)		25	30			5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eragrostis leptostachya								
Eragrostis sororia								
Aristida ramosa								
Sida ~~(photo 115 S2)~~ hackettiana								
Evolvulus alsinoides								
Cheilanthes sieberi								
Fimbristylis dichotoma								
Aristida caput-medusae								
Chrysopogon fallax								
* Melinis repens								
Small white flowers (photo)								
Panicum effusum								
Aristida calycina								
Digitaria brownii								
~~Pobba~~ Melaleuca ~~pointy~~		3						111 (3)
Chrysocephalum apiculatum								
Hakea lorea		2			(1)			(1)
Acacia leucolyx		16			~~IIII~~ ~~IIII~~ ~~IIII~~ (15)		(1)	
Alphitonia excelsa		1						(1)
Callitris glaucophylla		20		~~IIII~~ ~~IIII~~ 111 (13)				~~IIII~~ 11 (7)
Eucalyptus ~~[illegible]~~ crebra		27		(1)	~~IIII~~ ~~IIII~~ ~~IIII~~ (16)		~~[illegible]~~	~~IIII~~ ~~IIII~~ (10)

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
fuzzy glume	Eriachne mucronata							
~~Bottle~~ Lake	Centipeda minima							
Reed grass	Arundinella nepalensis							
black orchid	Cymbidium canaliculatum							
Phyllanthus virgatus								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	94	→	→	→	98	
Native perennial grass	80	65	85	80	95	81
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	5	5	5		4
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs	15					3
Litter		10		15	5	6
Rock						
Bare ground		20	10	1		6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 30	11.5.1	NA	LC	NCaP
Survey result	—	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4+6+8 (18)	No. of logs (>10cm)	IIII (5)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	320	Per hectare (x 20)	100

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11.7.2	Date:	17/03/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)** Collector	
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 135		#	
East	# ↓		#	
South	# ↓		#	
West	# 138		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	20	**Avg DBH (cm) of EDL**	25									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
O. tomentosa	Scattered				

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	W	Start Easting	229813	End Easting	229763		
		Start Northing	7052339	End Northing	7052347		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		15 | 20	6 | 8	3 | 4	0.5 | 2		
Canopy cover (%)		~~40~~ 50	30	5	10		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Digitaria brownii								
Eragrostis sororia								
Sida corrugata								
Oxalis sp.								
Cheilanthes sieberi								
Panicum effusum								
Euphorbia ~~[illegible]~~ drummondii								
Aristida caput-medusae								
Thyridolepis mitchelliana								
Hibiscus sturtii								
~~Hairy~~ Phyllanthus occidentalis								
Evolvulus alsinoides								
Eucalyptus crebra		2		11 (2)				
Callitris glaucophylla		3			(1)	11 (2)		
Acacia conferta		2				(1)	(1)	11
Acacia leiocalyx		1			(1)			
Corymbia clarksoniana		1			(1)			
Acacia shirleyi		101		1 (26)	(38)	(15)	11 (22)	

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	139	→	→	→	143	
Native perennial grass		25	3	20	2	10.4
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5	5	10		4
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	100	70	~~90~~ 85	70	98	84.6
Rock						
Bare ground			5			1
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3Decosmart	11.7.2	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect (56.5)							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	3+6+2.5+6+25+12+2	No. of logs (>10cm)	14
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	1130	Per hectare (x 20)	280

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trap 74m, logs
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
	Yes / (No)		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / (No)		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Alderley 186 PL492	**Date:**	24/6/20
Tenure:		**Assessor(s):**	Melanie

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	230095
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7051888
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 418		#	
East	# ↓		#	
South	# ↓		#	
West	# 421		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%		26-75%	>76%		n/a	
Site condition	Very good	Good		Moderate	Poor		Degraded	
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1		S2		G		
Avg height (m) of EDL	23					**Avg DBH (cm) of EDL**		45				
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	Throughout pad & gathering.			

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	230089	End Easting	230077
		Start Northing	7051865	End Northing	7051913

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		20 / 25	10 / 15	2 / 4	0.5 / 1	
Canopy cover (%)		25	25	10	5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus ~~crebra~~ fibrosa		26		II (2)	𝍸 III (8)	𝍸 𝍸 (11)	𝍸 (5)	
Acacia shirleyi		37			IIII (4)	𝍸 𝍸 𝍸 (17)	𝍸 𝍸 𝍸 (16)	
~~Calytrix~~ Melaleuca sp.		4					IIII (4)	
Calytris glaucophylla		17			𝍸 (5)	𝍸 𝍸 II (12)		
~~Cap~~ Capparis mitchellii		1					(1)	
Acacia-sample	Acacia semilunata	11			(1)	𝍸 III (8)	II (2)	
Allocasuarina luehmanii		8			(1)	IIII (4)	III (3)	
Acacia leiocalyx		3				(1)	II (2)	
Dianella longifolia								
Cheilanthes sieberi								
Aristida ramosa								
Enteropogon acicularis								
Paspalidium caespitosum								
Sida ~~[illegible]~~ hachettiana								
Ansistrachne uncinulata								
Gahnia aspera								
Lomandra (strappy)	Lomandra filiformis							
Aristida leptopoda								
Panicum effusum								
Aristida caput-medusae								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	422	423	424	425	426	
Native perennial grass	10	20	25	30	20	21
Native other grass (if relevant)						
Native forbs and other species (non-grass)	~~4~~ 2		5			1.4
Native shrubs (<1m)					15	3
Non-native grass						
Non-native forbs and shrubs						
Litter	68	75	60	70	~~7~~ 65	67.6
Rock						
Bare ground	20	5	10			7
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4/11.7.7/11.7.5/11.7.2	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

11 ~~IIII~~ 2+3+3+3+2+2 ~~IIII~~ 1+1+1+2+7+7 ~~IIII~~ ~~IIII~~ ~~IIII~~

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	2	No. of hollow logs	6	Total length of logs (>10cm)	40	No. of logs (>10cm)	17
Per hectare (x 20)	40	Per hectare (x 20)	120	Per hectare (x 20)	800	Per hectare (x 20)	340

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 151-154	**Date:**	11/11/20
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION				
Development Type			**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility		**Easting (E)** 568	230116
☐ Pilot Well + Dam	☐ Dam		**Northing (N)**	7050694
☐ Monitoring	☐ Pipeline		**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line		**Other description**	
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 153		#	
East	# ↓		#	
South	# ↓		#	
West	# 156		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**			
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL				16		**Avg DBH (cm) of EDL**			30			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SW	Start Easting	569	230134	End Easting	570	230092				
		Start Northing		7050707	End Northing		7050675				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		15	18	4	10	3	4	1	2	0	0.5
Canopy cover (%)		15		10		5		2		1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida ramosa								
Sida (linear leaves)	Sida cunninghamii							
Enneapogon	Enneapogon robustissimus							
Tefrosia shrub	Jasminum didymum							
Bothriochloa bladed	decipiens							
Paspalidium distans								
Eremophila debilis								
A. C-m	Aristida capsit-mediusal							
Alphitonia excelsa		1						(1)
Grevillea parviflora		2						II (2)
Eremophila mitchellii		3					(1)	II (2)
Dodonaea viscosa		4					(1)	III (3)
Allocasuarina luehmannii		7			III (3)	II (2)	(1)	(1)
Callitris glaucophylla		2				II (2)		
Bursaria spinosa		1						(1)
37-Bad								
Eucalyptus populnea		7		IIII (4)	II (2)			(1) *
Grevillea striata		1			(1)			
Acacia leiocalyx		15				* IIII (4)	IIII IIII (10)	* (1)

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	157	158	160	161	162	
Native perennial grass	29		10	30	50	23.8
Native other grass (if relevant)						
Native forbs and other species (non-grass)	1	1		2	1	1
Native shrubs (<1m)		80				16
Non-native grass						
Non-native forbs and shrubs						
Litter	50	10	40	38	29	33.4
Rock						
Bare ground	20	9	50	30	20	25.8
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4/11.7.7/11.7.9/11.7.7	NA	LC	NCAP
Survey result	11.5.16	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	No, dominated by Eucalyptus populnea and soil is typical of land zone 5.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	11 (2)	**No. of hollow logs**	11 (2)	**Total length of logs (>10cm)**	~~37~~ (18)	**No. of logs (>10cm)**	11 (2)
Per hectare (x 20)	40	**Per hectare (x 20)**	40	**Per hectare (x 20)**	360	**Per hectare (x 20)**	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 134	**Date:**	11/11/20
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	573 230 239
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048 225
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 172		#	
East	# ↓		#	
South	# ↓		#	
West	# 175		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	(SW)	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	15	**Avg DBH (cm) of EDL**	~~4~~35									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	S	Start Easting S74	230234	End Easting	230232		
		Start Northing	7048253	End Northing	7048203		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		~~10~~ 13 ~~18~~ 18	8 10		1 2	0 0.5	
Canopy cover (%)		15	10		5		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
A c-m	Aristida caput-medusae							
Entolasia stricta								
Gahnia aspera								
Brunoniella australis								
Purple flower mallow	Hibiscus sturtii							
Cheilanthes sieberi								
Aristida ramosa								
Unknown sedge (9/11/20)								
Fine Eragrostis	Eragrostis lacunaria							
Mulga mitchell	Thyridolepis mitchelliana							
Ancistrachne uncinulata								
Digitaria ammophila								
Eremophila mitchellii		1						1
Corymbia (small fruit)	Corymbia ~~[illegible]~~ Trachyphloia	3		1			11 2	
Angophora leiocarpa		1		1				
Acacia leocalyx		29		11 2	~~IIII~~ 7		~~IIII IIII IIII IIII~~ 20	~~IIII~~
Eucalyptus fibrosa subsp. nubilis		2		11 2				

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	176	→	→	179		
Native perennial grass	30	15	30	10		21.25
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	20	1	5		7.75
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	65	65	69	85		71
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4/11.7.7/11.7.9/11.7.2	NA	LC	NCAP
Survey result	11.7.4	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4+8 (12)	No. of logs (>10cm)	111 (4)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	240	Per hectare (x 20)	80

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Aldeyley 251 camp	**Date:**	26/10/2021
Tenure:	PL192	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	243 230582
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7059186
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	Camp
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 52		#	
East	# ↓		#	
South	#		#	
West	# 55		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam')	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent			(Scattered)		Frequent		
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: ?						
Evidence	~~Clearing~~	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1-5				
Disturbance notes	Previously disturbed											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL				6		**Avg DBH (cm) of EDL**			20			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	S	Start Easting 1244	230581	End Easting 1242	230586		
		Start Northing	7059213	End Northing	7059161		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		5 8	2 3		0.5 1		
Canopy cover (%)		5	10		1		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia (photo)	Acacia oswaldii	9			5		4	
Eucalyptus populnea		15		7	4		4	
Callitris glaucophylla		1		1				
Dodonaea stenophylla		2					2	
Allocasuarina luehmanii		3					3	
Calotis cuneifolia								
Hibiscus sturtii								
Solanum ferocissimum								
Fuzzy seedhead grass	Eriachne mucronata							
Eragrostis sororia								
Dichanthium sericeum								
Enteropogon acicularis								
Eremophila debilis								
Aristida ramosa								
Cheilanthes sieberi								
Panicum effusum								
Chrysopogon fallax								
Panicum effusum								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	56	57	58	59	60	
Native perennial grass	30	55	86	~~[illegible]~~ 8		34.6
Native other grass (if relevant)						
Native forbs and other species (non-grass)	~~[illegible]~~ 5		5	2		2.4
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	25 ~~[illegible]~~	5			8
Rock						
Bare ground	55	~~[illegible]~~ 20	~~[illegible]~~ 10	90	100	55
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	Cleared (3D)	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	11 (2)	**Total length of logs (>10cm)**	2.5+3+1 (6.5)	**No. of logs (>10cm)**	111 (3)
Per hectare (x 20)	0	**Per hectare (x 20)**	40	**Per hectare (x 20)**	130	**Per hectare (x 20)**	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other					
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**		**Other Information (e.g. age, collected, active/inactive)**
			Easting	**Northing**	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	~~Yes~~	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

9

Ecological Incl. Survey ORG-ABW-HSE-508-01537

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Warrego-Kerwicks infer.	**Date:**	20.07.2023
Tenure:		**Assessor(s):**	Nazim

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	230569
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7047781
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

RD

	Photos from centre of ESU		Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 178		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)		Moderately sloping (5-10%)		Strongly sloping (11-24%)		
	Moderately steep (25-38%)	Steep (39-55%)		Very steep (56-100%)		Slope >100% (45°)		
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow		Orange		Brown		Red	
	Black	Grey		Pale		Dark		Mottled	
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'		'Loam'		'Silty loam'	
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'		'Light clay'		'Light medium clay'	
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent			Scattered				Frequent	
Erosion Type	Tunnelling	Sheet	Rill	Gully		Mass failure		Stream-bank	

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	26								
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
opuntia stricta	very sparse				

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within S0m x 10m transect)											
Transect Start compass bearing	W	Start Easting	230597			End Easting	230549				
		Start Northing	7047779			End Northing	7047787				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		12	14	10	12	6	8	4	6	21	2
Canopy cover (%)		40		20		10		10		10	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (S0m x 10m plot) or (S0m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within S0m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. fibrosa		21		17	2	2		
Callitris glaucophylla		15			6	7	2	
Cagnavilla leuhamannii		24				4	12	8
Acacia shirleyi		8				6	2	
A. leiocalyx		4						4
Alphitonia excelsa		2						2
Ghania aspera								
Aristida spp.								
Panicum decomposicum								
Diquella spp.								
Cheilanthes siberi								

seedlings

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

target zero
► zero incidents ► zero injuries

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	0173	→	→	→	→	
Native perennial grass	10	10	15	10	10	
Native other grass (if relevant)	10	5	5			
Native forbs and other species (non-grass)						
Native shrubs (<1m)					10	
Non-native grass						
Non-native forbs and shrubs						
Litter	70	70	60	60	60	
Rock						
Bare ground	10	15	20	30	20	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE Non-rem	(Cleared)	N/A	N/A	N/A
Survey result	11.7.4	N/A	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	No, existing vegetation characteristics match with RE 11.7.4			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	**No. of hollow logs**	2	**Total length of logs (>10cm)**	28	**No. of logs (>10cm)**	14
Per hectare (x 20)	X	**Per hectare (x 20)**	40	**Per hectare (x 20)**	560	**Per hectare (x 20)**	280

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single Layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Bellevue 2 - WP217 - Reassessment	SITE IDENTIFICATION		
Site Name:	Bellevue 2 Reassessment - 01	**Date:**	22 Aug 23
Tenure:	PL 492	**Assessor(s):**	Thiago Moura

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	230583
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7050902
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or ✓ 56 J
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 6		#	
East	# 7		#	
South	# 8		#	
West	# 9		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain ✓	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%) ✓	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W ✓	NE	NW	SI	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale ✓	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**		
	'Sandy clay loam'	**'Clay loam'** ✓	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**		
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)				
Erosion	Absent ✓	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing ✓	Forestry ✓	Cropping	Conservation	Mining	Other:	
Evidence	Clearing ✓	Cultivation	Regrowth ✓	Logging	Thinning	No disturbance	
Dieback	0%	1-25% ✓	26-75%	>76%	n/a		
Site condition	Very good	Good ✓	Moderate	Poor	Degraded		
Fire scars	Absent ✓	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** N/A
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL** ✓	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1 ✓	S2	G
Avg height (m) of EDL	6		**Avg DBH (cm) of EDL**	50	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse) ✓	n/a
Functional shrub layer density (<2m)	Dense/closed ✓	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	✓ Not Found On Site
Weed infestations	Found on Site – records below	✓ Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero
► zero incidents ► zero injuries

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	W	Start Easting		56J 0230609		End Easting		56J 0230550			
		Start Northing		7056899		End Northing		7056904			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		7	11	-	-	-	-	1	7	0.1	1
Canopy cover (%)	2	2%		-		-		40%			
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Eucalyptus fibrosa		1	1								
Allocasuarina luehmanni		9		4			☒1				
Callitris glaucophylla		6		1			☒				
Acacia leucolyx		>50					>50				
Angophora leiocarpa		1	1				☒1				
Acacia sp. (ID)		6									
Cryptana amara											
Westringia cheelii											
Micromyrtus gracilis											
Arundinella nepalensis											
Chrysopogon filipes											
Eriachne mucronata											
Aristida obscura											
Gahnia aspera											

target zero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	5	4	3	2	1	
Native perennial grass				10	90	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	10	10	10			
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	80	70	80	20	10	
Rock						
Bare ground	10	20	10	70		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE GOV/GOV	11.7.7 / ~~[illegible]~~	N/A	LC	LC
Survey result	Non. Remnant	–	–	–
Agree with mapped RE? If **no**, provide justification from field data	Regrowth 11.7.7. Eucalyptus fibrosa ~~does~~ is not predominant or forms a distinct but discontinuous open forest to woodland canopy. ~~(>15 years)~~ (< 15 years)			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	**No. of hollow logs**	0	**Total length of logs (>10cm)**	4	**No. of logs (>10cm)**	5
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	80	**Per hectare (x 20)**	100

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status.**			
Cliffs / outcrops	✓ Absent		Present	
Wetland / Swamp / Waterbody	✓ Absent		Present	
Waterway	✓ Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	✓ Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	✓ Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	✓ Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	✓ Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	✓ Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	✓ Scattered	Common	Abundant
Large rocks (>30cm)	✓ Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	✓ Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	✓ Single layer	Multiple layers	Deep layers
Leaf litter coverage	✓ Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	✓ Absent	Scattered	Common	Abundant
Rock piles	✓ Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	✓ Scattered	Common	Abundant
Soil cracks	✓ Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	✓ Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	✓ Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	1	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Scats	Kangaroo				
Hollow (tree)	Glider				
Sheep					
Dogs					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes ✓	No	
Ecologist	Yes	No ✓	
Species Management Plan	Yes	No ✓	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No ✓		Is the vegetation suitable for slashing only?
	✓ Yes / No		Is the slope < 5%?
	✓ Yes / No		Is the clay content > 20%?
	✓ Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No ✓	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

(2)

Ecological Field Survey ofm ARAWISM-FOR-0002

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Warrego-Kenwicks interconnect	**Date:**	20.07.2023
Tenure:		**Assessor(s):**	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	230610
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7047779
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Rd

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 158		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent		(Scattered)		Frequent			
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Rd side						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	16		**Avg DBH (cm) of EDL**	28	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	230614	End Easting	230607
		Start Northing	7047797	End Northing	7047751

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)			6 8		2 4	01 2
Canopy cover (%)			40		30	30

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia shirleyi		102		14			37	51
A. leiocalyx		6						2+4
A. triptera		2						2
Calitris glaucophylla		2						2
E. fibrosa		5						5
Acacia conferta		6						6
Alphitonia excelsa		2						2
Aristida spp.								
Melinis rifens								
Gahnia aspera								
Panicum decompositum								
Aristida caput-medusae								

} seedlings

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	153 →					
Native perennial grass	10	5	10	20	10	
Native other grass (if relevant)					10	
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	90	90	80	70	20	
Rock					10	
Bare ground		5	10	10	40	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE Non-rem	(Cleared)	N/A	N/A	N/A
Survey result	11.7.4			
Agree with mapped RE? If no, provide justification from field data	No, vegetation characteristics match with RE 11.7.4			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	10	No. of logs (>10cm)	5
Per hectare (x 20)	X	Per hectare (x 20)	X	Per hectare (x 20)	200	Per hectare (x 20)	100

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11·5·1-2	**Date:**	15/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)** 1401	230 622
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060 096
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 107		#	
East	# ↓		#	
South	# ↓		#	
West	# 105		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	~~1-25%~~		26-75%	>76%		n/a
Site condition	Very good	Good		Moderate	Poor		Degraded
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** 4
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		~~15~~ 12	**Avg DBH (cm) of EDL**	30	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	1407 230676	End Easting	1400 230627
		Start Northing	7060121	End Northing	7060070

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		10 | 15	4 | 5		~~1~~ ~~1.5~~	0.5 | 1.5
Canopy cover (%)		20	2			5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Paincum effusum								
Eragrostis sororia								
Brunonella australis								
Eragrostis lepto								
Like centipeda								
Portulaca australis								
Sida ~~sinata~~ hackettiana								
Aristida ramosa								
Eriochloa crebra								
Aristida capsit - medusae								
Weping reedgrass Arundinella nepalensis								
Sporobolus ~~elongatus~~ contiguus								
Acacia sepitumata		2						II (2)
Acacia excelsa		1						(1)
Dodonaea ~~small triangular~~ bibolpa		10						~~IIII IIII~~ (10)
Senna sayle		10						~~IIII III~~ (10)
Eucalyptus crebra		11		~~IIII~~ (5)	III (3) (1)			III (3)
Allocasuarina luehmanii		13						~~IIII IIII~~ II (12)

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	107	→	→	→	111	
Native perennial grass	40	25	43	80	80	53·6
Native other grass (if relevant)						
Native forbs and other species (non-grass)	2	1	2			1
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	69	5	10	~~18~~ 15	23·8
Rock						
Bare ground	38	5	50	10	5	21·6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11·5·1	NA	LC	NCaP
Survey result	〃	〃	〃	〃
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	5+10 (15)	No. of logs (>10cm)	~~IIII~~ 11 (7)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	300	Per hectare (x 20)	140

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	~~Common~~	~~Abundant~~
Potential for **fleshy fruiting plants**	Absent	~~Scattered~~	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Warrego-Kerwicks intersect	Date:	20.07.2023
Tenure:		Assessor(s):	NAZ [illegible]

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	230644
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7047779
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 145		#	
East	# 146		#	
South	# 147		#	
West	# 148		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	(Sandy clay loam')	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	(Scattered)	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Along Rd		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	13	**Avg DBH (cm) of EDL**	25									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
opuntia tomentosa	very sparse.		0230644	7047786	

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	S	Start Easting	230634			End Easting	230649				
		Start Northing	7047797			End Northing	7047753				
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)	14	11			6	8			2	4	0.1 2
Canopy cover (%)	15				60						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia shirleyi		34			28		8	
A. spectabilis		2						2
A. leiocalyx		5						5
Calitris glaucophylla		4					4	
Eucalyptus crebra		1	1					
E. fibrosa		1	1					1
A. conferta		2						2
Alphitonia excelsa		2						2
Aristida caput-medusae								
Melinis ripens.								
Panicum deompostium								
Lecicarpa semiculva								

Seedlings

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	140	→	→	→	→	
Native perennial grass	10	5	5			
Native other grass (if relevant)		5	5			
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	80	80	10	10	
Rock				70	70	
Bare ground	70	5	10	20	20	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE Non-rem	(Cleared)	N/A	N/A	N/A
Survey result	11.7.4	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	No, assessed area has the vegetation characteristics that match with RE 11.7.4			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	x	No. of hollow logs	x	Total length of logs (>10cm)		No. of logs (>10cm)	x
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

(3) Ecological Field Survey

target zero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Warrego-Kerwicks infrast	**Date:**	20/07/2023
Tenure:		**Assessor(s):**	Nazim

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	230685
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7047774
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Rd

	Photos from centre of ESU		Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 169		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

targetzero
► zero incidents ► zero injuries

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Rd side						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	14					**Avg DBH (cm) of EDL**			29			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Ophiopogon stricta					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	E	Start Easting	230661			End Easting	230707						
		Start Northing	7047775			End Northing	7047778						
Stratum	E	T1		T2		T3		S1		S2/Seedlings			
Height range (m)		11	18	8	10	6	8	2	4	0.1	2		
Canopy cover (%)		30		30									
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed										
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2					
		TOTALS											
Eucalyptus crebra		11		6	5								
Acacia shirleyi		32			8	6	12	6					
A. leiocalyx		2						2					
Allocasuarina leuhamannii		18			12		6						
Callitris glaucophylla		10				4	6						
Alphitonia excelsa		2						2					
Cyanthia aspera													
Aristida spp.													
Panicum decompositum													
Melinis repens													

} Seedlings

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	16 4				→	
Native perennial grass	30	40	40	40	30	
Native other grass (if relevant)	20	10	10	10	10	
Native forbs and other species (non-grass)				5		
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	20	40	45	40	40	
Rock						
Bare ground	30	10	5	5	20	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE NOnr em	(Cleared)	N/A	N/A	N/A
Survey result	11.7.4	N/A	LC	NCAP
Agree with mapped RE? If **no**, provide justification from field data	No, vegetation class match with RE 11.7.4			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	**No. of hollow logs**	X	**Total length of logs (>10cm)**	30	**No. of logs (>10cm)**	15
Per hectare (x 20)	X	**Per hectare (x 20)**	X	**Per hectare (x 20)**	600	**Per hectare (x 20)**	300

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Aldinga 219	Date:	24/02/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	230675
☐ Pilot Well + Dam	☐ Dam	Northing (N)	6055576
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 387		#	
East	# ↓		#	
South	# ↓		#	
West	# 386		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	(W)	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	(Sandy loam')	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76%	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** 1.5
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	12		**Avg DBH (cm) of EDL**	30	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	throughout ESU			

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	1539	230668	End Easting	1537	230679				
		Start Northing		7055600	End Northing		7055553				
Stratum	E	T1		T2	T3		S1		S2/Seedlings		
Height range (m)		10	15	1.5					0	1	
Canopy cover (%)		10		60					10		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Euphorbia dallachyana								
Panicum effusum								
Cheilanthes sieberi								
Digitaria diffusa								
Aristida ramosa								
Hibiscus Sturtii								
Aristida caput-medusae								
Δ Sedge phyto	Carex inversa							
Forb phyto	Teucrium junceum							
Oxalis radicosa								
Waltheria subxerophila								
Paspalidium distans								
Digitaria brownii								
Eragrostis sororia								
Acacia bivenosa		258			206			52
Eucalyptus crebra		17		5	9			3

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	387	→	→	→	392	
Native perennial grass	20		30	40	50	28
Native other grass (if relevant)						
Native forbs and other species (non-grass)	~~78~~ 70	5	40	40	50	41
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	40	30	20		20
Rock						
Bare ground		55				11
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.7	NA	LC	NCaP
Survey result	11.7.4	"	"	"
Agree with mapped RE? If no, provide justification from field data	No, E. crebra w/ Acacia understorey, no E. fibrosa present.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	342 (5)	No. of logs (>10cm)	11 (2)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	100	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Sighting	Wallaby		230809	7055375	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) (Yes) / No Yes / (No) Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Bellevue 213

SITE IDENTIFICATION			
Site Name:	Aldar 242	Date:	8 Dec 2022
Tenure:	PL 492	Assessor(s):	PH, TM, TC

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	230656
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7059113
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 62		#	
East	# 63		#	
South	# 64		#	
West	# 65		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting	230683	End Easting	230633
		Start Northing	7059113	End Northing	7059116

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 | 12	2 | 6 ~~12~~		1 | 2	0.1 | 1
Canopy cover (%)		2%.	5%.		>1%.	>1%.

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia aprapta		4			~~4~~			1
Eucalyptus populnea		2		~~2~~				
Panicum decompositum								
Chiclantes sieberi								
Fimbristylis dichotoma								
Cassytha sp								
Eucalyptus sp								
Dianella sp								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	66	67	68	69	70	
Native perennial grass	80	40	40	35	45	
Native other grass (if relevant)				~~35~~		
Native forbs and other species (non-grass)	15	40	40	35	~~45~~ 50	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter			20		5	
Rock						
Bare ground	5	10		~~25~~ 30		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Unclear			
Survey result	Clear			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	(Absent)		Present	
Waterway	(Absent)		Present	
Potential for **nectar / pollen**	Absent	(Scattered)	Common	Abundant
Potential for **fleshy fruiting plants**	(Absent)	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	(Common)	Abundant
Dense shrub/grass shelter	Absent	(Scattered)	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	(Scattered)	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	(Absent)	Scattered	Common	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	(Absent)	Scattered	Common	Abundant
Leaf litter depth	Absent	(Single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	(Scattered)	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	(Common)	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	Absent	(Scattered)	Common	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	(Scattered)	Common	Abundant
Mistletoe/Epiphytes	Absent	(Scattered)	Common	Abundant



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 251	**Date:**	26/10/21
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)** 1246	230810
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060904
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 61		#	
East	# ↓		#	
South	# ↓		#	
West	# 64		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light-medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent		Scattered		Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76%	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	3
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		1.6	**Avg DBH (cm) of EDL**	1	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	247 230809	End Easting	1245 230808		
		Start Northing	7060879	End Northing	7060927		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)	3 | 4	~~3 | 4~~			1 | 2	0 | 0-3	
Canopy cover (%)	2				50	10	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Acacia (photo)	Acacia cowaldii	83					33	50
Corymbia btoxsonei		1					1	
X Digitaria brownii								
Purple flower forb (photo)	Thysanotus tuberosis							
Walwhalleya subxerophila								
forb photo								
Eragrostis leptostachya								
Pentcum effusum								
Cheilanthes sieberi								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	65	→	→	→	69	
Native perennial grass	25	20	45	40	~~80~~ 45	35
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	~~50~~ 10	~~5~~		5	5.2
Native shrubs (<1m)	5	~~10~~ 50	20		30	21
Non-native grass						
Non-native forbs and shrubs						
Litter	60	20	20	20	20	28
Rock						
Bare ground	5		9	35		9.8
Cryptogams				5		1
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	Cleared	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	2	**No. of logs (>10cm)**	1
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	40	**Per hectare (x 20)**	20

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m scattered
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11-7-2-1	**Date:**	23/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	1524 230896
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7057024
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~350~~ 352		#	
East	# 1		#	
South	#		#	
West	# 353		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	(Orange)	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent		Scattered		Frequent				
Erosion Type	Tunnelling	Sheet (Scalds)	Rill	Gully	Mass failure	Stream-bank			

targetzero
► zero incidents ► zero injuries

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL	2					**Avg DBH (cm) of EDL**			3			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	ENE	Start Easting	1525 230 872	End Easting	1523 230 918		
		Start Northing	7057016	End Northing	7057033		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)					1 | 4	0 | 0.5	
Canopy cover (%)					75	5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Forb (photo)	Sigesbeckia orientalis							
Panicum effusum								
Digitaria brownii								
Aristida capat-medusae								
An Aristida calycina								
Hibiscus sturtii								
Paspalidium distans								
Cheilanthes sieberi								
Phyllanthus virgatus								
Acacia leiocalyx		1					(1)	
Amyema linophora		2					11 (2)	
Acacia (photo)	Acacia oswaldii	54					12+5+8+3+3 (1) +3+6+2+1+2 +8 (53)	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

targetzero
► zero incidents ► zero injuries

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	354	→	→	→	358	
Native perennial grass	2			5		1·4
Native other grass (if relevant)						
Native forbs and other species (non-grass)	3					0·6
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	~~95~~ 90	5	20	95	25	47
Rock						
Bare ground	5	95	80		75	51
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11-7-2	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES. Disturbed.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4+4+7+3+11+3 (32)	No. of logs (>10cm)	~~IIII~~ ~~IIII~~ IIII (14)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	640	Per hectare (x 20)	280

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Scattered trees >4m, termite mounds, logs
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
	Yes / (No)		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / (No)		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Gathering N of Aldersley 137-139	**Date:**	29/04/21
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	230891
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7049688
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 89		#	
East	# ↓		#	
South	# ↓		#	
West	# 92		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW (Nil)
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	(Silty clay loam)	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent			(Scattered)		Frequent		
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL			1.5				**Avg DBH (cm) of EDL**			3		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	N	Start Easting	230 890	End Easting	230894		
		Start Northing	7049664	End Northing	7049713		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)	4 | 5				1.2 | 1.6		
Canopy cover (%)	2				20		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS					~~////~~ ~~////~~ (30)	
Eremophila mitchellii		30					~~////~~ ~~////~~ ~~////~~ ~~////~~	
Allocasuarina luehmanii		1 (1)						
Dactylotenium radulans								
Fimbristylis dichotoma								
Eragrostis leptostachya								
Aristida ramosa								
Chloris ventricosa								
Tragus australianus								
~~[illegible] (photo)~~ Chrysocephalum apiculatum								
Cheilanthes sieberi								
Phyllanthus sp.								
Aristida caput-medusae								
Bothriochloa decipiens								
Cenchrus ciliaris								
Digitaria (large seedhead) Digitaria ammophila								
* Sida spinosa								
* Melinis repens								
Awned grass Chrysocephalum apiculatum								
Sporobolus (like coroi) Sporobolus scabridus								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	93	→	→	→	97	
Native perennial grass	3	75	70	45	30	44.6
Native other grass (if relevant)						
Native forbs and other species (non-grass)					40	8
Native shrubs (<1m)	90			25		23
Non-native grass	2				10	2.4
Non-native forbs and shrubs		10		10		4
Litter			20			4
Rock						
Bare ground	5	15	10	20	20	14
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Cleared (3D)	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Scattered trees 74m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

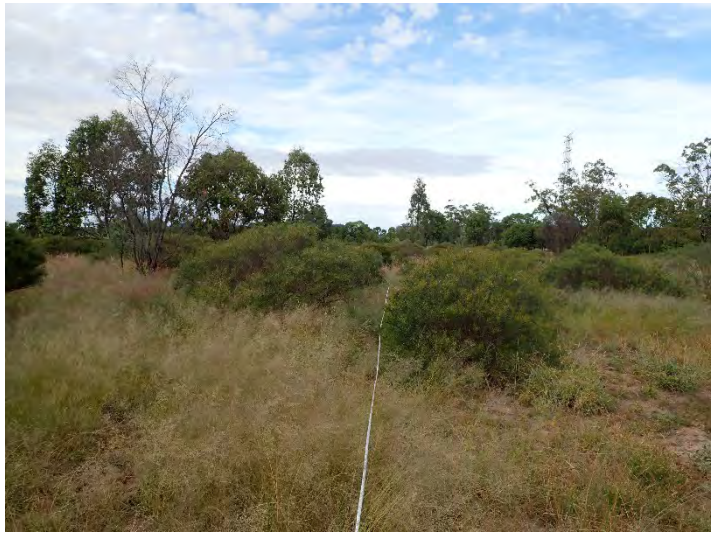
Soil cracks present, scattered, too small for snake habitat
Well pad to north is same, p. 98–101.



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey 020-SBW-HSM-FOR-00067 targetzero ► zero incidents ► zero injuries

Bellevue Part 1

SITE IDENTIFICATION			
Site Name:	Alderly 138 (multi well pad)	Date:	3 Nov 2020
Tenure:	PC492	Assessor(s):	

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	230872
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7049245
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU			Photos of landscape and features	
		Number	Notes	Number	Notes
398	North	# 399		#	
397	East	# 400		#	
398	South	# 401		#	
399	West	# 402		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	(1-25%)	26-75%		>76%		n/a	
Site condition	Very good	Good	(Moderate)		Poor		Degraded	
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	(**WDL**)	(**GRL**)	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	(T1)	T2	S1	S2	G
Avg height (m) of EDL	5m		**Avg DBH (cm) of EDL**	30	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	(<10% (very sparse))	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	(Very sparse)	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Spurtle stride					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067 targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W 270	Start Easting	230896	End Easting	230847
		Start Northing	7049239	End Northing	7049251

Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		4	10	2	4			1	2	0.1	1
Canopy cover (%)		5%									

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Owenia acidula	Owenia acidula	24		1	15		7	1
Maytenus cunninghamii		13					12	1
Geijera parviflora		12					4	8
Dodonaea viscosa		2			1			1
					+			+
Aristida capat-medusa								
A. calycina								
Melinis repens								
Mayer's pest	Glandularia aristigera							
Africa lovegrass	Eragrostis curvula							
Drumsticks	Pycnoros Chrysocephalum apiculatum							

Owenia acidula
T2 S1 T1
S2
MC
S1 S2
W/ gr
S1 S2
Dodon

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

406

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	403	404	405	406	407	
Native perennial grass	25	55	10	40	15	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	2		10			
Native shrubs (<1m)						
Non-native grass	15					
Non-native forbs and shrubs	2					
Litter		5	20		2	
Rock						
Bare ground	66	40	60	60	83	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	cleared			
Survey result	# Cat X			
Agree with mapped RE? If no, provide justification from field data	No			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	1.5	No. of logs (>10cm)	3
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for nectar / pollen	Absent	~~Scattered~~	Common	Abundant
Potential for fleshy fruiting plants	Absent	~~Scattered~~	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	~~Scattered~~	Common	Abundant
Leaf litter depth	~~Absent~~	Single layer	Multiple layers	Deep layers
Leaf litter coverage	~~Absent~~	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	~~Absent~~	Scattered	Common	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	~~Scattered~~	Common	Abundant
Mistletoe/Epiphytes	~~Absent~~	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	(Yes)	No	large trees
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	large trees soil pits
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

targetzero
► zero incidents ► zero injuries

Bellevue PWA 1

SITE IDENTIFICATION			
Site Name:	Aduly 135 (re-locate)	**Date:**	2 November 2020
Tenure:	PL492	**Assessor(s):**	Peter Neil

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	230 914
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048193
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
382	**Number**	**Notes**	**Number**	**Notes**
383 **North**	# 386		#	
384 **East**	# 387		#	
385 **South**	# 388		#	
386 **West**	# 389		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	(Orange)	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	(Clearing)	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	(1-25%)	26-75%	>76%	n/a							
Site condition	Very good	(Good)	Moderate	Poor	Degraded							
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	(**WDL**)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL							**Avg DBH (cm) of EDL**			25		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			(10-30% (sparse))			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia stricta					

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	270 W.	Start Easting	230938	End Easting	230889
		Start Northing	7048191	End Northing	7048194

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 / 17	2 / 6		1 / 2	0.1 / 1
Canopy cover (%)		22%	10		10%	2%

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus fibrosa		11		8	2		1	
Callitris glaucophylla		12		6	6			
Brachychiton populnea		2			1			1
Geijera parviflora		13					11	2
Acacia leiocalyx		6			4		2	
Alphitonia excelsa		1					1	
Gahnia seiberi	Gahnia aspera							
Aristida – caput medusae								
A. calycina								
Solanum ferrosissimum								
Panicum sp	Panicum sp.							
Sida spicatum								

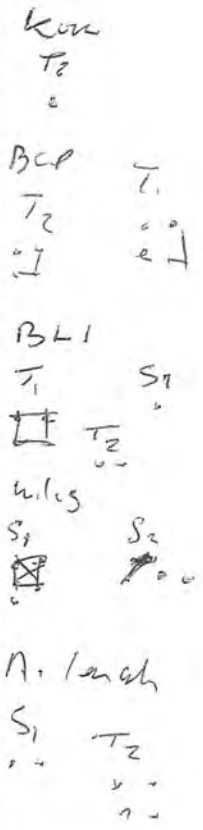
Kur
T2

BCP T1
T2

BLI
T1 S1
T2

wilg
S1 S2

A. lenah
S1 T2



Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

targetzero
► zero incidents ► zero injuries

387

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	390	391	392	393	394	
Native perennial grass	20	2	20	15	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	80	98	60	35	70	
Rock						
Bare ground			20	50	20	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.7.4			
Survey result	11.7.4			
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	5	**No. of logs (>10cm)**	2
Per hectare (x 20)		**Per hectare (x 20)**		**Per hectare (x 20)**		**Per hectare (x 20)**	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	(Absent)		Present	
Waterway	(Absent)		Present	
Potential for **nectar / pollen**	Absent	Scattered	(Common)	Abundant
Potential for **fleshy fruiting plants**	Absent	(Scattered)	Common	Abundant
Potential for **seeding grass cover**	Absent	(Scattered)	Common	Abundant
Dense shrub/grass shelter	(Absent)	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	(Common)	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	(Scattered)	Common	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	(Common)	Abundant
Leaf litter depth	Absent	(Single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	(Common)	Abundant
Termite mounds (>50cm)	Absent	(Scattered)	Common	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	Absent	(Scattered)	Common	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	(Abundant)
Mistletoe/Epiphytes	Absent	(Scattered)	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	Remnant veg
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Aldinga 187	**Date:**	24/6/20
Tenure:	PL492	**Assessor(s):**	Melanie

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	230954
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7051939
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 409		#	
East	# ↓		#	
South	# ↓		#	
West	# 412		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	~~Moderately sloping (5-10%)~~	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)		(Red)			
	Black	Grey	Pale	Dark		Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'		'Loam'		'Silty loam'	
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'		'Light clay'		'Light medium clay'	
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	~~Absent~~			~~Scattered~~				Frequent	
Erosion Type	Tunnelling	(Sheet)	Rill	Gully		Mass failure		Stream-bank	

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76%	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		10	**Avg DBH (cm) of EDL**	10	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia Tomentosa	Scattered	Throughout pad			

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	230957	End Easting	230951
		Start Northing	7051918	End Northing	7051959

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		8 | 10	4 | 6		0.5 | 1	
Canopy cover (%)		20	5		2	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS		24				
Acacia leiocalyx		38		~~24~~	~~14~~			
~~Eucalyptus crebra~~								
Eucalyptus exserta		3		2	1			
Corymbia (small fruit)	Corymbia trachyphloia	3		1	1		1	
~~Corymbia~~ (pointy leaves)	Melaleuca nodosa						3	
Callitris glaucophylla		10		~~8~~	2			
Carex sp.								
Eragrostis sororia								
Panicum effusum								
Aristida ramosa								
Eragrostis leptostachya								
Sida cordifolia								
Mulga grass	Thyridolepis mitchelliana							
Cheilanthes sieberi								
Eleocharis sp.								
Solanum (hairy, thorns on stem)	Solanum ellipticum							
Aristida caput-medusae								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	413	414	415	416	417	
Native perennial grass	10	30	75	30	45	38
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	10	5	5	10	7
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	85	60	20	15	40	44
Rock				45		9
Bare ground				5	5	2
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.4/11.7.7/11.7.3/11.7.2	NA	LC	NCAP
Survey result	11.7.7	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	39	No. of logs (>10cm)	15
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	780	Per hectare (x 20)	300

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 216	Date:	23/02/2022
Tenure:	PL 492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	520 230999
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7057 887
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# ~~341~~ 343		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~344~~ 346		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)	
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	('Sandy loam')	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)		
Erosion		(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76% - in T1	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** 5
Disturbance notes	T1 virtually gone, Acacia dominant						

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		4	**Avg DBH (cm) of EDL**	5	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	S	Start Easting	1521	230997	End Easting	1519	230998				
		Start Northing		7057912	End Northing		7057860				
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)	15	20	2	5							0.5 2
Canopy cover (%)	2		75								10

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Cheilanthes sieberi								
Phyllanthus virgatus								
Hibiscus sturtii								
Ancistrachne uncinulata								
Sida ~~shrubby~~ hackettiana								
Phyllanthus ~~hairy~~ occidentalis								
Aristida ramosa								
Panicum effusum								
Fuzzy glume Eriachne mucronata								
Digitaria ~~(small)~~ diffusa								
Digitaria brownii								
Sedge (photo) Bulbostylis barbata								
Lysicarpus angustifolius		1						1
Eucalyptus erebia (outside stem count Area)								
Acacia leiocalyx		16		11				5
~~Wairy bark wattle~~ Acacia burrowii		64		S2				12

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	347	→	→	→	351	
Native perennial grass	5	5	20	3	10	8.6
Native other grass (if relevant)						
Native forbs and other species (non-grass)	~~7~~ 10	~~20~~ 30	5	2	10	11.4
Native shrubs (<1m)	20					4
Non-native grass						
Non-native forbs and shrubs						
Litter	65	65	55	80	65	66
Rock						
Bare ground			20	15	15	10
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.4	NA	LC	NCaP
Survey result	11.7.4	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	i	Total length of logs (>10cm)	1+ 60 2+2+11+10+11+23	No. of logs (>10cm)	~~11 11 11 11~~ 11 17
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	1200	Per hectare (x 20)	340

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Sighting	Wallaby x 2		230986	7057766	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Kerwick Rd upgrades	**Date:**	17/03/2022
Tenure:	PLL 492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	231012
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7051111
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 126		#	
East	# ↓		#	
South	# ↓		#	
West	# 129		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Road reserve Track		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	15	**Avg DBH (cm) of EDL**	45									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa	Scattered	throughout	road	reserve	

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S	Start Easting	1625	231019		End Easting	1623	231005			
		Start Northing		7051134		End Northing		7051086			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		10	18	2	5					0.5	1
Canopy cover (%)		30		10						1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
* Megathyrsus maximus								
* Urochloa panic								
* Cynchrus diiaris								
Sida ~~spinosa~~ hacbettiana								
Brachychiton populneus		1		1				
Corymbia clarksoniana		3		III (3)				
Carissa ovata		3						III (3)
Grevillea parallela		1			1			
Eucalyptus Populnea		5		IIII (5)				

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	130	→	→	→	134	
Native perennial grass						
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass	100	100	100	100	100	100
Non-native forbs and shrubs						
Litter						
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D ecosmart	11.3.25	NA	LC	OC
Survey result	11.3.2	TEC	OC	OC
Agree with mapped RE? If no, provide justification from field data	No, Eucalyptus populnea dominant			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	1	No. of hollow logs	111 (3)	Total length of logs (>10cm)	4+3+5+4 (21)	No. of logs (>10cm)	~~111~~ (5)
Per hectare (x 20)	20	Per hectare (x 20)	60	Per hectare (x 20)	420	Per hectare (x 20)	100

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4m, watercourse
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Bellevue 243 Keel

SITE IDENTIFICATION			
Site Name:	Alderla 240	Date:	8 Dec 2022
Tenure:	PL 3492	Assessor(s):	PA TM TC

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	231419
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7057024
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 71		#	
East	# 72		#	
South	# 73		#	
West	# 74		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'
	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

Nil

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%		>76%		n/a
Site condition	Very good	Good	Moderate		Poor		Degraded
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)** 3.
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	18				**Avg DBH (cm) of EDL**		32 42					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E	Start Easting	231399	End Easting	231447
		Start Northing	7059015	End Northing	7059027

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		6 20	2 6		1 2	0.1 1
Canopy cover (%)		15	35		10	2

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eucalyptus Ribcose		21		20			1	
Acacia shirleyi		81			64		23	
~~A. decora~~ A. spectabilis		18			12		~~4~~	2
Allocasuarina leuhmannii		1			1			
Acacia ixiophylla		7					4	3
Acrotriche caput-medusae								
Prolonga triangularis								
Oplismenus								
Entolassia stricta								

H

1x2 1x2 H 1x2 1x5 1+2.5 1+5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	75	~~B~~ 76	77	78	79	
Native perennial grass	10	5			70	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	30	30		25		
Non-native grass						
Non-native forbs and shrubs						
Litter	60	60	5	75	30	
Rock						
Bare ground		5	95			
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7			
Survey result	11.7.7			
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	1	No. of hollow logs	1	Total length of logs (>10cm)	14	No. of logs (>10cm)	6
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	~~Common~~	Abundant
Potential for **fleshy fruiting plants**	~~Absent~~	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	~~Abundant~~
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	~~Scattered~~	Common	Abundant
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	~~Abundant~~
Mistletoe/Epiphytes	Absent	~~Scattered~~	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)	7	No. of trees with hollows (>30cm)	0

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Hollow tree					
Loss Tree					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	See above
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Bellevue Part 2	Date:	01.06.2023
Tenure:	PL 492	Assessor(s):	NJ

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	231548
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7052165
☐ Monitoring	☑ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9726		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)			
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)			
Aspect	N	S	E	W	NE	NW	(SE)	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red		
	Black	Grey	Pale	Dark	Mottled		
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	**'Loam'**	**'Silty loam'**	
	(Sandy clay loam')	**'Clay loam'**	**'Clay loam sandy'**	**'Silty clay loam'**	**'Light clay'**	**'Light medium clay'**	
	'Medium clay'	**'Medium heavy clay'**	**'Heavy clay'**	(Saline mud)			
Erosion	(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank	

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	9 m	**Avg DBH (cm) of EDL**	12									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)												
Transect Start compass bearing	SE	Start Easting	231526			End Easting	231568					
		Start Northing	7052152			End Northing	7052175					
Stratum	E	T1		T2		T3		S1		S2/Seedlings		
Height range (m)				8	10			2	4	2	0.1	
Canopy cover (%)												

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
F. cretacea		2			1			
Callitris glaucophylla		14			12			2
Casuarina leuhmannii		5			3			2
A. leiocalyx		6						1
Eucalyptus decorticans								
Cheilanthes sieberi								
Melinis repens								
Heteropogon contortus								
Aristida spp.								
Chrysocephalum apiculatum								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9726	→	→	→	→	
Native perennial grass	5	80	40	50	70	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5	20	15	10	
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	10	10	20	5	15	
Rock						
Bare ground	85	5	20	30	5	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	Cleared	N/A	N/A	N/A
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	Y	No. of hollow logs	Y	Total length of logs (>10cm)	N	No. of logs (>10cm)	N
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11.7.6-1	**Date:**	23/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)** 1534	231528
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7055758
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~368~~ 370		#	
East	# ↓		#	
South	#		#	
West	# 373		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	1.5				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL	25					**Avg DBH (cm) of EDL**	35					
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting	1538 231553	End Easting	1533 231506
		Start Northing	7055768	End Northing	7055762

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		20 | 25			1 | 3	0 | 05
Canopy cover (%)		30			70	5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Fuzzy plume	Eriachne mucronata							
Lomandra	leucocephala							
Panicum	effusum							
Aristida	calycina							
Grass photo	Setaria surgens							
Oxalis	radicosa							
Galenia	asperа							
Digitaria	~~sanguinalis~~ diffusa							
Reed grass	Arundinella nepalensis							
Dianella	caerulea							
Aristachne	uncinulata							
Petalostigma	pubescens	1					1	
Acacia	sericata	26					25	1
Acacia	spectabilis	1					1	
Acacia	leptocalyx	33					30	III (3)
Corymbia	citriodora	4		III (3)			1	
Acacia	conferta	19					13	IIII (6)

Ecological Field Survey ORG-ARW-HSM-FOR-00067

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	374				378	
Native perennial grass	50	30			15	19
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5				1
Native shrubs (<1m)		5				1
Non-native grass						
Non-native forbs and shrubs						
Litter	50	60	100	100	85	79
Rock						
Bare ground						
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.7	NA	LC	NCaP
Survey result	11.7.6	"	"	"
Agree with mapped RE? If no, provide justification from field data	No, dominated by Corymbia citriodora.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	22.5 ~~5~~ +6 ~~+1.5~~ +9	No. of logs (>10cm)	~~IIII~~ 6
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	450	Per hectare (x 20)	120

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11-5-1-3	**Date:**	16/02
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	1423 231670
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7060 088
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 154		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~155~~ 157		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	(Pale)	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	(Silty loam)	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	2				
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	15		**Avg DBH (cm) of EDL**	25	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
O. tomentosa	Scattered	throughout ESU			

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	NNE	Start Easting 1424	231661	End Easting 1422	231676		
		Start Northing	7060063	End Northing	7060111		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		13 / 16	6 / 8	3 / 4	1 / 2	0 / 0.5	
Canopy cover (%)		10	5	5	10	1	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eragrostis sororia								
~~[illegible]~~ Walwhalleya subxerophila								
Paspalidium distans								
Aristida jerichoensis								
Fuzzy glume Eriachne mucronata								
Fimbristylis dichotoma								
Chrysopogon fallax								
Panicum effusum								
Eragrostis leptostachya								
~~Melaleuca? pointy~~ Leucopogon mitchellii		1					1	
Dichanthium sericeum								
Acacia conferta		2					II 2	
Allocasuarina luehmanii		3					1	II 2
Acacia ixiophylla		22				1	~~IIII~~ ~~IIII~~ ~~IIII~~ II 1	IIII 4
Dodonaea ~~[illegible]~~ biloba		2						II 2
Eucalyptus crebra		1		1				
Callitris glaucophylla		4			II 2	II 2		
Acacia ~~[illegible]~~ sparsiflora		44			II 2	II 2	~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ 31	~~IIII~~ IIII 9

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	158	→	→	→	161	
Native perennial grass	30	80	30	25	40	41
Native other grass (if relevant)						
Native forbs and other species (non-grass)			20			4
Native shrubs (<1m)		5		10	10	5
Non-native grass						
Non-native forbs and shrubs						
Litter	10	15	40	25	40	26
Rock						
Bare ground	60		10	40	10	24
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.5.1	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	11 (2)	Total length of logs (>10cm) (15)	8+1.5+3.5+2	No. of logs (>10cm)	IIII (4)
Per hectare (x 20)	0	Per hectare (x 20)	40	Per hectare (x 20)	300	Per hectare (x 20)	80

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ... ARW-HSM-FOR-00067

Bellevue part 1

targetzero ► zero incidents ► zero injuries

Alderly 161 – 164

SITE IDENTIFICATION			
Site Name:	Alderly 161 multi well	Date:	3 Nov 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	231791
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7050501
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
419 North	# 423		#	
East	# 423		#	
South	# 424		#	
425 West	# 425		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1	T2	S1	S2	G							
Avg height (m) of EDL	5m	**Avg DBH (cm) of EDL**	6cm									
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a							
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent							

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Eragrostis curvula/a Mex;					
Opuntia tomentosa					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E 90°	Start Easting	231765			End Easting	231816				
		Start Northing	7050501			End Northing	7050500				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		2	7								
Canopy cover (%)								1	2	0.1	1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Allocasuarina leuhmannii		4		4				
Eucalyptus crucbac.		1		1				
E. populnea		1		1				
Acacia leiocalyx		3		2				1
Mysterus Maytenus cunninghamii		11					11	
Callitris glaucophylla		2		2				
Eragrostis curvula	Eragrostis curvula							
Aristida caput medusae								
A. Calycina								
Melinis repens								
buttal	Chenchrus ciliaris.							
Cahnia sieber-	Cahnia aspera							
Pycnosorus								
Mayo per'	Glandularia aristigera							
Sida spicata								
Themeda austral,	~~Themeda aust~~ Themeda triandra							
Chiolaena sieberi								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

423

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	426	428	428	429	430	
Native perennial grass	60		60	50	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass		70				
Non-native forbs and shrubs						
Litter		30	30	10	20	
Rock						
Bare ground	40		10	40	60	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	cleared			
Survey result	cleared			
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	(Absent)		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	(Absent)		Present	
Potential for nectar / pollen	Absent	Scattered	(Common)	Abundant
Potential for fleshy fruiting plants	Absent	(Scattered)	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	(Abundant)
Dense shrub/grass shelter	Absent	Scattered	(Common)	Abundant
Large Eucalypts (>30cm DBH)	(Absent)	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	(Absent)	Scattered	Common	Abundant
Large rocks (>30cm)	(Absent)	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	(Scattered)	Common	Abundant
Leaf litter depth	Absent	(Single layer)	Multiple layers	Deep layers
Leaf litter coverage	Absent	(Scattered)	Common	Abundant
Termite mounds (>50cm)	Absent	(Scattered)	Common	Abundant
Rock piles	(Absent)	Scattered	Common	Abundant
Trees with shedding bark	(Absent)	Scattered	Common	Abundant
Soil cracks	(Absent)	Scattered	Common	Abundant
Koala feed trees	Absent	(Scattered)	Common	Abundant
Mistletoe/Epiphytes	(Absent)	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
	Trees				

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	trees gilgais
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	Scatter small gilgais
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 189 PL492	Date:	24/6/20
Tenure:		Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	231795
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7051873
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 400		#	
East	# ↓		#	
South	# ↓		#	
West	# 403		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL	20					**Avg DBH (cm) of EDL**			≥ 30			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	throughout	pad		

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)											
Transect Start compass bearing	N	Start Easting	231794		End Easting	231797					
		Start Northing	7051848		End Northing	7051898					
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		18	23	6	10			1	2	0.2	0.5
Canopy cover (%)		20		5				5			
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed								
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2			
		TOTALS									
Panicum effusum											
Aristida caput-medusae											
Awned grass Chrysopogon fallax											
Fimbristylis sp.											
Aristida leptopoda											
Galenia aspera											
Mulga grass Thyridolepis mitchelliana											
Lomandra (strappy) Lomandra filiformis											
Eragrostis leptostachya											
Eucalyptus chlorodada		4		1		1/1 3					
Pointy-leaf shrub Melaleuca nodosa		1								1	
Eucalyptus fibrosa subsp. nubilis		3		1/1 2		1					
Small Eragrostis Eragrostis brownii						1/1					
Callitris glaucophylla		29				1/1 ~~1/1~~ 22		~~1/1~~ 5		1/1 2	
Allocasuarina lehmanii		75		1		~~1/1~~ ~~1/1~~ 1/1 13		26 ~~1/1~~ ~~1/1~~ ~~1/1~~		~~1/1~~ ~~1/1~~ ~~1/1~~ ~~1/1~~ ~~1/1~~ 35	

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	404	405	406	407	408	
Native perennial grass	10	20	10	60	60	32
Native other grass (if relevant)						
Native forbs and other species (non-grass)			20			4
Native shrubs (<1m)	20				15	7
Non-native grass						
Non-native forbs and shrubs						
Litter	65	75	65	28	15	49.6
Rock						
Bare ground	5	5	5	10	10	7
Cryptogams				2		0.4
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.7.7	NA	LC	NCAP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4	No. of logs (>10cm)	2
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	80	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees >4m
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			

Drainage depressions/ Washouts - 231797 7052037 photos 396-397
- 231811 7051962 photos 398-399



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	11.7.7-1	**Date:**	15/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)** 1416	231890
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7059111
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~139~~ 141		#	
East	# ↓		#	
South	# ↓		#	
West	# 142		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Not in use						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	6				
Disturbance notes	Dense Acacia new growth - heavily disturbed by fire											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL				20		**Avg DBH (cm) of EDL**			~~40~~ 30			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W	Start Easting 1417	231914	End Easting 1415	231864		
		Start Northing	7059118	End Northing	7059108		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		18 20	3 4		1 2	0 0.5	
Canopy cover (%)		15	5		75	10	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Paspalidium distans								
~~Entolasia stricta~~ Enteropogon acicularis								
Brunoniella australis								
Panicum effusum								
Weeping bamboo Arundinella nepalensis								
Chrysopogon fallax								
Galmia aspera								
Fuzzy glume Eriachne mucronata								
Aristida leptopoda								
Eriochloa crebra								
W								
Eucalyptus fibrosa		13		111 (3)	(1)		9+10+9+4+6+8 (105) 0+19+9+8	~~IIII~~ IIII (9) ~~IIII IIII IIII~~ (15)
Acacia semilunata		117						
Dodonaea ~~(small A)~~ biloba		56						10+10+9+11+1+2+2+7+4 (56)

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	145	→	→	→	149	
Native perennial grass	20	30		15	~~40~~ 30	19
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	5				2
Native shrubs (<1m)	45	20	40	10	20	27
Non-native grass						
Non-native forbs and shrubs						
Litter	30	45	55	75	45	50
Rock						
Bare ground	2		5		5	2
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.7	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect 7+4+10=47							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1111 (4)	Total length of logs (>10cm)	3+1+5+14+3=940	No. of logs (>10cm)	10
Per hectare (x 20)	0	Per hectare (x 20)	80	Per hectare (x 20)		Per hectare (x 20)	200

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees 7cm
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No)		Is the vegetation suitable for slashing only?
	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

targetzero
► zero incidents ► zero injuries

Bellevue Part 1

SITE IDENTIFICATION			
Site Name:	Accessfield,	Date:	2 November 2020
Tenure:	PL92	Assessor(s):	Peter Hall

Lot ~~67 Plan~~ R 672 RP 897022

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	231927
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7047919
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

	Photos from centre of ESU		Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 361		#	
East	# 362		#	
South	# 363		#	
West	# 364		#	

358
9
60
61

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	(Orange)	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion		(Absent)	Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	~~Regrowth~~	Logging	Thinning	No disturbance	
Dieback	0%	(1-25%)		26-75%	>76%		n/a
Site condition	Very good	Good	(Moderate)		Poor		Degraded
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	(**WDL**)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	(T1)	T2	S1	S2	G
Avg height (m) of EDL	?		**Avg DBH (cm) of EDL**	25	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	(10-30% (sparse))	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	(Sparse)	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	~~Not Found On Site~~
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N.	Start Easting	231 935			End Easting	231 929				
		Start Northing	7047 897			End Northing	7047 944				
Stratum	E		T1		T2		T3		S1		S2/Seedlings
Height range (m)			4	12	2	4			0.1	2	0.1 / 1
Canopy cover (%)											

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Callitris glaucophylla		14		1	8		8	5
Acacia leiocalyx		11			6		5	
Allocasuarina lehmanni		1					1	
Eucalyptus camaldulensis		2			1		1	
Xanthorrhoea johnsoni		17			1		16	
Micromyrtus sp.		1					1	
Corymbia clarksoniana		2		1				1
Acacia conferta Acacia conferta		1		1				
Aristida capit. medusae								
Chrysolaena sieberi								
Entolossia stricta								
Epalyptus australe								
Aristida calycina								
Sida sp								
Gahnia sieberi Gahnia aspera								

A lei.
S1
T2
S1
RLC
T2
Bullo
S1
BCP
T2
3.
S1
S2
8
Xant
S1
T2
16
Ma
S1

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

362

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	365	366	367	368	369	
Native perennial grass	70	15		10	15	5
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)	15			10		
Non-native grass						
Non-native forbs and shrubs						
Litter	15	10		55	40	2
Rock						
Bare ground		75		25	45	93
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non Nat			
Survey result	HVR			
Agree with mapped RE? If no, provide justification from field data	No 11.3.25/11.5.1 15 yrs +			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4	No. of logs (>10cm)	4
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	Absent		~~Present~~	
Waterway	Absent		~~Present~~	
Potential for nectar / pollen	Absent	~~Scattered~~	Common	Abundant
Potential for fleshy fruiting plants	Absent	~~Scattered~~	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	~~Scattered~~	Common	Abundant
Large Eucalypts (>30cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	Absent	~~Scattered~~	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	~~Scattered~~	Common	Abundant
Soil cracks	~~Absent~~	Scattered	~~Common~~	Abundant
Koala feed trees	Absent	Scattered	~~Common~~	Abundant
Mistletoe/Epiphytes	Absent	Scattered	~~Common~~	Abundant

3 x 3 4x4

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species**
V	Vulnerable	Echidna, Platypus, Migratory Species
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species**
CBS	Colonial Breeding Species	Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Large trees termite mounds
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	Large trees. Not a well pad
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 236	**Date:**	17/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	463 232057
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7057294
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 188		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~189~~ 191		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent			
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank										

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	25				**Avg DBH (cm) of EDL**		35					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	N	Start Easting 1444	232058	End Easting 1445	232058		
		Start Northing	7057271	End Northing	7057321		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		20 | 25	8 | 10	2 | 3	0.5 | 1.5	~~0.5~~	
Canopy cover (%)		20	30	5	5		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida jerichoensis								
Ancistrachne uncinulata								
Eragrostis scoria								
Panicum effusum								
Digitaria brownii								
Brunoniella australis								
Acacia leiocalyx		4				1	III 3	
Acacia semilunata		4				III 3	1	
Acacia shirleyi		64		1	~~IIII~~ 20+9+10 44	III 3	~~IIII~~ ~~IIII~~ ~~IIII~~ 17	
Corymbia citriodora		7		II 2	III 3	II 2		

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	192	→	→	→	196	
Native perennial grass	10	5	25	10	40	18
Native other grass (if relevant)						
Native forbs and other species (non-grass)			5			1
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	55	95	70	90	60	74
Rock						
Bare ground	35					7
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.7.6	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	[illegible]		YES	

FAUNA HABITAT within 50m x 10m transect 4+ (45.5)							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	7+13+5+8+8+6.5	No. of logs (>10cm)	~~IIII~~ (10)
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	910	Per hectare (x 20)	200

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

11.7.5



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey ORG-ARW-HSM-FOR-0005?

Bellevue Pt 1

SITE IDENTIFICATION			
Site Name:	Alder Lg 142	Date:	3 November 2020
Tenure:	PL 492	Assessor(s):	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☒ Well pad	☐ Gas Processing Facility	Easting (E)	232129
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7049076
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
486 North	# 4609		#	
East	# 4610		#	
South	# 4611		#	
West	# 4612		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red			
	Black	Grey	(Pale)	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	(Grazing)	(Forestry)	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	(Logging)	Thinning	No disturbance						
Dieback	0%	(1-25%)	26-75%	>76%	n/a							
Site condition	Very good	(Good)	Moderate	Poor	Degraded							
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	(**FOR**)	(**WDL**)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		**Avg DBH (cm) of EDL**			
Canopy cover (%) of EDL	>70% (dense/closed)	(30-70% (mid-dense))	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	(Mid-dense)	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	(Found on Site – records below)	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia stricta					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067 targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	S 180°	Start Easting	232132		End Easting	232129			
		Start Northing	7049097		End Northing	7049051			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)		4	12	2	4			1	2
Canopy cover (%)		30%		10%				1%	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Allocasuarina leuhmannii		16		12	4			
Callitris glaucophylla		29		27				2
Angophora leiocarpa		4		4				
Cangabia clarksoniana		1		1				
Acacia leiocarpa		4					3	1
Lomandra patens								
Aristida caput-medusae								
A. calycina								
Fimbristylis dichotoma								
Chielanthes sieberi								

Bc P
T1 S2
BO
T1 T2
SBA
T1
RBW
T1
A. leu
S1 S2

5 + 5 + 7 + 1 + 5
4 + 4 + 1

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	413	414	415	416	417	
Native perennial grass		1	5	15	20	
Native other grass (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter	100	99	45	50	60	
Rock						
Bare ground			30	35	20	
Cryptogams			10			
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.5.1			
Survey result	11.5.1			
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	1	No. of hollow logs		Total length of logs (>10cm)	37.5	No. of logs (>10cm)	7
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
large trees					

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	Large trees.
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 238	Date:	16/02/22
Tenure:	PL#12	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E) 14/2	232 229
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7059037
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 128		#	
East	# ↓		#	
South	#		#	
West	# ~~124~~ 131		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	(Level (<1%))	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	(W)	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion		(Absent)		Scattered			Frequent	
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76% – in T1		n/a	
Site condition	Very good	Good	Moderate	Poor		Degraded	
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	4
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		8	**Avg DBH (cm) of EDL**	15	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect) ~~50m x 2m~~

Transect Start compass bearing	W	Start Easting 413	232252	End Easting 411	232205
		Start Northing	7059039	End Northing	7059034

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)			3 ~~2~~ 4		1 2	0 0.5
Canopy cover (%)			20		40	5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Panicum effusum								
Fimbristylis dichotoma								
Eragrostis leptostachya								
Aristida ~~caput~~-medusae								
Paspalidium distans								
Walwhalleya subxerophila								
Chrysopogon fallax								
Enteropogon acicularis								
Weeping Brushgrass Arundinella nepalensis								
Acacia leiocalyx		1			(1)			
Dodonaea ~~(small triangle)~~ biloba		1						(1)
Acacia ~~plata~~ sparsiflora		3			II (2)		I	
Acacia semilunata		11			III (3)		IIII III (8)	
Allocasuarina luehmannii		4			II (2)		II (2)	
Callitris glaucophylla		~~3~~	Outside of stem		~~count~~ area			
Eucalyptus crebra		11			IIII (4)		III (3)	IIII (4)
Eucalyptus populnea			Outside of stem		count area			

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	~~131~~ 132	→	→	→	136	
Native perennial grass	100	95	60	95	95	87
Native other grass (if relevant)						
Native forbs and other species (non-grass)				5	5	2
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs						
Litter		2	20			4.4
Rock						
Bare ground		3	20	10		6.6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.5.1	NA	LC	NCaP
Survey result	"	"	"	"
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4+5(9)	No. of logs (>10cm)	11(3)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	180	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	~~Abundant~~
Potential for **fleshy fruiting plants**	~~Absent~~	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	~~Abundant~~
Dense shrub/grass shelter	Absent	Scattered	Common	~~Abundant~~
Large Eucalypts (>30cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	~~Scattered~~	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	~~Scattered~~	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	~~Common~~	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	~~Scattered~~	Common	Abundant
Mistletoe/Epiphytes	~~Absent~~	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Sightings	Quails	Throughout ESU			

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees 74m skattered, dense veg, termites
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 237	**Date:**	17/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	232640
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7058282
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 173		#	
East	# ↓		#	
South	# ↓		#	
West	# 178		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	(S)	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	(Loam)	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing		Forestry		Cropping		Conservation		Mining		Other:	
Evidence	Clearing		Cultivation		Regrowth		Logging		Thinning		No disturbance	
Dieback	0%		1-25%			26-75%			>76%			n/a
Site condition	Very good		Good			Moderate			Poor			Degraded
Fire scars	Absent	Scattered		Frequent	**Time since**		Recent	Old		**Average Height (m)**		2
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL		10	**Avg DBH (cm) of EDL**	20	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	throughout ESU			
O. stricta	"		"		

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SW	Start Easting	431 232671	End Easting	1430 232 676
		Start Northing	7058 294	End Northing	7058 274

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		10 | 11	6 | ~~8~~ 7	2 | 3	~~+5~~ ~~2~~	0 ~~1~~ | 1
Canopy cover (%)		20	30	5		2

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Bothriochloa decipiens								
Panicum effusum								
Walwhalleya subxerophila								
Fimbristylis dichotoma								
Eragrostis leptostachya								
Pomax umbellata								
Aristida capit-medusae								
Weeping bamboo	Arundinella nepalensis							
Aristida jerichoensis								
Paspalidium distans								
Bromuella australis								
Barbwire	Cymbopogon refractus							
Hibiscus sturtii								
Digitaria ~~sanguinalis~~ diffusa								
Fuzzy glume	Eriachne mucronata							
Phyllanthus virgatus								
Dodonaea viscosa		8				17 (2)		~~1~~ (6)
Acacia leiocalyx		16				~~1~~ 11 (12)		1111 (4)
Callitris glaucophylla		60	(1)		~~1~~ (60)			
Dodonaea ~~sinuolata~~ bursariifolia		2						11 (2)
Eucalyptus populnea		14	~~1~~ (11)		111 (3)			

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Allocasuarina luehmanii		1				1		
Galmia aspera								
Lomandra filiformis								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	179	→	→	→	183	
Native perennial grass	30	50	25	30	~~8~~ 10	29
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	5	10	2	~~15~~ 20	8.4
Native shrubs (<1m)	15					3
Non-native grass						
Non-native forbs and shrubs						
Litter	45	40	65	58	60	53.6
Rock						
Bare ground	5	5		10	10	6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.5.1	NA	LC	NCaP
Survey result	11.5.1a	"	"	"
Agree with mapped RE? If no, provide justification from field data	Dominated by Eucalyptus populnea			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	6	Total length of logs (>10cm)	2+1+1 (4)	No. of logs (>10cm)	111 (3)
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	80	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 234	**Date:**	17/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION				
Development Type			**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility		**Easting (E)**	454 232 698
☐ Pilot Well + Dam	☐ Dam		**Northing (N)**	7056531
☐ Monitoring	☐ Pipeline		**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line		**Other description**	
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~208~~ 210		#	
East	# ↓		#	
South	# ↓		#	
West	# ~~211~~ 213		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	(Slope or hill not specified)	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	(Moderately sloping (5-10%))	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	(Orange)	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	(Sandy loam')	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent		(Scattered)		Frequent			
Erosion Type	Tunnelling	(Sheet)	Rill	Gully	Mass failure	Stream-bank		

targetzero
► zero incidents ► zero injuries

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes	Drought dieback probably											

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL				3			**Avg DBH (cm) of EDL**			3		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)									
Transect Start compass bearing	N	Start Easting 1455	232705		End Easting 1453	232690			
		Start Northing	7056506		End Northing	7056556			
Stratum	E	T1		T2		T3		S1	S2/Seedlings
Height range (m)		~~4~~ 5						1 2	
Canopy cover (%)		5						15	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Lobelia								
~~Pratia~~ concolor								
Aristida caput-medusae								
Aristida jerichoensis								
Cheilanthes sieberi								
Mitchell grass Thyridolepis mitchelliana								
Sida ~~photo~~ fibulifera								
Eragrostis sororia								
Panicum effusum								
~~Cornflower~~ Brunonia australis								
Chrysocephalum apiculatum								
Phyllanthus virgatus								
Fuzzy glume Eriachne mucronata								
~~Lake~~ centipeda minima								
Grevillea striata		1					1	
Callitris ~~[illegible]~~ glaucophylla		7					~~[illegible]~~ 7	
Acacia melanoxylon		64		III 3			~~[illegible]~~ 18 12+11+20 61	
Acacia biocalyx		46		~~[illegible]~~ 6			27+11+2 4	

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	214				218	
Native perennial grass	90	65	80	30	~~4~~ 30	59
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5		10	10	5
Native shrubs (<1m)			15	~~10~~	~~10~~	3
Non-native grass						
Non-native forbs and shrubs	10	10			5	5
Litter						
Rock						
Bare ground		20	5	60	55	28
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE 3D	Regrowth 11.5.1	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other					
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**		**Other Information (e.g. age, collected, active/inactive)**
			Easting	**Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Scattered trees 74m, termite mounds
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / (No) Yes / (No) Yes / (No) (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Bellevue part 2, WP209	**Date:**	30 05 2023
Tenure:	PL 492	**Assessor(s):**	NV

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	232799
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7054662
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 3651		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion		(Absent)	Scattered		Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	23		**Avg DBH (cm) of EDL**	22	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia stricta					

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	N		Start Easting	232781			End Easting	232821					
			Start Northing	7054651			End Northing	7054680					
Stratum	E		T1		T2		T3		S1		S2/Seedlings		
Height range (m)			20	26	12	14			2	4	01	02	
Canopy cover (%)													

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra		6		6				
C. gummifera		8		8				
Eucalyptus glaucophylla		5			4		1	
Acacia spp.		66					66	
A. semilunata		2					2	
Gahnia aspera								
Cheilanthes sieberi								
Austrostipa scabra								
Fragaria sp.								
Melinis repens								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9646	→	→	→	→	
Native perennial grass	20	15	20	20	40	
Native other grass (if relevant)			5			
Native forbs and other species (non-grass)	5	5	5	5	10	
Native shrubs (<1m)				20	10	
Non-native grass						
Non-native forbs and shrubs						
Litter	70	75	60	45	35	
Rock						
Bare ground	5	5	10	10	5	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.5.1	N/A	LC	NCAP
Survey result	11.5.1	N/A	LC	NCAP
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	x	No. of hollow logs	x	Total length of logs (>10cm)	26	No. of logs (>10cm)	4
Per hectare (x 20)	x	Per hectare (x 20)	x	Per hectare (x 20)	400	Per hectare (x 20)	80

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Holland			23,4707	7054642	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Regrowth 11.5.1a	Date:	17/02/2022
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	466 232 889
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7058 250
☐ Monitoring	☑ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 2446		#	
East	#		#	
South	#		#	
West	# 2479		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	(NE)	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2			G
Avg height (m) of EDL				8		**Avg DBH (cm) of EDL**			15			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)			n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse			Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SW	Start Easting	1467	232911		End Easting	1465	232868			
		Start Northing		7058266		End Northing		7058244			
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		7	9	2	4					0	1
Canopy cover (%)		10		10						5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Aristida jerichoensis								
Panicum effusum								
Waltheria sbxerophila								
Chrysocephalum apiculatum								
Themeda triandra								
Eragrostis leptostachya								
* ~~Aloe~~ Glandularia aristigera								
Evolvulus alsinoides								
Enneapogon cenchroides								
* Cenchrus ciliaris								
* Melinis repens								
Hibiscus sturtii								
Fuzzy glume Enneapogon muricronata								
Aristida caput-medusae								
Poinsettia		1						1
Callitris glaucophylla		3		1	II (2)			
Eucalyptus exserta		3		III (3)				
Sida sp. Sida hackettiana								
Eucalyptus populnea		17		~~IIII IIII~~ (15)	1			1
Acacia semilunata		2			II (2)			
Acacia melanoxylon		15			III (3)			~~IIII~~ II (12)

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Bloodwood	Corymbia trachyphloia	1			(1)			
Pragrostis leptostachya								
Cheilanthes sieberi								
* Eriegeron bonariensis								
Chrysopogon fallax								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	250				254	
Native perennial grass	35	60	70	70	10	65
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5	15			5	5
Native shrubs (<1m)				10		2
Non-native grass		10				2
Non-native forbs and shrubs			5			1
Litter	5	~~10~~ 15	10	15	5	10
Rock						
Bare ground	55	-	15	5		15
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	Cleared	NA	NA	NA
Survey result	~~Regrowth 11.5.1a~~	"	"	"
Agree with mapped RE? If no, provide justification from field data	Regrowth 11.5.1a ~~No, regrowth RE 11.5.1a~~ No, regrowth 11.5.1a clearing appears to be pre-2002. ~~YES, clearing evident last 15 years.~~			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 74 m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

targetzero
► zero incidents ► zero injuries

Bellevue Pt 1

SITE IDENTIFICATION			
Site Name:	Alderly 143	**Date:**	6 November
Tenure:	PL 492	**Assessor(s):**	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	233100
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048927
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
562 **North**	# 565		#	
East	# 566		#	
South	# 567		#	
565 **West**	# 568		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%	>76%	n/a		
Site condition	Very good	Good	Moderate	Poor	Degraded		
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL			**Avg DBH (cm) of EDL**	1 cm	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	E 90°	Start Easting	233074	End Easting	233124
		Start Northing	7048927	End Northing	7048926

Stratum	E		T1		T2		T3		S1		S2/Seedlings	
Height range (m)	5	5-5							1	2	0.1	1
Canopy cover (%)	2%								35%		1%	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Corymbia clarksoniana		1	1					
Dodonea viscosa	Dodonaea visosa	41					26	15
Acacia leiocalyx		13					1	11
Moytenus cunninghamii		16					13	3
Aristida caput medusae								
Sclerolaena birchii	Sclerolaena birchii							
buffel	Chenchrus ciliares							
Salsola kali	Salsola kali							
Aristida calycina								
Glandularia aristigera								
Pycnosorus	Chrysocephalum apiculatum							
Chloris divaricata	Chloris divaricata							
Eragrostis sp								

SHB

S2 S1

A. leio

S1 S2

Moytenus

S1

MC

S1 S2

1 2 H

2

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

561

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	569	570	571	572	573	
Native perennial grass	15	25	20	50	35	
Native other grass (if relevant)						
Native forbs and other species (non-grass)					2	
Native shrubs (<1m)	25					
Non-native grass						
Non-native forbs and shrubs						
Litter		25	40			
Rock						
Bare ground	60	50	40	50	63	
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	C, t x			
Survey result	C, t x			
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	5	No. of logs (>10cm)	3
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	~~Absent~~	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	~~Absent~~	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	~~Scattered~~	Common	Abundant
Large Eucalypts (>30cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	~~Absent~~	Scattered	Common	Abundant
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	~~Scattered~~	Common	Abundant
Termite mounds (>50cm)	~~Absent~~	Scattered	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	~~Absent~~	Scattered	Common	Abundant
Soil cracks	~~Absent~~	Scattered	Common	Abundant
Koala feed trees	Absent	~~Scattered~~	Common	Abundant
Mistletoe/Epiphytes	~~Absent~~	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Hollow log trees.
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	Trees
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

①

targetzero
► zero incidents ► zero injuries

SITE IDENTIFICATION			
Site Name:	Bellevue Part2	Date:	30 05. 2023
Tenure:	PL492	Assessor(s):	NU

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	233101
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7054221
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9429		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)									
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)					
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)					
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'			
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'			
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)					
Erosion	Absent	Scattered	Frequent						
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank			

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	Time since	Recent	Old	Average Height (m)			
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS
Key: CEST-Coastal & estuarine; Rf-Rainforest (including SEVT); H-Heath; FOR-Forest; WDL-Woodland; GRL-Grassland; IMP-Improved pasture; LKE-Lake/dam; RIP-Riparian; SHR-Shrubland; SW-Swamp/Wetland; DIS-Disturbed areas (e.g. roadsides, cropping land, urban areas).										
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G	
Avg height (m) of EDL	3				Avg DBH (cm) of EDL		4			
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)													
Transect Start compass bearing	N	Start Easting	233086			End Easting	233118						
		Start Northing	7054221			End Northing	7054259						
Stratum	E	T1		T2		T3		S1		S2/Seedlings			
Height range (m)		10	12	8	10			2	4	2	0.1		
Canopy cover (%)													

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E crebra		4		4				
Allocasuarina leuhamannii		6			6			
A. semitrimata		76					76	
A. leucocalyx		52					52	
E. fibrosa		1		1				
Geahnia aspera								
Cheilanthes sieberi								
Panicum decompositum								
Aristida spp.								
Eragrostis spp.								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9624	→	→	→	→	
Native perennial grass	60	70	40	70	40	
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5	5			
Native shrubs (<1m)					10	
Non-native grass						
Non-native forbs and shrubs						
Litter	40	25	15	30	50	
Rock						
Bare ground			40			
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	11.5.1 Disturbed,	N/A	Non. Remnant	Non. Remnant
Survey result	11.5.1	"	"	"
Agree with mapped RE? If no, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)		No. of hollow logs	X	Total length of logs (>10cm)	X	No. of logs (>10cm)	X
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	Special Least Concern Species Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	Colonial Breeding Species Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Alderley 235	**Date:**	17/02/2022
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION				
Development Type			**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☑ Well pad	☐ Gas Processing Facility		**Easting (E)** 1451	233098
☐ Pilot Well + Dam	☐ Dam		**Northing (N)**	7057188
☐ Monitoring	☐ Pipeline		**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line		**Other description**	
☐ Work over	☐ Property (area) wide			

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# ~~194~~ 201		#	
East	# ↓		#	
South	# ✓		#	
West	# ~~202~~ 204		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2			S1			S2		G
Avg height (m) of EDL				12			**Avg DBH (cm) of EDL**			15		
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)			10-30% (sparse)			<10% (very sparse)		n/a
Functional shrub layer density (<2m)	Dense/closed			Mid-dense			Sparse			Very sparse		Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Opuntia tomentosa	Scattered	throughout	ESU		

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	451 233096	End Easting	1469 233104
		Start Northing	7057 168	End Northing	7057222

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		10 | 12	~~5~~ ~~10~~ 6 | ~~12~~	2 | 3		0 | 1
Canopy cover (%)		40	~~40~~ 10	5		5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Cheilanthes sieberi								
Digitaria brownii								
Eragrostis sororia								
Fimbristylis, Eriachne mucronata								
Aristida jerichoensis								
Walwhalleya subxerophila								
Common forb	Boronia bipinnata							
Mulga grass	Thyridolepis mitchelliana							
Galenia aspera								
Hibiscus sturtii								
~~Bronze~~ Evolvulus alsinoides								
~~Convolvulus photo~~ Wahlenbergia stricta								
Oxalis perennans								
Quinine Petalostigma pubescens		1				(1)		
Alphitonia excelsa		4						IIII (4)
Eucalyptus creba		2		II (2)				
Lysicarpus angustifolius		15				IIII (9)		IIII I (6)
Acacia leiocalyx		56			IIII IIII (16)	IIII IIII II (12)		IIII IIII III (13)
~~Hairy leaf acacia~~ Acacia sparsiflora		15		+7 IIII (5)	IIII (4)	I (2)		IIII IIII (9)
Callitris glaucophylla		~~51~~						
~~Pointy shrub (heath?)~~ Leucopogon mitchellii		17						IIII IIII II (17)

Ecological Field Survey

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Phyllanthus ~~(hairy photo)~~ Digitaria ~~smooth~~ diffusa	occidentalis							
Acacia shirleyi		4			11 (2)	11 (2)		

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	205	→	→	→	209	
Native perennial grass	25	65	95	60	80	65
Native other grass (if relevant)						
Native forbs and other species (non-grass)	15	5	5	20		9
Native shrubs (<1m)	30					6
Non-native grass						
Non-native forbs and shrubs						
Litter	30	20		20	10	16
Rock						
Bare ground		10			10	4
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE 3D	11.5.1	NA	LC	NCaP
Survey result	11.7.~~4~~	"	"	"
Agree with mapped RE? If no, provide justification from field data	No, ~~not~~ gravelly soils, sloping (Land zone 7) & presence of Lysicarpus angustifolius			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	1	Total length of logs (>10cm)	21 ~~5~~ 4 10	No. of logs (>10cm)	1 1 3
Per hectare (x 20)	0	Per hectare (x 20)	20	Per hectare (x 20)	220	Per hectare (x 20)	60

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Grey fantail sighting	(Rhipidura albiscapa)	LC	229575	7058549	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment:	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
Suitable – if all 4 questions are yes	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Tie-in east of Alderley 161-164	**Date:**	11/11/20
Tenure:	PL492	**Assessor(s):**	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)** S65	233513
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7050325
☐ Monitoring	☑ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 144		#	
East	# ↓		#	
South	# ↓		#	
West	# 147		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent		Scattered	Frequent				
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%		>76%		n/a
Site condition	Very good	Good	Moderate		Poor		Degraded
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	2		**Avg DBH (cm) of EDL**	10	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant)
(Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORGANIZATION FOR DOING targetzero

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	NE	Start Easting 566	233500	End Easting 567	233529		
		Start Northing	7050303	End Northing	7050344		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		5 | 6			1·5 | 3	0 | 0·5	
Canopy cover (%)		10			25	5	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eremophila mitchellii		19					IIII (8)	IIII IIII I (11)
Sporobolus caroli								
Eragrostis parviflora								
Acacia sp (sample)	Acacia muelleriana	7					IIII (5)	II (2)
Sida (linear leaf)	Sida cunninghamii							
Enteropogon ramosus								
Waltheria subxerophila								
Bothriochloa decipiens								
Aristida c-m	Aristida caput-medusae							
* Cenchrus ciliaris								
Aristida calycina								
Acacia harpophylla		12		IIII III (12)				
Eragrostis (fine)	Eragrostis lacunaria							
Chetanthes sieberi								
Enteropogon Fimbriatulis *								
Sclerolaena birchii								
* Glandularia aristigera								
Enneapogon procera								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #	146	→	→	→	152	
Native perennial grass	35	30	70	5	10	30
Native other grass (if relevant)						
Native forbs and other species (non-grass)					40	8
Native shrubs (<1m)	25			80		21
Non-native grass		20				4
Non-native forbs and shrubs	15					3
Litter		5	30	15	5	11
Rock						
Bare ground	25	45			45	23
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	Cleared	NA	NA	NA
Survey result	"	"	"	"
Agree with mapped RE? If **no**, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	**No. of hollow logs**	0	**Total length of logs (>10cm)**	0	**No. of logs (>10cm)**	0
Per hectare (x 20)	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0	**Per hectare (x 20)**	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)
N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	**Special Least Concern Species** Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	**Colonial Breeding Species** Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation

	Required?		If required, why?
Fauna spotter/catcher	Yes	No	Trees >4m
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Bellevue part 2, WP208	Date:	30.05.2023
Tenure:	PL492	Assessor(s):	NJ

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	233704
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7054561
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 9L41		#	
East	#		#	
South	#		#	
West	#		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	(Alluvial plain or flat, flood plain)	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	(N)	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	(Brown)	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)										
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:				
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance				
Dieback	0%	1-25%	26-75%	>76%	n/a					
Site condition	Very good	Good	Moderate	Poor	Degraded					
Fire scars	Absent	Scattered	Frequent	Time since	Recent	Old	Average Height (m)			
Disturbance notes										

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	CEST	Rf	H	FOR	WDL	GRL	IMP	LKE	RIP	SHR	SW	DIS
Key: CEST-Coastal & estuarine; Rf-Rainforest (including SEVT); H-Heath; FOR-Forest; WDL-Woodland; GRL-Grassland; IMP-Improved pasture; LKE-Lake/dam; RIP-Riparian; SHR-Shrubland; SW-Swamp/Wetland; DIS-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G			
Avg height (m) of EDL	3				Avg DBH (cm) of EDL		4					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	N	Start Easting	233696	End Easting	233708
		Start Northing	7054541	End Northing	7054589

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)		12 14	6 8		2 4	01 02
Canopy cover (%)						

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
E. crebra		3		3				
Callitris glaucophylla		4			4			
A. leiocalyx		77					77	
A. conferta		3					3	
Chrysophyllum apiculatum								
Heteropogon contortus								
Cahuia aspera								
Eulalia aurea								
Aristida spp.								
Panicum decompositum								
Cheilanthes spp.								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	9836	→	→	→	→	
Native perennial grass	60	25	20	30	70	
Native other grass (if relevant)						
Native forbs and other species (non-grass)	5			5	5	
Native shrubs (<1m)		5	10			
Non-native grass						
Non-native forbs and shrubs						
Litter	30	70	70	60	25	
Rock						
Bare ground	5			5		
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE (3D)	Cleared	N/A	N/A	N/A
Survey result	11.5.1 (Disturbed)	Non-remnant	Non-remnant	Non-remnant
Agree with mapped RE? If no, provide justification from field data	NO, the vegetation structure and context justifies the RE 11.5.1 (disturbed).			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm)	X	No. of hollow logs	X	Total length of logs (>10cm)	6	No. of logs (>10cm)	2
Per hectare (x 20)	X	Per hectare (x 20)	X	Per hectare (x 20)	120	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER HABITAT within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered	Special Least Concern Species Echidna, Platypus, Migratory Species
V	Vulnerable	
NT	Near Threatened	
SLC	Special Least Concern	Colonial Breeding Species Microbats, wetland birds
CBS	Colonial Breeding Species	

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Bellview Alderley 171-174	Date:	23/06/20
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	233698
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7050 455
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 353		#	
East	#		#	
South	#		#	
West	# 356		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1			S2		G	
Avg height (m) of EDL	30cm					**Avg DBH (cm) of EDL**			—			
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)			<10% (very sparse)		n/a	
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse			Very sparse		Absent	

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia tomentosa	Scattered	throughout paddock			

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	SW	Start Easting	233712	End Easting	233684
		Start Northing	7050472	End Northing	7050429

Stratum	E	T1	T2	T3	S1	S2/Seedlings
Height range (m)						0.2 | 0.5
Canopy cover (%)						5

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Eragrostis parviflora								
Aristida calycina								
* Cenchrus ciliaris								
* Urochloa paincoides								
Panicum queenslandicum								
Digitaria (curly leaves)	Digitaria divaricatissima							
Euphorbia dallachyana								
Portulaca oleracea								
Eragrostis sororia								
Sida sp.								
Chloris (windmill)	Chloris truncata							
Shrub (citr dots) – photo349-350	Eremophila deserti	5						TNL (5)
Fimbristylis sp.								
Eragrostis leptostachya								
Panicum (large)	Panicum decompositum							
Emphylaena tomentosa								

targetzero
► zero incidents ► zero injuries

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	348	351	352	357	358	
Native perennial grass	10			75	20	21
Native other grass (if relevant)						
Native forbs and other species (non-grass)				15		3
Native shrubs (<1m)						
Non-native grass	30	70	90		80	54
Non-native forbs and shrubs						
Litter	5					1
Rock						
Bare ground	55	30	10	10		21
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non-remnant	NA	NA	NA
Survey result	11	11	1	11
Agree with mapped RE? If no, provide justification from field data	YES			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	0

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	(No)	
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	(Yes) / No (Yes) / No (Yes) / No (Yes) / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	(Yes)	No	
Notes			

Drainage depression on access track to east. Photos 359-360 taken at 234027 7050388



North face of the transect



East face of the transect



South face of the transect



West face of the transect

Ecological Field Survey

Bellevue RH

SITE IDENTIFICATION			
Site Name:	Alderly 167	**Date:**	6 November 2020
Tenure:	PL 492	**Assessor(s):**	Peter Hall

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☒ Well pad	☐ Gas Processing Facility	**Easting (E)**	233954
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	7048288
☐ Monitoring	☐ Pipeline	**Datum**	GDA94, MGA zone: 55 or (56)
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
571 **North**	# 579		#	
East	# 580		#	
South	# 581		#	
West	# 582		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pan, salt flat, salt pan	Coastal tidal flat or salt flat	(Unspecified, flat, gentle, slopes, undulating terrain)
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	(Nil)
Soil Colour	White	Yellow	Orange	(Brown)	Red			
	Black	Grey	Pale	Dark	Mottled			
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	(Absent)	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:						
Evidence	(Clearing)	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	(0%)	1-25%		26-75%		>76%			n/a			
Site condition	Very good	Good		(Moderate)		Poor			Degraded			
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	(**WDL**)	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	(T1)		T2		S1		S2		G			
Avg height (m) of EDL	5m				**Avg DBH (cm) of EDL**		4cm					
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		(10-30% (sparse))		<10% (very sparse)		n/a			
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		(Very sparse)		Absent			

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found On Site)
Weed infestations	Found on Site – records below	(Not Found On Site)

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing	W 270°	Start Easting	233978			End Easting	233931				
		Start Northing	7046289			End Northing	7046285				
Stratum	E	T1		T2		T3		S1		S2/Seedlings	
Height range (m)		2	7					1	2	0.	1
Canopy cover (%)		10%						2%		>1%	

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
Albizia adianthifolia	Albizia adianthifolia	27		27				
Grevillea striata	Grevillea striata	5		3			2	
Psydrax oleifolium	Psydrax oleifolia	1		1				
Mallotus cochinchinensis	Cockspur Macaranga chochinchinensis	1		1				
Dodonaea viscosa	Dodonaea viscosa	28					3	25
Maytenus cunninghamii		2					1	1
Pycnosorus	Chrysocephalum apiculatum							
Aristida spp								
Tall windmill grass	Chloris divaricata							
Entolasia stricta								
Epaltes australis								
Lomandra patens								
Chiloglottis sieberi								
Wallaceya subxerophila								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

580

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	583	584	585	586	587	
Native perennial grass	75	50	25	[illegible]	10	
Native other grass (if relevant)						
Native forbs and other species (non-grass)			2			
Native shrubs (<1m)	5					
Non-native grass						
Non-native forbs and shrubs						
Litter	5				5	
Rock				100		
Bare ground	10	50	73		85	
Cryptogams	5					
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Cat X			
Survey result	Cat X			
Agree with mapped RE? If **no**, provide justification from field data	Yes			

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	0	No. of logs (>10cm)	0
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other
Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	
Trees					

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation

	Required?		If **required**, why?
Fauna spotter/catcher	(Yes)	No	Trees to 7cm
Ecologist	Yes	(No)	
Species Management Plan	Yes	(No)	
Minimal disturbance suitability assessment:	Yes / (No)		Is the vegetation suitable for slashing only?
Suitable – if all 4 questions are yes	(Yes) / No		Is the slope < 5%?
	(Yes) / No		Is the clay content > 20%?
	(Yes) / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	(No)	
Notes			



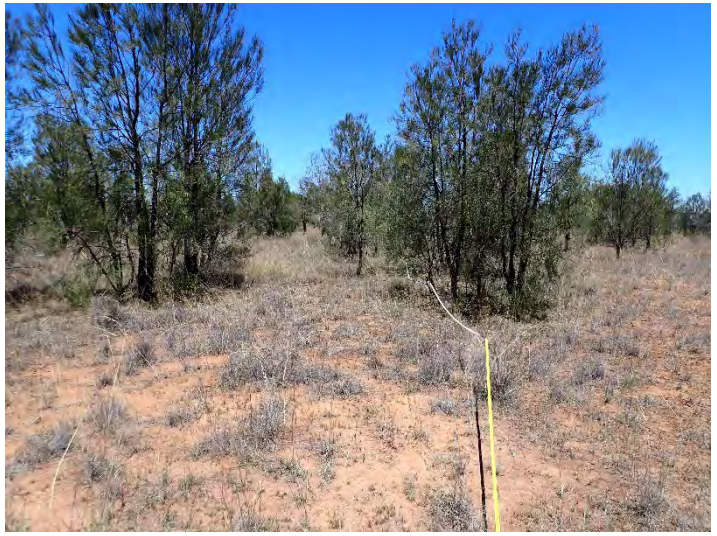
North face of the transect



East face of the transect



South face of the transect



West face of the transect

SITE IDENTIFICATION			
Site Name:	Turnout E of Alderley 170s	Date:	23/06/20
Tenure:	PL492	Assessor(s):	Melanie Ashmore

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	234791
☐ Pilot Well + Dam	☐ Dam	Northing (N)	7050389
☐ Monitoring	☐ Pipeline	Datum	GDA94, MGA zone: 55 or (56)
☑ Roads & Tracks	☐ Seismic Line	Other description	
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 361		#	
East	# ↓		#	
South	#		#	
West	# 364		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	(Inland clay pan, salt flat, salt pan)	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ~~ESU or 100m x 100m~~ area (broad assessment – random meander)								
Slope	Level (<1%)	(Gently sloping (1-4%))	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	(E)	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	(Grey)	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	('Medium clay')	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent		Scattered		(Frequent)			
Erosion Type	Tunnelling	(Sheet)	Rill	(Gully)	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Road corridor						
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance						
Dieback	0%	1-25%	26-75%	>76%	n/a							
Site condition	Very good	Good	Moderate	Poor	Degraded							
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**					
Disturbance notes												

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)												
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).												
Ecologically dominant layer (EDL)	T1			T2		S1		S2		G		
Avg height (m) of EDL				8		**Avg DBH (cm) of EDL**		15				
Canopy cover (%) of EDL	>70% (dense/closed)			30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed			Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found On Site
Weed infestations	Found on Site – records below	Not Found On Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)					
Species	**Density***	**Waypoint/Polygon**	**Easting**	**Northing**	**Photo number**
Opuntia Fomentosa	Scattered	Throughout			

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

VEGETATION FLORISTICS (record all species within 50m x 10m transect)							
Transect Start compass bearing	S	Start Easting	234297	End Easting	234289		
		Start Northing	7050415	End Northing	7050365		
Stratum	E	T1	T2	T3	S1	S2/Seedlings	
Height range (m)		7 | 10	3 | 5		0.5 | 1.5		
Canopy cover (%)		10	2		3		
Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed				
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
* Megathyrsus maximus								
Casuarina cristata		34		17	14		3	
Unknown shrub (oil dots)	Eremophila deserti	3					3	
Fimbristylis								
* Urochloa panicoides								
Trifoliolate pea								
Acacia harpophylla		2			1		1	
Parsonsia latifolia								
Paspalidium caespitosum								
Enteropogon ramosus								
Sporobolus (pyramidal)	Sporobolus actinocladus							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #	365					
Native perennial grass				10	10	4
Native other grass (if relevant)						
Native forbs and other species (non-grass)				5	15	4
Native shrubs (<1m)						
Non-native grass	35	75	55	10		35
Non-native forbs and shrubs						
Litter	45	5	45	75	65	47
Rock	10				10	4
Bare ground	~~10~~ 10	20				6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non-remnant	NA	NA	NA
Survey result	11	11	11	11
Agree with mapped RE? If no, provide justification from field data				

IIII II

FAUNA HABITAT within 50m x 10m transect							
No. Of trees with hollows (>10cm)	0	No. of hollow logs	0	Total length of logs (>10cm)	4	No. of logs (>10cm)	2
Per hectare (x 20)	0	Per hectare (x 20)	0	Per hectare (x 20)	80	Per hectare (x 20)	40

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	~~Absent~~		Present	
Wetland / Swamp / Waterbody	~~Absent~~		Present	
Waterway	~~Absent~~		Present	
Potential for **nectar / pollen**	Absent	Scattered	~~Common~~	Abundant
Potential for **fleshy fruiting plants**	Absent	~~Scattered~~	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	~~Common~~	Abundant
Dense shrub/grass shelter	Absent	Scattered	~~Common~~	Abundant
Large Eucalypts (>30cm DBH)	~~Absent~~	Scattered	Common	Abundant
Large Non-Eucalypts (>20cm DBH)	Absent	Scattered	~~Common~~	Abundant
Large rocks (>30cm)	~~Absent~~	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	~~Scattered~~	Common	Abundant
Leaf litter depth	Absent	~~Single layer~~	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	~~Common~~	Abundant
Termite mounds (>50cm)	~~Absent~~	Scattered	Common	Abundant
Rock piles	~~Absent~~	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	~~Common~~	Abundant
Soil cracks	~~Absent~~	Scattered	~~Common~~	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	~~Absent~~	Scattered	Common	Abundant

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander) N.B. GPS all potential breeding places but not necessarily all fauna signs. Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other Breeding places: Nests Burrows Shelters Drays Bowers Other				
Fauna Sign / Breeding Place	**Likely Species/Group**	**Conservation Status (see below)**	**Coordinates (GDA94)**	**Other Information (e.g. age, collected, active/inactive)**
			Easting / **Northing**	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	Trees 7km, soil cracks
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: **Suitable – if all 4 questions are yes**	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			



North face of the transect



East face of the transect



South face of the transect



West face of the transect

Appendix F

LFC Tool Outputs

Department of Environment and Heritage Protection (DEHP)
Landscape Fragmentation and Connectivity (LFC) Tool version 1.4 LOGFILE
Process started at 02-07-2024 11:13:43 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: GDA2020_MGA_Zone_56
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

11:13:44 Checking out the spatial analyst tool - required for LFC

11:13:44 _____BEGINNING LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

11:13:44 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'}

11:13:55 R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\lyr_file does not exist, creating it now.
11:13:55 Copying across impact site feature(s) and calculating area in hectares (AreaHA)
11:14:02 Making a local copy of the impact site
11:14:09 Preparing remnant cover layer for analysis
11:14:13 Created regional scale buffer of 20 kilometres
11:14:21 Created local scale buffer of 5 kilometres
11:14:51 Clipped the remnant cover to the regional buffer extent
11:14:59 Unioned the pre impact remnant layer with the impact site
11:15:18 Attributed the impact area as not RVM Cat B
11:15:18 Area of RVM Cat B clearing is 500.43 hectares
11:15:18 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

11:15:24 Categorised the cover attributes in clip_remcover_pre.shp ready for raster conversion
11:16:16 Converted clip_remcover_pre.shp to raster

11:16:26 Categorised the cover attributes in clip_remcover_post.shp ready for raster conversion

11:17:17 Converted clip_remcover_post.shp to raster

11:17:17 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 15.4 MINUTES)

11:32:41 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 16.3 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
11:50:00 Summarising area statistics for: lfc_localmsk_pre_impact
11:50:00 Summarising area statistics for: lfc_localmsk_post_impact
11:50:01 Summarising area statistics for: lfc_regional_pre_impact
11:50:03 Summarising patch count for lfc_localmsk_pre_impact
11:50:30 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 270116.25
The regional extent of core remnant is 122999.80
The regional extent of core remnant is 45.54 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): 31937.57
Area of core at the local scale (post impact): 30617.66
Percent change of core at the local scale (post impact): 4.13 percent

SIGNIFICANCE TEST TWO

The number of core remnant areas occurring on the site: 47
The number of core remnant areas remaining on the site post impact: 42
(Only core polygons greater than or equal to 1 hectare are included)

RESULT

11:51:27 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 500.43 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.

11:59:38 _____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 18-06-2024 07:19:32 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_MGA_Zone_56
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

19:19:33 Checking out the spatial analyst tool - required for LFC

19:19:33 _____BEGINNING LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

19:19:33 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'}

19:19:43 R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\lyr_file does not exist, creating it now.
19:19:43 Copying across impact site feature(s) and calculating area in hectares (AreaHA)
19:19:49 Making a local copy of the impact site
19:19:56 Preparing remnant cover layer for analysis
19:19:59 Created regional scale buffer of 20 kilometres
19:20:06 Created local scale buffer of 5 kilometres
19:20:21 Clipped the remnant cover to the regional buffer extent
19:20:25 Unioned the pre impact remnant layer with the impact site
19:20:31 Attributed the impact area as not RVM Cat B
19:20:31 Area of RVM Cat B clearing is 480.77 hectares
19:20:31 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

19:20:35 Categorised the cover attributes in clip_remcover_pre.shp ready for raster conversion
19:21:17 Converted clip_remcover_pre.shp to raster

19:21:21 Categorised the cover attributes in clip_remcover_post.shp ready for raster conversion

19:22:03 Converted clip_remcover_post.shp to raster

19:22:03 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 13.2 MINUTES)

19:35:15 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 13.6 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
19:49:43 Summarising area statistics for: lfc_localmsk_pre_impact
19:49:43 Summarising area statistics for: lfc_localmsk_post_impact
19:49:44 Summarising area statistics for: lfc_regional_pre_impact
19:49:46 Summarising patch count for lfc_localmsk_pre_impact
19:50:04 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 270116.26
The regional extent of core remnant is 124240.71
The regional extent of core remnant is 46.00 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): 32875.04
Area of core at the local scale (post impact): 31062.58
Percent change of core at the local scale (post impact): 5.51 percent

SIGNIFICANCE TEST TWO

The number of core remnant areas occurring on the site: 4
The number of core remnant areas remaining on the site post impact: 4
(Only core polygons greater than or equal to 1 hectare are included)

RESULT

19:50:46 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.

19:58:02 _____COMPLETED LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____