Australian Government
Department of Agriculture,
Water and the Environment

GUIDELINES FOR THE CONTENT OF A DRAFT PUBLIC ENVIRONMENT REPORT

Environment Protection and Biodiversity Conservation Act 1999

Gas Supply Security Project, Queensland

(EPBC 2020/8856)

Australia Pacific LNG Pty Ltd

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PREAMBLE

Australia Pacific LNG Pty Ltd (the proponent) proposes to construct, operate, decommission and rehabilitate gas field infrastructure within the Surat and Bowen Basins, Queensland (the proposed action).

The proposed action was submitted under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) and validated by the Department of Agriculture, Water and the Environment (the department) on 19 January 2021. On 17 February 2021, a delegate of the Minister for the Environment (the Minister) determined that the proposed action is a controlled action due to likely significant impacts on the following matters of national environmental significance (MNES) protected under Part 3 of the EPBC Act:

- Listed threatened species and communities (sections 18 and 18A);
- Migratory species (sections 20 and 20A); and
- A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E).

On that same date, the delegate made the decision that the proposed action will need to be assessed by public environment report (PER).

Information about the proposed action and its relevant impacts, as outlined below, is to be provided in the PER. This information should be sufficient to allow the Minister, or their delegate, to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision.

GENERAL ADVICE ON GUIDELINES

General content

The PER must be a stand-alone document that primarily focuses on the MNES listed above. It should contain sufficient information to avoid the need to search out previous or supplementary reports, including any relevant technical reports for previous studies in relation to existing operations. The PER should take into consideration the *Significant Impact Guidelines 1.1: Environment Protection and Biodiversity Conservation Act 1999* (2013) and other relevant EPBC Act policy statements that can be downloaded from the following website: http://www.environment.gov.au/epbc/guidelines-policies.html.

The PER should enable interested stakeholders and the Minister to understand the environmental consequences of the proposed action. Information provided in the PER must be objective, clear, and succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. The body of the PER is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing can be used to avoid unnecessary duplication of text but must be specific (e.g. section 1.1.1).

Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the PER. It is recommended that any additional supporting documentation and studies, reports or literature not normally available to the public from which information has been extracted be made available at appropriate locations during the period of public display of the PER.

After receiving the Minister's approval to publish the report, the proponent is required to make the draft PER available for a period of public comment. Specific instructions regarding publication requirements will be provided as part of the Minister's direction to publish.

If it is necessary to make use of material that is considered to be of a confidential nature, the proponent should consult with the department on the preferred presentation of that material, before submitting it to the Minister for approval for publication.

The level of analysis and detail in the PER should reflect the level of significance of the potential impacts on the environment. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. Further, any claims made (e.g. regarding the presence/absence of protected matters) need to be adequately justified and supported with evidence. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed.

The proponent should ensure that the PER assesses compliance of the action with the principles of Ecological Sustainable Development (ESD) as set out in the EPBC Act, and *The objects and principles of the EPBC Act* at Attachment 2. A copy of Schedule 4 of the EPBC Regulations, *Matters that must be addressed in a PER and EIS*, is at Attachment 3.

Format and style

The PER should comprise three elements, namely:

- the executive summary;
- the main text of the document, and
- appendices containing detailed technical information and other information that can be made publicly available.

These guidelines have been set out in a manner that may be adopted as the format for the PER. This format need not be followed where the required information can be more effectively presented in an alternative way. However, each of the elements must be addressed to meet the requirements of the EPBC Act and Regulations.

The PER should be written so that any conclusions reached can be independently assessed. To this end all sources must be appropriately referenced. The reference list should include the address of any web pages used as data sources.

The main text of the PER should include a list of abbreviations, a glossary of terms and appendices containing:

- a copy of these guidelines;
- a list of persons and agencies consulted during the PER; and
- contact details for the proponent.

Maps, diagrams and other illustrative material should be included in the PER. The PER should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size and in colour where possible.

The proponent should consider the format and style of the document appropriate for publication on the internet. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

SPECIFIC CONTENT

General information

This should provide the background and context of the action including:

- the title of the action;
- the full name and postal address of the designated proponent;
- a clear outline of the objective of the action;
- the location of the action;
- the background to the development of the action;
- how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;
- the current status of the action; and
- the consequences of not proceeding with the action.

1 DESCRIPTION OF THE ACTION

This section must describe the proposed action in sufficient detail to allow an understanding of all relevant stages (including interdependencies between stages) and components, and to determine potential associated environmental impacts.

All construction, operational and (if relevant) decommissioning and rehabilitation components of the proposed action should be described in detail. This should include, to the greatest extent practicable, the location (including coordinates) of all works to be undertaken, structures to be built or elements of the action that may have impacts on relevant controlling provisions for the action.

The description of the proposed action must also include details on how the works are to be undertaken (including stages of development and, where available, their timing) and design parameters for those aspects of the structures or elements of the proposed action that may have relevant impacts.

Provide the total size (in hectares) of the proposed action area and the total size (in hectares) of the disturbance footprint. If the disturbance footprint is the same as the project site this should be clearly stated.

The various elements of the project must be described in the text and illustrated with maps, diagrams, plans (at a suitable scale) and other information as required to provide sufficient context and basis for the identification and assessment of impacts.

Gas field and facility development

The PER must provide detail regarding:

- equipment and methods to be used to access the gas resource (drilling and well installation, stimulation etc.);
- equipment and processes for extracting the gas resource (dewatering wells and gas extraction);
- equipment and processes for taking the gas and water from the well head to gas and water facilities (gas/water separation and gathering networks);
- gas and water transmission pipelines, including any equipment needed for maintenance like pipe cleaning facilities;
- major transport corridors (rail and road) potentially crossed by gas and water gathering and transmission pipelines;
- chemicals to be used during drilling or extraction operations;
- gas facilities (design of gas treatment, compression, dehydration and flaring/venting);
- water storage and management (treatment, disposal and end uses); and
- power generation facilities and power lines to provide electricity to wellhead, compression and treatment facilities.

The description should refer to, and be complemented by, figures, typical design drawings, maximum case facility configurations, pipeline design specifications and photos.

Please note, where existing approved infrastructure will be utilised, this should be clearly articulated. Discussion must also be provided as to whether any new developments will be undertaken within existing EPBC approved development areas (e.g. EPBC 2009/4974) to facilitate the proposed action (e.g. pipelines, processing facilities), including justification for not including those activities as part of the proposed action.

Decommissioning and rehabilitation

Describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the proposed action, including:

- decommissioning wells that are proved not viable or from which gas supplies are exhausted;
- rehabilitating drilling sites and well sites (in part after drilling and fully after cessation of production);
- rehabilitating and decommissioning gas and water pipelines used for gathering and transmission;
- rehabilitating areas of associated infrastructure (access tracks, utility lines);

- decommissioning and rehabilitating gas treatment and compression facility sites; and
- decommissioning and rehabilitating water management facility sites and any associated storage, transfer, treatment and disposal ponds.

1.1 Feasible alternatives

Provide discussion on any feasible alternatives to the action to the extent reasonably practicable, including:

- if relevant, the alternative of taking no action;
- a comparative description of the impacts of each alternative on the MNES protected by controlling provisions for the action; and
- sufficient detail to make clear why any alternative is preferred to another.

Short, medium and long-term advantages and disadvantages of the options should be discussed.

1.2 Description of the existing environment

The PER must include a description of the existing environment of the proposed action area and the surrounding areas that may be affected by the action (this may include downstream of the proposed action area). This should include details of the current and historical land use of the area.

2 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

In relation to the MNES listed as controlling provisions for the proposed action, an inventory of surveys, both office-based and field-based, must be provided. These may be provided as appendices but must at least be fully referenced and must be made publicly available unless the department is provided with compelling reasons not to do so. Any anticipated future surveys to be conducted in relation to relevant controlling provisions for the action, whether office-based or field-based, must also be discussed.

Output from the protected matters search tool must also be included as an appendix. This can be accessed at the following website: http://environment.gov.au/epbc/protected-matters-search-tool.

The results, indicating the presence of MNES and/or their habitat, must also be provided. Any species or values considered likely or known to occur in areas impacted by the proposed action must be addressed. The description of MNES should focus on the following controlling provisions:

- Listed threatened species and ecological communities (sections 18 & 18A);
- Migratory species (sections 20 & 20A); and
- A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E).

2.1 Listed threatened species and ecological communities

This section must address, at a minimum, the listed threatened species and ecological communities identified in the output of the protected matters search tool that are likely to occur (i.e. a real or not a remote chance or possibility).

2.1.1 Description

Describe each listed threatened species and ecological community that is likely to occur (including EPBC Act listing status, distribution, habitat, life history, etc.). These descriptions are to align with the best available information including the SPRAT Database and other relevant departmental documents.

2.1.2 Habitat assessment

Provide a robust assessment of the potential habitat available within, adjacent to and/or downstream of the proposed action area for listed threatened species and ecological communities. Habitat assessments must be derived from information obtained from:

- the Species Profile and Threats (SPRAT) Database;
- field surveys and vegetation assessments;
- relevant departmental documents (e.g. approved conservation advices, recovery plans, listing advices, survey guidelines, etc.); and
- published research and other relevant sources (where relevant).

Please note where habitat for listed threatened species and communities is identified on site, an assessment must be undertaken regardless of whether or not the species was recorded. As such, the potential for occurrence of listed threatened species and communities must also be considered and assessed.

This section must also provide context to the proposed action area by discussing known historical records of listed threatened species and ecological communities in the broader region.

At a minimum the habitat assessment, for each listed threatened species and ecological community, must:

- identify any specific habitat requirement/s (e.g. breeding, foraging, dispersal, known important habitat, suitable habitats, roosting, etc);
- consider the regional context, describing the connectivity of habitat in the broader landscape; and
- provide the total amount of each type of habitat (in hectares) in the proposed action area.

The total amount of each type of habitat must also be presented on a map/maps for each listed threatened species and ecological community. The mapping provided must:

- include an appropriate basemap that provides the geographical context of the project area in the surrounding environment (i.e. aerial imagery);
- be specific to the habitat assessment undertaken for each listed threatened species and ecological community;
- include an overlay of the proposed disturbance footprint where available; and
- include known records of individuals (or evidence of individuals) derived from desktop analysis and/or field surveys.

The *Habitat descriptions and modelling rules* at Attachment 1 should be used and applied in undertaking predictive habitat modelling and any subsequent field validation surveys. Should field validation surveys be undertaken, the PER must include details of the scope, methodology, timing and effort of field surveys. Provide details of:

- how surveys were, or will be, undertaken in accordance with relevant Commonwealth, State and/or best practice survey guidelines; and
- if relevant, the justification for divergence from relevant Commonwealth, State and/or best practice survey guidelines.

2.1.3 Impact assessment

Describe and assess all relevant impacts (direct, indirect, cumulative and facilitated) of the proposed action to listed threatened species and communities, including the magnitude, duration and frequency of the impacts.

Impacts during the construction, operational and decommissioning stages of the action are to be addressed, and the following information provided:

- a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts;
- a statement, with supporting evidence, whether any relevant impacts are likely to be unknown, unpredictable or irreversible; and
- any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

Consideration must be given to, and information provided in accordance with, the SPRAT Database and relevant departmental policies and guidelines, including the *Significant Impact Guidelines 1.1: Environment Protection and Biodiversity Conservation Act 1999* (2013).

2.1.4 Mitigation measures

The PER must include detailed descriptions of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of all stages of the proposed action on

listed threatened species and communities. Please note the SPRAT Database may provide some relevant mitigation measures for listed threatened species and ecological communities.

Further guidance on mitigation measures is provided in section 3 of these guidelines.

2.1.5 Statutory requirements

Where relevant, discuss how the proponent has had regard to relevant approved conservation advice/s.

Demonstrate, with supporting evidence, that the proposed action will not be inconsistent with Australia's obligations under:

- the Biodiversity Convention;
- the Convention on Conservation of Nature in the South Pacific (Apia Convention);
- the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); or
- a recovery plan or threat abatement plan.

2.1.6 Residual significant impact assessment

After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on relevant listed threatened species and ecological communities. This assessment should be undertaken in accordance with the relevant departmental policies and guidelines, including the *Significant Impact Guidelines 1.1: Environment Protection and Biodiversity Conservation Act 1999* (2013). Any analysis and methodology for determining significant residual impacts must be supported by a science-based methodology, consistent with best available information including departmental policy, be repeatable, transparent and appropriate in the context of the project and the MNES impacted, and be approved by the department.

The PER must provide a clear and definitive conclusion of offsetting approach to residual significant impacts on relevant listed threatened species and ecological communities to align with the *EPBC Act Environmental Offsets Policy* (2012).

Further guidance on environmental offsets is provided in section 4 of these guidelines.

2.2 Migratory species

2.2.1 Description

Describe each migratory species that is likely (i.e. a real or not remote chance or possibility) to occur in the project area (including EPBC Act listing status, distribution, habitat, life history, etc.). These descriptions are to align with the best available information including the SPRAT Database and other relevant departmental documents.

The potential for occurrence of migratory species must also be considered and assessed, and include a discussion of known historical records of the migratory species in the broader region.

Provide information on the likelihood of each potentially occurring migratory species to be significantly impacted in line with the *Significant Impact Guidelines 1.1: Environment Protection and Biodiversity Conservation Act 1999* (2013) and other relevant department guidelines.

2.2.2 Habitat assessment

For those species that may be significantly impacted provide a robust assessment of the potential habitat available within, adjacent to and/or downstream of the proposed action area. Habitat assessments must be derived from information obtained from:

- the Species Profile and Threats (SPRAT) Database;
- field surveys and vegetation assessments;
- relevant departmental documents (e.g. approved conservation advices, recovery plans, listing advices, survey guidelines, etc.); and
- published research and other relevant sources (where relevant).

At a minimum, the habitat assessment for each migratory species that may be significantly impacted must:

- identify any specific habitat requirement/s (e.g. breeding, foraging, dispersal, known important habitat, suitable habitats, roosting, etc);
- consider the regional context, describing the connectivity of habitat in the broader landscape; and
- provide the total amount of each type of habitat (in hectares) in the proposed action area.

The total amount of each type of habitat must also be presented on a map for migratory species that may be significantly impacted. The mapping provided must:

- include an appropriate basemap that provides the geographical context of the proposed action area in the surrounding environment (i.e. aerial imagery);
- be specific to the habitat assessment undertaken for each migratory species (i.e. not illustrate relevant Queensland REs only);
- include an overlay of the proposed project disturbance footprint where available; and
- include known records of individuals (or evidence of individuals) derived from desktop analysis and/or field surveys.

2.2.3 Impact assessment

Describe and assess all relevant impacts (direct, indirect, cumulative and facilitated) of the proposed action to migratory species, including the magnitude, duration and frequency of the impacts.

Impacts during the construction, operational and decommissioning stages of the action are to be addressed, and the following information provided:

- a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts;
- a statement, with supporting evidence, whether any relevant impacts are likely to be unknown, unpredictable or irreversible; and
- any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

Consideration must be given to, and information provided in accordance with, the SPRAT Database and relevant departmental policies and guidelines, including the *Significant Impact Guidelines 1.1: Environment Protection and Biodiversity Conservation Act 1999* (2013) and the *Draft referral guideline for 14 migratory birds listed under the EPBC Act* (2015).

2.2.4 Mitigation measures

The PER must include detailed descriptions of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of all stages of the proposed action on migratory species. Please note the SPRAT Database may provide some relevant mitigation measures.

Further guidance on mitigation measures is provided in section 3 of these guidelines.

2.2.5 Statutory requirements

Demonstrate, with supporting evidence, that the action will not be inconsistent with Australia's obligations under:

- the Bonn Convention;
- China–Australia Migratory Bird Agreement (CAMBA);
- Japan–Australia Migratory Bird Agreement (JAMBA); or
- an international agreement approved under subsection 209(4) of the EPBC Act.

2.2.6 Residual significant impact assessment

After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on relevant migratory species. This assessment should be undertaken in accordance with the relevant departmental policies and guidelines, including the *Significant Impact Guidelines 1.1: Environment Protection and Biodiversity Conservation Act 1999* (2013). Any analysis and methodology for determining significant residual impact should be supported by a science-based methodology, consistent with best available information including departmental policy, be repeatable, transparent and appropriate in the context of the project and the MNES impacted, and be approved by the department.

The PER must provide a clear and definitive conclusion of residual significant impacts on relevant migratory species to align with the *EPBC Act Environmental Offsets Policy* (2012).

Further guidance on environmental offsets is provided in section 4 of these guidelines.

2.3 A water resource in relation to coal seam gas development and large coal mining development

Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development

Under section 131AB of the EPBC Act, the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC), which is a statutory body under the EPBC Act, will provide advice to the Minister on the referral.

The information guidelines for IESC advice on coal seam gas and large coal mining development proposals (IESC guidelines) providing guidance on the IESC's information needs can be found at the following website: http://www.iesc.environment.gov.au/publications/information-guidelines-independent-expert-scientific-committee-advice-coal-seam-gas.

The information provided in the draft PER will be reviewed by the IESC. The draft PER must cross-reference the IESC checklist, found in the IESC guidelines, to ensure that the IESC's information guidance has been considered and addressed.

The final PER must include the IESC advice and the proponent's response to that advice in the PER package that will be published for public comment.

The IESC provides a number of publications and resources, including the *IESC explanatory notes*, which can be used as guidance material in drafting the PER. These publications can be found at the following website: http://iesc.environment.gov.au/publications. Where the approach to assessment of impacts and management of water resources differs from that outlined in the IESC guidance documentation, provide detailed reasoning and justification.

The hydrology relevant to the proposed action area, including surface water and groundwater

Provide a regional overview of the proposed action area, including a description of the geological basin, coal resource, surface water catchments, groundwater systems and water-dependent assets.

Describe any potential third-party users of water in areas potentially affected by the proposed action, including municipal, agricultural, industrial, recreational and environmental uses of water.

The PER must include a description and assessment of the impacts to water resources giving consideration to relevant departmental policies and guidelines, including the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (2013). These guidelines can be found at the following website: http://environment.gov.au/resource/significant-impact-guidelines-13-coal-seam-gas-and-large-coal-mining-developments-impacts.

The PER must provide robust scientific information and supporting evidence for every assertion, assumption and/or conclusion made in the assessment of potential impacts, or lack of impacts, on *water resources* (*Water Act 2007*).

Monitoring, mitigating and managing impacts

The PER must outline methodologies and commitments for ongoing monitoring, identifying, assessing (including incorporation of a risk assessment) and managing impacts to *water resources* for the life of the project. Methodologies should be specific to the particular water resource component.

2.3.1 Groundwater

Identify and describe the occurrence of groundwater in the proposed action area and its vicinity, including the relevant groundwater-bearing units and groundwater levels.

The PER must include an assessment of the direct, indirect and consequential impacts to *water resources* as a result of groundwater drawdown, as well as impacts to groundwater and surface water connectivity.

Groundwater modelling

Utilising the Office of Groundwater Impact Assessment (OGIA) regional model for the Surat Cumulative Management Area (CMA) or a similar model, assess the potential impacts on groundwater resources, and define the extent of the area where *water resources* are likely to be affected, including consideration of significant impacts by the proposed action.

It is important to clearly distinguish between impacts from the proposed action and existing operations. Clearly identify the predicted drawdown due to the proposed action and the total predicted cumulative drawdown values. This must include details on how the estimated contributions to cumulative drawdown have been derived, including their likelihood as derived from the range of estimates in the uncertainty analysis.

The proponent must provide maps and discussion on the number and location of any groundwater monitoring bores (both within and adjacent to the proposed action area), including discussion on appropriate spatial coverage and replication in all relevant geological units. The role these monitoring bores play in monitoring impacts to groundwater system should be discussed, including highlighting areas where additional monitoring bores may be required to monitor the impacts of the proposed action.

The PER must describe how uncertainty in the groundwater model has been considered in the assessment, including where any significant uncertainty exists across the proposed action area. Discussion must be provided regarding the percentile estimates used for the reported predicted contributions to the cumulative drawdown levels.

Provide detailed discussion and justification regarding any proposed development areas excluded from the groundwater model.

2.3.2 Groundwater dependent ecosystems

The PER must include a discussion of potential groundwater dependent ecosystems (GDEs) in the vicinity of the proposed action area. An assessment must be provided of direct, indirect and consequential impacts to GDEs within the proposed action area and within the zone of potential groundwater drawdown.

To determine the presence of GDEs in and adjacent to the proposed action area, the GDE assessment should consider relevant IESC guidance. The desktop and field assessments must consider the *Australian GDE toolbox part 1 and part 2* (2011) and the *IESC GDE explanatory note* (2019).

Provide the details and results of the above assessment, including observations of the vegetation present in the area and descriptions of the soil/geology encountered.

Sufficient evidence needs to be provided to support any conclusion that particular ecosystems are not groundwater dependent, noting that not all GDEs draw on groundwater directly, and not all are solely reliant on groundwater. A GDE does not need to provide habitat for listed threatened species and communities in order to be protected under the water trigger (sections 24D and 24E).

Springs

The PER must include a discussion on the presence and predicted impacts to springs from the proposed action, including, but not limited to, the endangered *community of native species dependent on natural discharge of groundwater from the Great Artesian Basin* (GAB springs). Consideration must be given to how the proposed action will further contribute to any cumulative impacts predicted in the Underground Water Impact Report (UWIR) for the Surat CMA, along with how the proposed action will not be inconsistent with the *Recovery plan for GAB springs* (2010) and/or its objectives.

Discussion must include considerations of alternative development scenarios or actions and their potential to reduce or avoid impacts to GAB springs.

2.3.3 Stygofauna

The PER must provide an assessment of the suitability of local habitat for subterranean aquatic fauna. This assessment must be based on local geological, hydrological and other information, including the distribution of alluvium present in the proposed action area and likely hydrological connectivity with geological formations targeted for development.

Provide details of investigations undertaken (and any relevant previous published and/or unpublished studies) to determine the presence and composition of stygofauna communities in the region and proposed action area. Include the full results of any groundwater bores sampled (e.g. levels and water quality).

Stygofauna assessment guidance is available through the IESC guidelines explanatory note *Assessing groundwater-dependent ecosystems* (2019).

2.3.4 Surface water

A description of the surface water values of the proposed action area and surrounding vicinity must be provided in the PER, including a discussion of the regional water quality and water quality objectives, and the local receiving environment.

Include any water quality monitoring data, including when and where samples have been obtained. The monitoring data must be provided in full in the PER to show the temporal and spatial trends in water quality.

Where impacts (i.e. losses) are predicted to stream flow or baseflow, the PER must provide an assessment of the ranges of potential flow losses, and provide consideration of impacts to downstream and instream *water resources* (including consideration of third party users) as a result of potential losses. Consideration must also be given to potential impacts to watercourse springs due to predicted groundwater drawdown as a result of the proposed action.

2.3.5 Produced water management

The PER must include information regarding produced water generation and proposed management, including management of salts and brine.

Detail should be provided around the likely volume, frequency and quality of water to be extracted, including an estimate of the total amount of water expected to be extracted over the life of the proposed action.

This section must detail the strategy for management of water produced as a by-product of gas production, including the capacity of existing approved management facilities and the need for additional water management facilities and how and where these would be developed.

The PER must include a water budget, including analysis of volumes of water likely to be extracted and associated management of that water, and must include a discussion on reliance on existing approvals, or the need for additional approvals for management and disposal of coproduced water and brine/salts.

2.3.6 Subsidence

Provide a detailed discussion on the predicted subsidence likely to result from the proposed action, including likely impacts to the relevant controlling provisions and changes to water resources (including consideration of agricultural users) and proposed monitoring approach (including subsidence detection capability [i.e. what subsidence can the method accurately detect] of the proposed method) and management programs to mitigate impacts. The PER must also provide an assessment of the current ground levels within the project areas to use as a baseline.

2.3.7 Cumulative impacts

The PER must identify and assess the scale and extent of all the potential and likely cumulative impacts on water resources from the proposed action and other nearby resource projects. Where

cumulative impacts are predicted, avoidance, mitigation and management measures must be proposed.

3 PROPOSED AVOIDANCE, SAFEGUARDS AND MITIGATION MEASURES

The PER must provide information on proposed avoidance, safeguards and mitigation measures to deal with the relevant impacts of the proposed action on MNES, including those required by other Commonwealth, State and local government approvals. Committed language (e.g. 'will') rather than non-committed language (e.g. 'may', 'where possible', 'if required', etc.) must be used.

The proposed measures must consider the 'S.M.A.R.T' principle:

- S – Specific (what and how);
- M – Measurable (baseline information, number/value, auditable);
- A – Achievable (timeframe, money, personnel);
- R – Relevant (conservation advices, recovery plans, threat abatement plans); and
- T – Time-bound (specific timeframe to complete).

Specific and detailed descriptions of proposed measures must be provided and substantiated, based on best available practices, appropriate standards and supported by scientific evidence, and must include the following elements:

- an assessment of the predicted effectiveness and environmental outcomes of the proposed measures, including details of any baseline data or proposed monitoring required to demonstrate progress towards achieving these outcomes;
- any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advices, and a discussion on whether the proposed measures are consistent with relevant recovery plans and threat abatement plans;
- details of ongoing management, including monitoring programs to support an adaptive management approach and determine the effectiveness of the proposed measures;
- information on the timing, frequency and duration of the measures to be implemented; and
- where relevant, the name of the agency responsible for endorsing or approving each measure or monitoring program.

Provide discussion, where applicable, as to how the requirements of any state approvals or processes may mitigate potential impacts to MNES, noting (and attaching where relevant) any management or monitoring plans (e.g. Receiving Environment Monitoring Program, Water Management Plan, Groundwater Management and Monitoring Plan).

Any proposed management plans must set out the framework for management, mitigation and monitoring of relevant impacts of the proposed action.

Constraints planning protocol

The PER must include a detailed *Environmental constraints planning and field development protocol* (constraints protocol) that outlines the process for ensuring the proposed action adequately:

- considers MNES when siting gas field infrastructure; and
- avoids, minimises, mitigates, rehabilitates and/or offsets impacts to MNES.

The constraints protocol must provide constraints categories for MNES with consideration of their values (e.g. listing status), including proposed constraints, permitted activities and management measures under each category. Detailed discussion must be provided that links field survey, remote sensing data and habitat validation processes with avoidance, mitigation, reporting and offsetting requirements.

4 ENVIRONMENTAL OFFSETS

The PER must include an assessment of the likelihood of residual significant impacts occurring on MNES after avoidance, mitigation and management measures relating to the proposed action have been applied. If it is determined that a residual significant impact is likely, then environmental offsets will be required to be provided.

If it is considered that a residual significant impact is likely, the PER must include a draft Offset Management Plan (OMP) consistent with the department's *EPBC Act Environmental Offsets Policy* (2012). The draft OMP should establish a program of offset delivery that will meet regulatory needs. Accordingly, the OMP should propose how residual significant impacts will be measured, how offset areas will be calculated and how offsets will be managed and secured. At a minimum, the OMP must propose transparent procedures to:

- determine any residual significant impacts over the life of the project;
- calculate the spatial area of corresponding offsets to compensate for any residual significant impacts;
- manage and monitor offset areas;
- progressively secure the offset areas; and
- acquit and report on the ongoing delivery of offsets, including offset completion criteria derived from the site habitat quality to demonstrate the improvement in the quality of habitat in the environmental offset/s over an appropriate period.

The procedure for calculating spatial areas of offsets must be consistent with the requirements set out in the *EPBC Act Environmental Offsets Policy* (2012) and in the *Offsets assessment guide* (2012). Specifically:

- provide details of how the environmental offset/s meets the requirements of the department's *EPBC Act Environmental Offsets Policy* (2012);
- provide details on the methodologies that will be used to inform the necessary inputs of the *Offsets assessment guide* (2012) for each significantly impacted MNES, including:
    - total area of residual significantly impacted habitat (in hectares)
    - habitat quality of impacted area (e.g. using the *Queensland Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* (2020))
    - proposed area of offset
    - habitat quality of offset area (e.g. using the *Queensland Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* (2020))
    - time over which loss is averted (max. 20 years)
    - time until ecological benefit
    - risk of loss (%) without offset
    - risk of loss (%) with offset
    - start quality, anticipated future quality without offset and future quality with offset
    - confidence in result (%).

The OMP must also outline management, monitoring and reporting mechanisms that will, over the life of the project, provide:

- a description and map of any environmental offset areas, including location, size, condition, environmental values present and surrounding land uses;
- details of how each site meets the habitat criteria for MNES, including for species, presence (or otherwise) on the offset area (noting that for a species found at the impact site, it will be expected that the species will be confirmed as present at the offset site);
- information about how the proposed offset/s area provides connectivity with other relevant habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant MNES;
- details of the management actions and timeframes for implementation, to be carried out to meet outcomes and the offset completion criteria;
- details of the nature, timing and frequency of monitoring to inform progress against achieving 5-yearly milestones (the frequency of monitoring must be sufficient to track progress towards milestones and sufficient to determine whether the environmental offset/s are likely to achieve those milestones in adequate time to implement all necessary corrective actions);

- timing for the implementation of corrective actions if monitoring activities indicate the milestones have not been achieved; and
- details of the mechanism to retain the site for immediate active management prior to legal securement and details of the legal mechanism for legally securing the environmental offset/s, such that legal security remains in force over the environmental offset/s for at least the life of the approval to provide enduring protection for the environmental offset/s against development incompatible with conservation.

The department expects reporting on progress of offset site/s in relation to agreed performance targets, outcomes and completion criteria, through the life of the approval (3–5 year intervals may be appropriate). Please note, this means monitoring and management until completion criteria are met, then ongoing monitoring to ensure the offset site remains at that completion criteria, and if it doesn't then there will be a requirement to reintroduce management measures to achieve and maintain the required HQS and agreed environmental outcomes.

The department will require the OMP be approved and implemented prior to the commencement of the action to align with the *EPBC Act Environmental Offsets Policy* (2012). Legal security of the offset area is generally required within 12 months of the date of approval of the OMP.

The draft OMP must be prepared by a suitably qualified person and in accordance with the department's *Environmental Management Plan Guidelines* (2014).

Supporting evidence must be included in the draft OMP to justify how proposed management action/s are additional to the existing requirements of the landholder in managing their land (e.g. weed and pest management requirements under the *Biosecurity Act 2014* (Qld), existing grazing regimes, etc.) as required by the *EPBC Act Environmental Offsets Policy* (2012).

Where the proposed offset area/s supports an environmental offset for multiple MNES, proposed management action/s for one protected matter must not be detrimental (i.e. have an impact) to other protected matters.

Where an offset is proposed, with a completed *Offsets assessment guide* (2012) calculation, all inputs must be supported by robust scientific evidence and/or supporting evidence (e.g. historical grazing regimes, satellite imagery, statements from landholders, etc.).

Please note, it is the department's expectation that the agreed inputs into the *Offsets assessment guide* (2012) are specified in the conditions of approval where the action is approved, subject to conditions, under the EPBC Act.

5 OTHER APPROVALS AND CONDITIONS

The PER must include information on any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action. This must include:

- details of any local or State Government planning scheme, or plan or policy under any local or State Government planning system that deals with the proposed action, including:
    - what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy; and
    - how the scheme provides for the prevention, minimisation and management of any relevant impacts.
- a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply to the action;
- a statement identifying any additional approval that is required; and
- a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

6 ECONOMIC AND SOCIAL MATTERS

The economic and social impacts of the proposed action, both positive and negative, must be analysed and provided in the PER. Matters of interest may include:

- details of any public consultation activities undertaken, or that will be undertaken, and their outcomes (including identification of affected parties and their views);
- overview of the economic costs and benefits of the project; and
- employment opportunities expected to be generated by the project (including construction and operational phases).

Details of the relevant cost and benefits of alternative options to the proposed action, as identified in section 2.1 above, should also be included.

Indigenous engagement

Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the proposed action and the potential for managing those impacts.

Describe any Indigenous consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes.

The department considers that best practice consultation, in accordance with the *Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act* (2016) includes:

- identifying and acknowledging all relevant affected Indigenous peoples and communities;
- committing to early engagement;

- building trust through early and ongoing communication for the duration of the project, including approvals, implementation and future management;
- setting appropriate timeframes for consultation; and
- demonstrating cultural awareness.

Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action with regards to Indigenous peoples and communities.

7 ENVIRONMENTAL RECORD OF PERSON(S) PROPOSING TO TAKE THE ACTION

The PER must include the environmental record of the proponent. This must include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

- the person proposing to take the action; and
- for an action for which a person has applied for a permit, the person making the application.

If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.

8 INFORMATION SOURCES PROVIDED IN THE PER

For information given in the PER, the PER must state:

- the source of the information;
- how recent the information is;
- how the reliability of the information was tested; and
- what uncertainties (if any) are in the information.

9 CONCLUSION

An overall conclusion as to the environmental acceptability of the proposed action should be provided, including discussion on compliance with principles of ESD and the objects and requirements of the EPBC Act. Reasons justifying undertaking the proposed action in the manner proposed should also be outlined.

Measures proposed or required by way of offset for any unavoided impacts on MNES, and the relative degree of compensation, should be restated here.

ATTACHMENT 1

HABITAT DESCRIPTIONS AND MODELLING RULES

The following rules must be applied in predictive habitat modelling for listed threatened species and communities (see section 2.1.2), unless otherwise stated by the department.

Where mosaic polygons have been excluded from the model on the basis of only containing ≤33% habitat, discussion and evidence must be provided on the implications and quantum estimates around potential habitat that may have been excluded in the assessment as a result. The excluded polygons must also be included in the PER for discussion, along with a process for considering potential impacts to excluded habitats in these polygons during project implementation.

1 Threatened Ecological Communities

1.1 Brigalow TEC

Habitat feature	Model component (inclusions and exclusions)
Dominance or co-dominance of Brigalow	Inclusion of the following REs: 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14 and 11.12.21.
Brigalow listed RE (in the QLD Brigalow Belt Bioregion) and/or	
Brigalow regrowth ≥ 15 years old with species composition and structural elements broadly typical of one of the identified QLD REs	
The percentage of exotic perennial plants comprises less than 50% of the total vegetation cover of the patch	
The minimum patch size is 0.5 ha	Patches of the REs accounted for in the model were only included if they were ≥ 0.5 ha.

1.2 Coolibah – Black Box Woodlands TEC

Habitat feature	Model component (inclusions and exclusions)
Distribution is limited to the Darling Riverine Plains and the Brigalow Belt South bioregions	Project area lies within the Brigalow Belt South Bioregion.
Typically occurs on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees	Inclusion of the following REs: 11.3.3, 11.3.15, 11.3.16, 11.3.27, 11.3.28 and 11.3.37.
A tree canopy layer is present that shows these features: • *Eucalyptus coolabah* subsp. *coolabah* (Coolibah) must be present in the tree canopy • Coolibah typically is dominant (≥50% of tree crown cover) • where Coolibah and *E. largiflorens* (Black Box) co-occur, together they make up the dominant species in the tree canopy layer (≥50% of tree crown cover) • hybrids of Coolibah or Black Box with each	

Habitat feature	Model component (inclusions and exclusions)
other and other *Eucalyptus* species (typically Bimble Box) are included as dominant tree species.	
The mid or shrub layer may or may not be present. When present it is typically sparse or clumped and is of variable composition.	
The ground layer is of variable composition and cover ranging from sparse to dense. Ground cover lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall.	
The TEC is limited to patches and the following condition thresholds: • the minimum patch size is 5 ha • the crown cover of trees in the patch must be greater than 8% • Coolibah and/or Black Box in the tree canopy must be present in the patch that are either: o mature trees with a main stem that has a dbh of ≥30 cm o hollow-bearing trees (live or dead) o coppiced trees with a main stem that has a dbh of ≥20 cm. • 10% or more of the ground cover comprises native graminoids, other herbs, chenopods and/or native low shrubs (i.e. woody plants typically less than 50 cm tall) • in the ground layer, the percentage cover of non-native perennial plant species does not exceed the percentage cover of native plant species (annual or perennial).	Inclusion of the following REs: 11.3.3, 11.3.15, 11.3.16, 11.3.27, 11.3.28 and 11.3.37. Patches of the REs accounted for in the model were only included if they were ≥ 5 ha.

1.3 Natural Grassland TEC

Habitat feature	Model component (inclusions and exclusions)
Native tussock grasslands, primarily comprised of perennial native grasses with a commonly absent to < 10% tree canopy	Inclusion of the following REs: 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12 and 11.11.17.
Found on flat or gently undulating rises of fine- textured soils, often cracked clay, remnant of basalt or fine-grained sedimentary rocks that have been transported via historical watercourses to become extensive alluvial plains	
Minimum patch size is 1 ha	Patches of the REs accounted for in the model were only included if they were ≥ 1 ha.
At least four native perennial grass species present in patch	
Total projected canopy is less than 30%	
Perennial non-woody introduced species are less than	

Habitat feature	Model component (inclusions and exclusions)
5% of the total projected perennial plant cover	

1.4 Poplar Box Grassy Woodland TEC

Habitat feature	Model component (inclusions and exclusions)
Located to the west of the Great Dividing Range, extending from south of Charters Towers in Qld, south to north of Leeton in NSW and west to Ipswich and Armidale and east to Longreach and Hillstown in Qld and NSW respectively	Project area lies within this region.
The ecological community exists on flat to undulating landscapes, occasionally along watercourses across a wide range of alluvial and depositional origin soil types such a as clay or clay- loam. The ecological community is widely absent from sandy-loam or siliceous soils.	Inclusion of the following REs: 11.3.2, 11.3.17, 11.4.7 and 11.4.12.
Class A1 patch meets all the following key diagnostic characteristics and conditions thresholds: • little to no perennial weeds and diverse native understorey high quality patch: • the crown cover of canopy trees in the patch is ≥10% and ≥90% perennial vegetation cover in the ground layer is native and ≥30 native plant species per patch in the ground layer • the minimum patch size is 1 ha.	Patches of the REs accounted for in the model were only included if they were ≥ 1 ha.

1.5 Semi-evergreen Vine Thicket TEC

Habitat feature	Model component (inclusions and exclusions)
Semi-evergreen Vine Thickets TEC occurs in all sized patches that meet the following key diagnostic characteristics: • semi-evergreen vine thicket and semi- deciduous notophyll rainforest on Cainozoic alluvial plains • semi-evergreen vine thicket +/- *Casuarina cristata* on Cainozoic clay plains including extensively weathered Tertiary basalt • semi-evergreen vine thicket on remnant Tertiary surfaces and sometimes eroded scarp slopes. Deep red and yellow earths • semi-evergreen vine thicket and microphyll/notophyll rainforest on Cainozoic igneous rocks. Lowlands • semi-evergreen vine thicket on Cainozoic to Proterozoic consolidated, fine-grained sediments. Emergents may be present including *Acacia harpophylla*, *Eucalyptus populnea*, *Casuarina cristata*, *Cadellia pentastylis* and *Brachychiton* spp. • semi-evergreen vine thicket on Mesozoic to	Inclusion of the following REs: 11.2.3, 11.3.11, 11.4.1, 11.5.15, 11.7.1x1, 11.8.3, 11.8.6, 11.8.13, 11.9.4, 11.9.8 and 11.11.18 Exclusions for Semi-evergreen Vine Thickets TEC include areas outside of the North and South Brigalow Belt Bioregions with the boundary set as that mapped on Qld Globe.

Habitat feature	Model component (inclusions and exclusions)
Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics • low microphyll rainforest on Quaternary coastal dunes and beaches • semi-evergreen vine thicket which may have emergent *Acacia harpophylla*, *Casuarina cristata*, *Eucalyptus* spp. on Cainozoic igneous rocks (steep hillsides) • *Macropteranthes leichhardtii* thicket on Cainozoic igneous rocks (steep hills) • *Macropteranthes leichhardtii* thicket on Cainozoic to Proterozoic consolidated, fine-grained sediments (lowlands) • semi-evergreen vine thicket in the Brigalow Belt South and Nandewar Bioregions.	

1.6 Weeping Myall TEC

Habitat feature	Model component (inclusions and exclusions)
Occurs across the Great Diving Range in NSW to QLD. In QLD, the community is restricted to small patches within ecosystems of woodlands on alluvial plains.	Inclusion of the following REs: 11.3.2 and 11.3.28. Areas outside of the South Brigalow Belt bioregion have been excluded from the model.
The TEC is limited to patches that meet all the following diagnostic characteristics and condition classes: • The tree canopy is dominated (at least 50% of trees present) by living, dead of defoliated Weeping Myall trees • The overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha • The area is at least 0.5 ha in size • The patch has either: o More than two layer of regeneration of Weeping Myall present o The tallest layer of living, dead or defoliated Weeping Myall tress is at least 4 m tall and of the vegetative cover present, 50% is comprised of native species.	Patches of the REs accounted for in the model were only included if they were ≥ 0.5 ha.

1.7 White Box-Yellow Box TEC

Habitat feature	Model component (inclusions and exclusions)
Community requires rainfall between 400-1,200 mm per year, with moderate to highly fertile soils of altitude between 170-1,200 m.	The Project area is within this rain belt and altitude.
The ecological community is comprised of a species-	Inclusion of the following REs: 11.3.23, 11.8.2a,

Habitat feature	Model component (inclusions and exclusions)
rich native understory of tussock grasses, herbs, scattered shrubs and varying components of the eucalypt trees White Box, Yellow Box or Blakely's Red.	11.88 and 11.9.9a.
In order to be listed as an ecological community, White Box- Yellow Box- Blakely's Red Gum TEC patches must have: • an understorey patch, in the absence of overstorey trees, must have a high level of native floral species diversity, but only needs to be 0.1 ha or greater in size • a patch in which the perennial vegetation of the ground layer is dominated by native species, and which contains at least 12 native, non-grass understorey species (such as forbs, shrubs, ferns, grasses and sedges) is considered to have a sufficiently high level of native diversity to be the listed ecological community • at least one of the understorey species should be an important species (e.g. grazing-sensitive, regionally significant or uncommon species; such as Kangaroo Grass or orchids) in order to indicate a reasonable condition • the minimum patch size is 0.1 ha for areas derived from grassland type, or 2 ha for areas derived from woodland type.	Inclusion of the following REs: 11.3.23, 11.8.2a, 11.88 and 11.9.9a. Exclusions for White Box, Yellow Box, Blakely's Red Gum TEC include: • minimum patch size threshold > 0.1 ha for areas derived from grassland type • minimum patch size threshold > 2 ha for areas derived from woodland type • areas outside of the South Brigalow Belt Bioregion.

2 Flora Species

2.1 Austral Toadflax (*Thesium ausrale*)

Habitat feature	Model component (inclusions and exclusions)
Occurs in QLD from the Bunya Mountains south, with an outlier in the Carnarvon Gorge.	Species habitat has been modelled in all tenements excluding Mahalo (T1, T2, T3).
Is semi-parasitic on a range of native grass species, notably Kangaroo Grass (*Themeda triandra*).	Inclusion of the following REs: 11.3.2, 11.3.3a, 11.3.4, 11.3.6, 11.3.17, 11.3.18, 11.3.21, 11.3.25, 11.4.2, 11.4.4, 11.4.7, 11.5.3, 11.8.4, 11.8.5, 11.8.8, 11.9.7, 11.9.7a, 11.9.10 and 11.9.13.
Occurs over a range soil types including black clay loams, yellow podzolics and peaty loams and is found in shrubland, grassland or woodland, often on damp sites.	
Is associated with a range of vegetation types include open grassy heath dominated by Swamp Myrtle (*Leptospermum myrtifolium*), Small-fruit Hakea (*Hakea microcarpa*), Alpine Bottlebrush (*Callistemon sieberi*), Woolly Grevillea (*Grevillea lanigera*), Coral Heath (*Epacris microphylla*), Poa spp., Kangaroo Grass grassland surrounded by Eucalyptus woodland; and grassland dominated by Barbed-wire Grass (*Cymbopogon refractus*).	

Habitat feature	Model component (inclusions and exclusions)
Grows in grassland or woodland often in damp sites. Examples of associated vegetation includes: open woodland with *Eucalyptus tereticornis* and *E. tindaliae* on skeletal soils; on heavy alluvium soil in grassy *E. populnea* woodland; on black cracking clay in grassland of *Dichanthium sericeum*; and grassland dominated by *Themeda triandra* and *Heteropogon controtus* on basaltic rocky soils.	
REs that are included as Austral Toadflax habitat in desktop resources and literature (Queensland Herbarium 2019, Golder 2019b): 11.3.21, 11.8.2, 11.8.5 and 11.8.8.	Inclusions of the following REs: 11.3.21, 11.8.2, 11.8.5 and 11.8.8.

2.2 Belson's Panic (*Homopholis belsonii*)

Habitat feature	Model component (inclusions and exclusions)
Shade-dependent perennial grass that inhabits forests and woodlands of parts of the Brigalow Belt South Bioregion in NSW and QLD.	All development areas other than Peat and Ironbark have been excluded from the model. Peat and Ironbark are the only development areas that are within of closely adjacent to the extent of the public distribution grid for Belson's Panic.
Occurs at elevations between 342 and 500 m above sea level in QLD.	All polygons that are entirely outside the elevation range 342 – 500 m asl have been excluded.
Vegetation associated include: • Rocky basalt hills that support White Box (*Euycalyptus albens*) / Wilga (*Geijera parviflora*) woodlands • Flat to gently undulating alluvial areas supporting Belah (*Casuarina cristata*) and sometimes Brigalow (*Acacia harpohylla*) and Wiga • Along drainage lines that support Belah in sandy country dominated by Cypress Pine-Bloodwood-Ironbark-Sheoak forest • In Poplar Box (*Eucalyptus populnea*) woodlands on clay-loam soils • In shadier areas of various Acacia woodlands (*A. harpophylla, A melvillei, A. pendula*) • In regenerating roadside vegetation • Mountain Coolibah (*Eucalyptus orgadophila*) woodlands.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.17, 11.3.18, 11.3.19, 11.4.3, 11.4.7, 11.4.9, 11.4.9a, 11.4.10, 11.4.12, 11.5.1, 11.9.2, 11.9.5, 11.9.6, 11.9.7, 11.9.7a, 11.9.10.
REs that are included as Belson's Panic habitat in desktop resources and literature (Queensland Herbarium 2019, Golder 2018, Boobook 2017a, Loren Appleby pers. comm. 2020): 11.3.2, 11.3.17, 11.4.3, 11.8.2, 11.8.15, 11.9.5, 11.9.6, 11.9.7 and 11.9.10.	Inclusion of the following REs: 11.3.2, 11.3.17, 11.4.3, 11.8.2, 11.8.15, 11.9.5, 11.9.6, 11.9.7 and 11.9.10.

2.3 *Bertya opponens*

Habitat feature	Model component (inclusions and exclusions)
Recorded growing in a variety of community types including mixed shrubland, lancewood woodland, mallee woodland, eucalypt/acacia open forest with shrubby understorey, eucalypt/callitris open woodland and semi-evergreen vine-thicket.	Inclusion of the following REs: 11.7.2, 11.9.4, 11.9.4a, 11.9.5a, 11.10.1, 11.10.3, 11.10.7.
Within QLD this species is generally found within shallow sandy loams or red earths which are associated with sandstone, and sometimes with rhyolite, shale and metasediments.	
Associated species include: • woodland with *Eucalyptus citriodora* and *Alyxia spicata* • *Corymbia leichhardtii* woodland with some *Acacia harpophylla* on sandstone • sheltered sandstone gully with *Acacia shirleyi*, *Corymbia citriodora*, *Corymbia trachyphloia*, *Gahnia aspera* • woodland of *Eucalyptus cloeziana* with *Eucalyptus suffulgens* and *Callitris endlicheri* • *Eucalyptus crebra*/*Corymbia trachyphloia* tall woodland • open woodland of *Eucalyptus exserta*, *Eucalyptus panda*, *Corymbia trachyphloia* on lateritic sandstone.	

2.4 Bluegrass (*Dichanthium setosum*)

Habitat feature	Model component (inclusions and exclusions)
The species is associated with the Natural Grasslands of the Qld Central Highlands and the northern Fitzroy basin TEC.	Inclusion of the following REs: 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12, 11.11.17 Patches of the REs accounted for in the model were only included if they were ≥ 1 ha.
Associated with basaltic soils and hard setting loam with clay subsoils.	

2.5 Curly-bark wattle (*Acacia curraniii*)

Habitat feature	Model component (inclusions and exclusions)
Within QLD the species grows in the Gurulmundi area north of Miles and occurs: • On rocky outcrops of isolated hills and ranges on deeply weathered sandstone forming red-sandy soils. • In patches of healthy scrub with emergent trees.	All development areas other than the Peat tenement have been excluded from the model. The Peat tenement is the only development area that is within of closely adjacent to the extent of the public distribution grid for Curly-bark wattle.
REs and landforms that are included as Curly-bark wattle habitat in desktop resources and literature (Queensland Herbarium 2019, Golder 2019b, Boobook 2017a): 11.3.18, 11.7.5, 11.10.4 and	Inclusion of the followings REs: 11.3.18, 11.7.2, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.10.1, 11.10.4.

lateritic plateaux in Land Zone 7.	

2.6 King Bluegrass (*Dichanthium queenslandicum*)

Habitat feature	Model component (inclusions and exclusions)
The species occurs in three disjunct populations at Hughenden, from Nebo to Monto and west to Clermont and Rolleston and in the Dalby district in Darling Downs (TSSC, 2013) and occurs in tussock grasslands of central and southern Queensland, often among other bluegrass species.	Inclusion of the following REs: 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12, 11.11.17.
Grows on heavy black basaltic soils and hard setting loam with clay subsoils.	Exclusions: • Any polygon < 1 ha • Any polygon outside of the North and South Brigalow Belt Bioregions with the boundary set as that as mapped as QLD Globe.

2.7 Ooline (*Cadellia pentastylis*)

Habitat feature	Model component (inclusions and exclusions)
Species grow in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone	Inclusion of the following REs: 11.3.39, 11.4.9, 11.5.15, 11.8.3, 11.8.9, 11.8.13, 11.9.1, 11.9.4, 11.9.4a, 11.9.5, 11.9.5a and 11.10.1. Any polygon not containing survey records that is entirely outside the extent of the public distribution grid for Ooline established by the Australian Government has been excluded.
Soils generally have low to medium nutrient content and are normally associated with upper and midslopes of the landscape	
The altitude is generally 300-460 m above sea level, with some instances of the species known to occur at 600 m above sea level.	Any polygon that is entirely < 300 m in elevation has been excluded.
The species forms a closed or open canopy, as a dominant or commonly with White Box (*Eucalyptus albens*) and White Cypress Pine (*Callitris glaucophylla*)	Inclusion of the following REs: 11.3.39 and 11.8.9,
Occurs in the 500 to 750 mm per annum rainfall belt	The entire Project area lies entirely within this rainfall belt.
REs that are included as Ooline habitat in desktop resources and literature (Queensland Herbarium 2019, Golder 2019b): 11.4.9, 11.5.15, 11.7.1, 11.9.1, 11.9.4a, 11.9.5, 11.9.5a, 11.9.11 and 11.11.14.	Inclusion of the following REs: 11.4.9, 11.5.15, 11.7.1, 11.9.1, 11.9.4a, 11.9.5, 11.9.5a, 11.9.11 and 11.11.14. Any polygon not containing survey records that is entirely outside the extent of the public distribution grid for Ooline established by the Australian Government has been excluded.
Ooline does not associate with White Box (*Eucalyptus albens*) in Qld, and when it has been recorded in REs within Land Zone 10, it is likely to be on lower slopes with finer textured soils adjacent to Land Zone 9 (Alan House pers. comm. 2020).	The following have been excluded from the model: • Any RE 11.10.1. polygon that does not contain a survey record • Any part of a record positive RE 11.10.1 polygon, that is at least 500 m from land zone 9, where the record(s) is within 500 m of land zone 9.

2.8 Salt pipewort (*Eriocaulon carsonii*)

Habitat feature	Model component (inclusions and exclusions)
Associated with 12 spring complexes in Qld, is a 'mound spring endemic' and has been well surveyed and is not likely to be found in any other locations in the future.	Suitable habitat is 100 m around any mapped artesian spring or species record. Any area not within 100 m if a mapped spring and/or species record has been excluded from the model.
REs that are included as Salt Pipewort habitat in desktop resources and literature (Queensland Herbarium 2019, Aurecon 2014): 11.3.2, 11.3.4, 11.3.25, 11.5.5, 11.9.5a and 11.9.7.	Individual REs have not been included within the model.

2.9 Shiny-leaved ironbark (*Eucalyptus virens*)

Habitat feature	Model component (inclusions and exclusions)
The species occurs at five known sites in south- east QLD and occupies plateaus, sandstone escarpments or sandy soils on low rises.	Project lies within this region.
It grows in woodland communities that contain *Angophora leiocarpa*, *Corymbia trachyphloia*, *Eucalyptus exserta*, *Allocasuarina inophloia* and *Lysicarpus angustifolius*.	Inclusion of the following REs: 11.5.4, 11.7.4, 11.7.5, 11.7.7, 11.10.4 and 11.10.6. Any polygon not containing survey records that is entirely outside the extent of the public distribution grid for Shiny-leaved Ironbark has been excluded.
REs and habitat features that area included as Shiny-leaved ironbark habitat in desktop resources and literature (Queensland Herbarium 2019, Alan House *pers. comms.* 2020, Brooker and Bean 1986): 11.7.5, 11.7.7, 11.10.4 • Species has been observed recovering via active regrowth following land clearing.	

2.10 Tara Wattle (*Acacia lauta*)

Habitat feature	Model component (inclusions and exclusions)
All confirmed records are from three small areas: Spinifex Corner, 15 km north of Tara; 16 km east of Tara; and Marron Glen, 15 km south-east of Inglewood (DSEWPC, 2008).	Any polygon not containing survey records that is entirely outside the extent of the public distribution grid for Tara Wattle has been excluded from the model.
The species occupies flat to gently undulating landforms with soils that are deep and hard setting, with a sandy loam surface grading into sandy clay subsoil.	Inclusion of the following REs: 11.3.18, 11.3.19, 11.5.1, 11.5.1a, 11.5.4, 11.7.7, 11.10.3, 11.10.4, 11.10.6 and 11.10.9.
Tree species present include White Cypress Pine (*Callitris glaucophylla*) and Bull-oak (*Allocasuarina leuhmannii*).	
REs and habitat features that area included as Tara Wattle habitat in desktop resources and literature (Queensland Herbarium 2019, Golder 2019b): 11.3.18, 11.7.7, 11.10.3 and 11.10.4	

2.11 *Aristida annua*

Habitat feature	Model component (inclusions and exclusions)
The species is restricted to central QLD, in the Emerald and Springsure districts and commonly associated with the Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy basin TEC (DAWE, 2020).	Inclusion of the following REs: 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12, 11.11.17. The following has been excluded from the model: • Minimum patch size threshold > 1 ha • Areas outside of the North and South Brigalow Belt Bioregions within the boundary set as that mapped on Qld Globe.
Occurs in eucalypt woodland on black clay or basalt soils, commonly associated with previous disturbance (DAWE, 2020).	

2.12 *Marsdenia brevifolia*

Habitat feature	Model component (inclusions and exclusions)
Known from the north and central Qld, growing in eucalypt woodland in the Springsure region.	Any polygon not containing survey records that is entirely outside the extent of the public distribution grid for *Marsdenia brevifolia* has been excluded from the model.
Found in woodland dominated by *Corymbia erythrophloia* and *Eucalyptus crebra,* with a dense understorey of *Themeda triandra* occurring on basalt.	Inclusion of the following REs: 11.3.1, 11.3.3, 11.3.6, 11.3.11, 11.4.8, 11.4.9, 11.8.4, 11.8.5, 11.8.11, 11.9.4a, 11.9.5a
REs and habitat features that area included as *Marsdenia brevifolia* habitat in desktop resources and literature (Queensland Herbarium 2019, Golder 2019a): 11.3.1, 11.3.1b, 11.3.3, 11.3.11, 11.4.8, 11.4.9, 11.4.9a, 11.8.4, 11.8.11, 11.9.4a, 11.9.5a, 11.11.3, 11.11.4, 11.11.7 and 11.12.16.	Habitat has been modelled based on the above vegetation communities that either: • Are identified in desktop resources/literature • Is co-dominated by *Corymbia erythrophloia* with an understorey co- dominated by *Themeda triandra* • Contains a species record

3 Fauna Species

3.1 Australian Painted Snipe (*Rostratula australis*)

Habitat feature	Model component (inclusions and exclusions)
Occurs within shallow freshwater wetland habitats, including ephemeral and permanent (i.e. lakes, swamps, claypans, inundated or waterlogged grassland/saltmarsh, dams, rice crops etc).	Inclusion of the following REs: 11.3.1, 11.3.2b, 11.3.3a, 11.3.3c, 11.3.10a, 11.3.25c, 11.3.25d, 11.3.27, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16. Vegetation previously containing brigalow that may still have gilgai formations was also included.
Generally, their habitats will have dense grasses, rushes and reeds, low scrub, *Muehlenbeckia* spp., open timber or samphire.	
Breeding habitat requirements include: • Continuous reed beds • Strands of reed-like vegetation • Rice fields Areas with no surrounding low cover are avoided.	

3.2 Brigalow Woodland Snail (*Adclarkia cameronii*)

Habitat feature	Model component (inclusions and exclusions)
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.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.4.3, 11.4.9, 11.4.10 and 11.9.5.
The species uses vegetation of alluvial black soils.	
Occurs in the 'Brigalow (*Acacia harpophylla* dominant and co-dominant)' TEC and may also occur in the 'Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt Bioregions' TEC	
Known to occur under logs and leaf litter and areas of relatively high canopy density and relatively high moisture. Accumulated ground debris provides important shelter for the species.	Habitat has been modelled based on suitable vegetation communities that coarse woody debris length of > 500 m/ha, litter cover of >50% and has a tree cover of >25% and a shrub cover of >25%. The inclusion of these parameters accounts for key microhabitat features.
The narrow Condamine River riparian corridor is an important refuge for the species, particularly in an area that has been largely cleared for cattle grazing and agriculture. The it has very limited mobility - under favourable conditions it can move between suitable areas of microhabitat, but the extent to which this occurs will be limited by the spatial arrangement of habitat patches.	The following has been excluded from the model: • a mosaic polygon in which habitat comprises ≤ 33% of the polygon • any small remnant patch < 4 ha that has at least 50% agricultural land within a 500 m buffer, or any suitable or preferred RE that is < 4 ha, within a patch < 10 ha that has at least 50% agricultural land within a 500 m buffer • any RE that occurs entirely outside the public distribution grid for Brigalow Woodland Snail established by the Australian Government.
REs that are included as brigalow woodland snail habitat in desktop resources and literature (Boobook 2017b, Loren Appleby pers. comm. 2020): 11.4.3, 11.4.9 and REs on Land Zone 3.	Inclusions of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.4.3, 11.4.9, 11.4.10 and 11.9.5.

3.3 Black-throated Finch (*Poephila cincta cincta*)

Habitat feature	Model component (inclusions and exclusions)
Occupies woodland savannah and riverine vegetation. Inland the species prefers grassland woodland dominated by eucalypts, paperbarks or acacias where there is access to seedling grasses and water.	Inclusions of the following REs: 11.3.3a, 11.3.4, 11.3.6, 11.3.18, 11.3.25, 11.3.27, 11.3.27a, 11.3.27b, 11.5.1, 11.5.1a, 11.5.3, 11.5.5, 11.5.5c, 11.7.6, 11.7.7, 11.8.4, 11.8.5, 11.9.2, 11.9.7, 11.10.1d, 11.10.7a and 11.10.9.
REs that are included as black-throated finch habitat in desktop resources and literature (Black- throated Finch Recovery Team 2007, Vanderduys *et al.* 2016, Rechetelo *et al.*): 11.3.4, 11.3.12, 11.3.25b, 11.3.27, 11.3.30, 11.3.31, 11.3.35, 11.3.35a, 11.11.9, 11.11.15, 11.11.19, 11.12.1 and 11.12.9.	Inclusion of the following REs: 11.3.4, 11.3.12, 11.3.27.
Requires a mosaic of different habitats in which it can	The model excludes:

Habitat feature	Model component (inclusions and exclusions)
find seed during the wet season, having been recorded in freshwater wetlands, cultivation surrounded by woodland, and in a heavily grazed paddock (Golder, 2019b). It is likely that permanent sources of water (and the habitat surrounding these) provide refuge for during the dry season, especially during drought years.	• All areas > 3 km of permanent water, a wetland or a watercourse (≥3rd order stream; and • All areas > 1 km of a water course or stream order 1 or 2.
Some of the more common species of eucalypts in woodlands and forests frequented by the subspecies include Narrow-leaved Ironbark (*Eucalyptus crebra*), River Red Gum (*E. camaldulensis*), Silver-leaved Ironbark (*E. melanophloia*), Reid River Box (*E. brownii*), Yellowjacket (*E. similis*) and Forest Red Gum (*E.* tereticornis). The subspecies occasionally occurs in Melaleuca woodlands.	Inclusions of the following REs: 11.3.3a, 11.3.4, 11.3.6, 11.3.18, 11.3.25, 11.3.27, 11.3.27a, 11.3.27b, 11.5.1, 11.5.1a, 11.5.3, 11.5.5, 11.5.5c, 11.7.6, 11.7.7, 11.8.4, 11.8.5, 11.9.2, 11.9.7, 11.10.1d, 11.10.7a and 11.10.9.
The species not be modelled in the Project area on account of (Loren Appleby pers. comm. 2020): • the extent of occurrence of the species having contracted by approximately 80% over the last 30 years, including a contraction north-wards (no longer in NSW or southern QLD - the closest known records where the species still persists is approximately 300 km north of the Project area near Belyando) • the species having two major strongholds - parts of the Townsville Plain in the northern Brigalow Belt bioregion and along the eastern edge of the Desert Uplands bioregion - areas that are well outside the Project area.	A model is provided for this Project as the species was almost certain to have occupied forest, woodland and grassland ecosystems within the Project area in the past and given large areas of contiguous habitat remain across the area, the species could potentially persist or may have the potential to recolonise in favourable seasons. All development areas other than the northern Mahalo tenement have been excluded from the model. The Mahalo tenement is located immediately south of the mapped distribution of the species.

3.4 Collared Delma (*Delma torquatus*)

Habitat feature	Model component (inclusions and exclusions)
Eucalypt dominated woodland and open forest with suitable micro-habitats (exposed rocky outcrops). The ground cover is predominantly native grasses, such as Kangaroo Grass (*Themeda triandra*), Barbed-wire Grass (*Cymbopogon refractus*), Wiregrass (*Aristida* sp.) and Lomandra (*Lomandra* sp.)	Inclusion of the following REs: 11.3.2, 11.7.2, 11.7.4, 11.7.6, 11.7.7, 11.9.2, 11.9.5, 11.97, 11.9.7a, 11.9.10, 11.9.13, 11.10.1, 11.10.1d, 11.10.4, 11.10.7a, 11.10.9, 11.10.11.
Exposed rocky outcrops on ridges of slopes, and rocks of the ground surface.	
Normally inhabits eucalypt-dominated woodlands and open-forests and exposed rocky areas in land zones 3, 9 and 10. Is known to inhabit REs 11.3.2, 11.9.10, 11.10.1 and 11.10.4.	
Associated tree species include Lemon-scented Gum (*Corymbia citriodora*), Narrow-leaved Ironbark	

Habitat feature	Model component (inclusions and exclusions)
(*Eucalyptus crebra*), Silver-leaved Ironbark (*E. melanophloia*), Grey Box (*E. moluccana*), Poplar Box (*E. populnea*) and Forest Red Gum (*E. tereticornis*)	
Rocks, logs, bark and other coarse woody debris, and mats of leaf litter (typically 30–100 mm thick) appear to be an essential characteristic of the collared delma microhabitat and is always present where the species occurs.	
Suitable habitat can occur between grazed or cropped areas, along road reserves and travelling stock routes. Exhibits high site-fidelity and appears to be sensitive to grazing. Maintaining connectivity between habitat patches is important.	The following has been excluded from the model: • a mosaic polygon in which habitat comprises ≤ 33% of the polygon • any polygon that is entirely outside the extent of the public distribution grid for collared delma.
REs that are included as collared delma habitat in desktop resources and literature (Boobook 2017b, 2017c, 2018): 11.3.2, 11.3.25, 11.7.2, 11.7.4, 11.7.6, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.7a, 11.10.9 and 11.10.11. Land zone 7 provides potential habitat for collared delma (Loren Appleby pers. comm. 2020).	Inclusion of the following REs: 11.3.2, 11.7.2, 11.7.4, 11.7.6, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.7a, 11.10.9 and 11.10.11.

3.5 Dulacca Woodland Snail (*Adclarkia dulacca*)

Habitat feature	Model component (inclusions and exclusions)
Endemic to south-east Qld, where it occurs in a small number of isolated and fragmented populations between Miles and Dulacca.	Any RE that occurs entirely outside the public distribution grid for Dulucca woodland snail has been excluded from the model.
The species inhabits a variety of habitats including vine thicket and Brigalow (*Acacia harpophylla*) woodland patches on rocky outcrops, ironbark species with Lancewood (*Acacia shirleyi*) on ridges, and Gum-topped Box (*Eucalyptus woollsiana*) woodland.	Inclusion of the following REs: 11.4.1, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.16, 11.7.6, 11.9.1, 11.9.4, 11.9.4a, 11.9.5, 11.9.5a and 11.9.10.
Can exist in Brigalow regrowth and in cleared paddocks if logs, woody debris and other suitable microhabitat remains.	
May occur in the 'Brigalow (*Acacia harpophylla* dominant and co-dominant)' TEC, the 'Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt Bioregions' TEC, and the 'Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions' TEC	
Known to occur under rocks and timber, and areas of relatively high canopy density and relatively high moisture. Has limited mobility but can move between suitable areas of microhabitat.	Any small remnant patch < 4 ha that has at least 50% agricultural land within a 500 m buffer, or any RE that is < 4 ha, within a patch < 10 ha that has at least 50% agricultural land within a 500 m buffer has been excluded from the model.
REs that are included as dulacca woodland snail habitat in desktop resources and literature (Boobook	Inclusion of the following REs: 11.4.1, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.16, 11.7.6, 11.9.1, 11.9.4,

2019, 2017d): 11.4.3, 11.7.1, 11.7.6, 11.7.1x1, 11.9.1 and 11.9.5. Species has been detected in vegetation within land zones 4, 5, 7 and 9 (Boobook 2017d).	11.9.4a, 11.9.5, 11.9.5a and 11.9.10.

3.6 Dunmall's Snake (*Furina dunmalli*)

Habitat feature	Model component (inclusions and exclusions)
Occurs primarily in the Brigalow Belt region in the south-eastern interior of Qld, at elevations between 200–500 m above sea level.	Areas < 200 m or > 500 m elevation have been excluded from the model.
Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (*Acacia harpophylla*), other wattles (*A. burowii, A. deanii, A. leioclyx*), cypress pine (*Callitris* spp.) or Bull-oak (*Allocasuarina luehmannii*).	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.17, 11.3.18, 11.3.19, 11.3.25, 11.3.39, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.9a, 11.5.1, 11.7.2, 11.7.6, 11.7.7, 11.9.1, 11.9.2, 11.9.4, 11.9.5, 11.9.5a, 11.9.6, 11.9.7, 11.9.10, 11.10.1, 11.10.1d, 11.10.7a, 11.10.9 and 11.10.11.
Various Lemon-scented Gum (*Corymbia citriodora*), ironbark (*Eucalyptus crebra* and *E. melanophloia*), White Cypress Pine (*Callitris glaucophylla*) and Bull-oak (*Allocasuarina luehmannii*) open forest and woodland associations on sandstone derived soils, and the edge of dry vine scrub.	
Hard ironstone country (land zone 7).	Inclusion of the following REs: 11.7.2, 11.7.6 and 11.7.7.
The species has been found sheltering under fallen timber and ground litter, and may use cracks in alluvial clay soils. Large hollow logs may be a preferred habitat component of this species.	Habitat has been modelled based on suitable vegetation communities that comprises a large-tree basal area of >1 m^2/ha. The inclusion accounts for key microhabitat features.
Species distribution is highly fragmented due to cropping and grazing and as a result the species has declined dramatically.	
REs that are included as dunmall's snake habitat in desktop resources and literature (Golder 2019a, Boobook 2018, Boobook 2017b, 2017c, 2018): 11.3.2, 11.3.25, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.1, 11.5.13, 11.7.2, 11.7.6, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.1, 11.10.7a, 11.10.9 and 11.10.11.	Inclusion of the following REs: 11.3.2, 11.3.25, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.1, 11.5.13, 11.7.2, 11.7.6, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.1, 11.10.7a, 11.10.9 and 11.10.11.

3.7 Fitzroy River Turtle (*Rheodytes leukops*)

Habitat feature	Model component (inclusions and exclusions)
Only found in the drainage system of the Fitzroy River.	Areas outside of the Fitzroy River drainage system have been excluded from the model.

Habitat feature	Model component (inclusions and exclusions)
Confined to rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Requires flowing rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles.	All stream order 4 and above are included in the model.
Known sites include Boolburra, Gainsford, Glenroy Crossing, Theodore, Baralba, the MacKenzie River, the Connors River, Duaringa, Marlborough Creek and Gogango.	Areas outside of the species geographic range have not been included in the model.
The Fitzroy River Turtle prefers habitats with high water clarity and associated with Ribbonweed beds. Common riparian vegetation includes the following: Blue Gums, River Oaks, Weeping Bottlebrushes and paperbarks.	

3.8 Greater Glider (*Petauroides volans*)

Habitat feature	Model component (inclusions and exclusions)
Occurs in eucalypt forests along the ranges and coastal plains of eastern Australia from Central Victoria to far northern Qld.	Project area is within this region.
Shelters in large hollows in large, older trees during the day, requiring at least 2 to 4 live den trees for every 2 ha of suitable forest habitat in southern Qld.	Habitat has been modelled based on suitable vegetation communities that contain: • contains *Corymbia citriodora*, *Eucalyptus camaldulensis* or *E. tereticorns* as a dominant or frequent species, where total cover is ≥ 5% to ≥ 15% • has a stand height of ≥ 20 m and a basal area of large trees of ≥ 1m^2/ha.
REs and microhabitat features that are included as greater glider habitat in desktop resources and literature (Eyre 2006, Wormington *et al* 2002, Smith *et al* 2007, Golder 2019a, Loren Appleby *pers. comm.* 2020): 11.3.1, 11.3.1b, 11.3.2, 11.3.3, 11.3.4, 11.3.4a, 11.3.25 and 11.5.13. • *Corymbia citriodora* and *Eucalyptus tereticornis* important in habitat selection, as area live hollow-bearing trees and intactness of the surrounding landscape. • Species observed using *Eucalyptus moluccana*, *E. fibrosa, E. tereticornis* and *Corymbia citriodora* preferring mature and over-mature trees, and higher densities of den trees. • Presence of Eucalyptus camaldulensis favours glider habitat, even within relatively small linear patches. • RE 11.3.6 should be considered when adjacent to RE 11.3.25.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.25, 11.4.2, 11.5.2, 11.5.20, 11.7.6, 11.8.4, 11.10.1, 11.10.3 and 11.10.4. The following has been excluded from the model: • A mosaic polygon in which habitat comprises ≤ 33% of the polygon.

3.9 Grey Falcon (*Falco hypoleucos*)

Habitat feature	Model component (inclusions and exclusions)
Occupying arid and semi-arid parts of the continent. It is normally found in areas that receive an average annual rainfall less than 500 mm/yr, but may venture into wetter areas during drought. Appears to be absent in areas east of the Great Dividing Range in both NSW and Qld.	Given the Grey Falcon is seldomly observed either east of the Great Dividing Range or in areas that experience > 500 mm/yr average rainfall, all suitable habitat that coincides with either of these zones was excluded from the model, this includes all areas within the Project area.
Frequents timbered lowland plains, particularly acacia shrublands that area crossed by tree-lined watercourses. Has been observed hunting in treeless areas and frequents tussock grassland and open woodland. Nests in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).	
It is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions. It often occurs near wetlands where surface water attracts prey.	
Inhabits woodland, scrub, savanna, dunes, and plains in arid and semi-arid zones. Prefers timbered lowland plains, particularly acacia shrublands crossed by tree-lined watercourses. Also found in other grassland and woodland habitats and nest in riparian woodland in the arid zone.	

3.10 Grey-headed Flying-fox (*Pteropus poliocephalus*)

Habitat feature	Model component (inclusions and exclusions)
Occurs from Rockhampton in central Qld through NSW to Victoria along the south-east coast of Australia.	Project area is within this region.
Canopy feeding frugivore and nectarivores, with the primary food source being flowering *Melaleuca* and *Eucalyptus*, as well as rainforest fruits.	Inclusions of REs: 11.3.17, 11.3.25, 11.4.10, 11.4.12, 11.5.1, 11.5.1a, 11.5.4, 11.5.5, 11.5.20, 11.7.4, 11.7.7, 11.9.7 and 11.9.10. Only vegetation within a 50 km radius of a known grey-headed flying-fox camp have been included, as the nightly foraging range can extend up to 50 km.
Foraging habitat includes rainforests, open forest, closed and open woodlands, *Melaleuca* swamps, *Banksia* woodlands and can extend to urban parks and gardens when food resources are available. Of these vegetation communities, all lack the ability to produce ongoing and continuous foraging resources for the year.	
Roosting habitats are typically located near water bodies, such as coastlines, lakes and rivers, that support rainforest patches, strands of *Melaleuca*, mangroves and riparian vegetation.	

3.11 Koala (*Phascolarctos cinereus*)

Habitat feature	Model component (inclusions and exclusions)
Feeds primarily on the foliage of *Eucalyptus* spp. and related genera including *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp. It may supplement its diet with the foliage of other myrtaceous species including *Leptospermum* spp. and *Melaleuca* spp. Habitat can be broadly defined as any environment containing food tree species or shelter trees which are naturally abundant on fertile clayey soils.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.18, 11.3.25, 11.4.2, 11.4.12, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.5, 11.7.4, 11.7.6, 11.7.7, 11.8.4, 11.8.5, 11.9.2, 11.9.7, 11.9.10, 11.10.1, 11.10.1d, 11.10.9 and 11.10.11.
In the semi-arid regions in the western and northern parts of the species' range, koala distribution and abundance is strongly influenced by the availability of water in soils from which food trees draw water where koalas inhabit *Eucalyptus*- dominated forests and woodlands, particularly in the vicinity of riparian environments, as well as *Acacia*-dominated forests, woodlands and shrublands. Shelter trees play an essential role in koala thermoregulation and those occurring in gullies are preferable (Crowther et al., 2014). In the west and north of their range in Qld, the distribution of koalas is also determined by heat in combination with water availability. This is reflected in a tendency to find the highest densities of koalas along creek lines (Sullivan, Norris and Baxter, 2003).	Habitat has been modelled based on suitable vegetation communities that contain: • At least one feed tree as a dominant species where total cover of dominant species ≥ 15% • At least one feed tree as a dominant species where total cover of dominant species is 5-15%, and the ecosystem contains at least one survey record • Contains at least three survey records and is a forest or woodland type • Is a riverine community • Contains dominant feed tree species that collectively comprise ≥ 30% foliage cover • Occurs in alluvial flats or clay plains represented by land zones 3 and 4, which are more likely to support groundwater dependent trees with higher foliar moisture
REs and microhabitat features that are included as koala habitat in desktop resources and literature (Ellis et al. 2016, Meltzer et al 2014, Golder 2019a, Loren Appleby pers. comms. 2020): 11.3.1, 11.3.1b, 11.3.2, 11.3.3, 11.3.4, 11.3.4a, 11.3.25, 11.4.8, 11.4.9, 11.5.3, 11.5.5, 11.5.13, 11.8.4, 11.8.5, 11.11.1, 11.11.2 • *Eucalyptus populnea*, *E. tereticornis*, *E. crebra*, *E. melanophloia*, *E. orgadophila*, *E. citriodora*, *E. exserta*, *E. coolabah* and *E. melanophloia* observed to be preferred food trees • *Acacia salicina* and *Melaleuca bracteate* observed to be day shelter trees • Habitat candidacy is 'high' for alluvial REs and large tracts and 'low to moderate' for isolated patches, regrowth or drier woodlands.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.18, 11.3.25, 11.4.2, 11.4.12, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.5, 11.7.4, 11.7.6, 11.7.7, 11.8.4, 11.8.5, 11.9.2, 11.9.7, 11.9.10, 11.10.1, 11.10.1d, 11.10.9 and 11.10.11. The following has been excluded from the model: • Any RE determined to be suitable on the basis of dominant species cover of 15-30% but which is not identified in desktop resources/literature, is not an alluvial type, and for which no historical survey data are associated • A mosaic polygon in which habitat comprises ≤33% of the polygon • A non-alluvial RE identified as suitable habitat that was not identified in desktop resources/literature and that is 'regrowth' rather than 'remnant'.

3.12 Large-eared Pied Bat (*Chalinolobus dwyeri*)

Habitat feature	Model component (inclusions and exclusions)
In Qld records are known from north of Rockhampton	Project area is within this region.

Habitat feature	Model component (inclusions and exclusions)
south to the NSW border, and inland to sandstone escarpments in the Carnarvon and Expedition Ranges and Blackdown Tablelands.	
Requires a combination of sandstone cliff/escarpment to provide roosting habitat. Roosts need to be adjacent to higher fertility foraging sites particularly box gum woodlands or river/rainforest corridors. Nursey roost are generally arch caves with dome roofs, and inundations in the roof. Available roosts are not evenly distributed across the species' range. no evidence has been found for the species roost in tree hollows.	Roosting habitat is all slopes 25-40% (incorporating all other caves, fissures and boulders associated with escarpments and scree slopes, and steep slopes associated with gorges). The following has been excluded as habitat: • all Land Zone 10 REs polygon (apart from slopes > 25 degrees) that possess an average elevation of > 440m asl, noting that the average elevation of preferred roosting habitat was 508m asl, and the average elevation of suitable roosting habitat was 442m asl.
Roosting requirements: • the species roosted in small fissures in west-facing cliff-lines, sought moist gully vegetation with riparian zone within 700 m of the day roost site (maximum distance recorded between roost and foraging area was 2.5 km) • preferred roosting habitat is sandstone cliff-lines (Land Zone 10) with a north- westerly to south-westerly aspect, where it roosts in small caves and fissures. Sheltered caves of several metres depth may be critical maternity sites • suitable roosting habitat potentially includes larger scarps in Land Zone 7 ("ironstone jump-ups") and volcanic plugs in Land Zone 8 • preferred habitat is roosting habitat that includes caves, rocks, overhangs and cliff- lines associated with sandstone outcrops and gorges, in close proximity to fertile wooded valleys • roosting sites occur in REs such as 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.7 and 11.10.7a • roosting habitat is limited to Land Zones 10, 11, 12, where dome overhangs / caves occur, whilst foraging can occur within 3 km of roosting habitat. This approach is consistent with the species recovery plan • Land Zone 10 REs need to be included (consider 11.10.1, 11.10.3, 11.10.7 for example) as potential roosting habitat. The species has previously been recorded in RE 11.3.39 (likely foraging and was in close proximity to sandstone cliffs of RE 11.10.1) in Spring Gully	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.3a, 11.3.4, 11.3.25, 11.3.39, 11.4.2, 11.4.3a, 11.4.9, 11.8.4, 11.9.1, 11.9.2, 11.9.4a, 11.9.5, 11.9.5a, 11.9.7 and 11.9.13. The following exclusions were applied to foraging habitat: • All REs associated with Land Zone 7 • All isolated patches < 10 ha.
Foraging requirements: • likely to forage predominantly below the canopy • forages in high-fertility forest or woodland near watercourses has been observed foraging in a range of vegetation communities including dry and wet sclerophyll forest, grassy woodland,	

Habitat feature	Model component (inclusions and exclusions)
Callitris dominated forest, tall open eucalypt forest with a rainforest sub- canopy, sub-alpine woodland and sandstone outcrop country • almost all records of the species are within several kilometres of cliff-lines or rocky terrain, although extensive trapping and call data indicates that bats do not usually forage in sandstone habitat • modelling based on presence-only data indicates that bats forage in fertile valleys and plains, as well as areas with moderately-tall to taller trees along water courses • preferred foraging habitat is on fertile foot- slopes and valley floors, within 0.5-2.5 km of preferred roosting habitat. Foraging activity appears to be concentrated particularly along ecotones between moist and dry vegetation types and abrupt edges between woodland and pasture • suitable foraging habitat includes woodland and forest associated with suitable roosting habitat. Ecotones and edges (e.g. between vine-thicket and woodland or between riparian woodland and pasture) appear to be important foraging areas. Bats may forage several kilometres away from roost sites, following riparian corridors that traverse otherwise cleared pasture-land. • vegetation types are mainly forests and woodlands, particularly box-gum woodlands or river corridors • preferred canopied habitat and narrow connecting riparian strips in otherwise cleared habitat • foraging is associated with wooded fertile valleys that include REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26 and 11.3.39 (i.e. foraging is often associated with Land Zone 3) • requires drinking water that is within 3 km of the roost site • most sites are within canopied vegetation, suggesting a sensitivity to clearing, so retaining connectivity between remnant vegetation patches is likely to be important.	

3.13 Ornamental Snake (*Denisonia maculata*)

Habitat feature	Model component (inclusions and exclusions)
Ornamental Snake is sparsely distributed across its geographic range which is restricted to the Dawson and Fitzroy River catchments.	Project area is within this region.
It can be found on floodplains, undulating clay pans and	Inclusion of the following REs: 11.3.1, 11.3.3, 11.4.3,

Habitat feature	Model component (inclusions and exclusions)
along the margins of swamps, lakes and watercourses, and on adjoining areas of elevated ground in woodlands and open woodlands of coolabah, poplar box, and brigalow, and in fringing vegetation along watercourses. Is known to prefer woodlands and open forests associated with moist areas, particularly gilgais and depressions in Land Zone 4, but also lake margins and wetlands. is likely to be found in habitat dominated by Brigalow (*Acacia harpophylla*), Gidgee (*Acacia cambagei*), Blackwood (*Acacia argyrodendron*) or Coolibah (*Eucalyptus coolabah*), or pure grassland associated with gilgais.	11.4.3a, 11.4.4, 11.4.7, 11.4.8, 11.4.9, 11.5.16, 11.7.2, 11.9.1, 11.9.5 and 11.9.6. The following exclusions were applied to the model: • a mosaic polygon in which habitat comprises ≤ 33% of the polygon.
REs and microhabitat features that are included as ornamental snake habitat in desktop resources and literature (DAWE2020, DSEWPaC 2011, Loren Appleby *pers. comms.* 2020): 11.3.1, 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9, 11.5.16, 11.9.1, 11.9.5, 119.6 • also known to occurs in areas mapped as cleared but where the above REs formerly occurred • occurs in habitat patches that are typically greater than 10 hectares in area and are within, or connected, to larger areas of remnant vegetation. • species is nocturnal and shelters under litter and fallen timber during the day	

3.14 Painted honeyeater (*Grantiella picata*)

Habitat feature	Model component (inclusions and exclusions)
Mostly found on inland slopes of the Great Dividing Range up to Roma QLD.	The Project area lies within this region.
Inhabits mistletoes in eucalypt forests and woodlands (including riparian woodlands of black box and river red gum and box-ironbark-yellow gum woodlands), acacia-dominated woodlands, as well as paperbarks, casuarinas and cypress pine	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.11, 11.3.25, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.1, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.7.2, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.8.4, 11.8.5, 11.9.4, 11.9.4a, 11.9.5, 11.9.7, 11.9.10, 11.10.3, 11.10.9 and 11.10.11.
Prefers forests and woodlands that contain a high number of mature trees, as these trees host more mistletoes.	
More common in larger intact blocks than in narrower strips.	
The NSW Government profile for Painted Honeyeater (Office of Environment and Heritage, 2020b) provides the following additional evidence: inhabits Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests prefers mistletoes of the genus *Amyema*.	Inclusion of the following REs: 11.3.2, 11.3.3, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.4, 11.7.4, 11.7.7, 11.9.4, 11.9.4a and 11.10.9.

Habitat feature	Model component (inclusions and exclusions)
A number of species of *Amyema* have been documented (Golder, 2019b) as being a food source for the Painted Honeyeater, including *Amyema cambagei*, *A. linophyllum*, *A. miraculosum*, *A. miquellii*, *A. pendulum*, *A. preissii* and *A. quandang*.	
REs that are included as painted honeyeater habitat in desktop resources and literature (Golder 2019a, Boobook 2018, Loren Appleby pers. comm. 2020): 11.3.1, 11.3.1b, 11.3.2, 11.3.3, 11.3.4, 11.3.4a, 11.3.11, 11.3.25, 11.3.27, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.3, 11.5.5, 11.5.5c, 11.5.13, 11.7.2, 11.7.4, 11.7.6, 11.8.4, 11.8.5, 11.9.4, 11.9.4a, 11.9.5, 11.9.7, 11.9.10, 11.10.3, 11.10.9 and 11.10.11.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.11, 11.3.25, 11.4.3, 11.4.8, 11.4.9, 11.4.9a, 11.5.1, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.7.2, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.8.4, 11.8.5, 11.9.4, 11.9.4a, 11.9.5, 11.9.7, 11.9.10, 11.10.3, 11.10.9 and 11.10.11.

3.15 Red Goshawk (*Erythrotriorchis radiatus*)

Habitat feature	Model component (inclusions and exclusions)
Occurs across southern Qld to at least the western slopes of the Great Dividing Range, with an estimated home range of about 200 km2. Nearly all significant locations in southern Qld are within National Parks and State Forests, but given the large home ranges, contiguous habitat into other tenures is important for the species	Project area lies within this region.
Breeding habitat features: • nests in large trees, frequently the tallest and largest in the stand, almost always > 20 m height • nest trees are invariably within 1 km of and often immediately adjacent to permanent water • nest trees are usually within biologically rich forest or woodland that supports an abundance of medium-sized birds on which the Red Goshawk feeds	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.3a, 11.3.4, 11.3.6, 11.3.11, 11.3.17, 11.3.18, 11.3.19, 11.3.25, 11.4.1, 11.4.2, 11.4.3, 11.4.3a, 11.4.7, 11.4.8, 11.4.9, 11.4.9a, 11.4.10, 11.4.12, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.5.16, 11.5.20, 11.7.2, 11.7.4, 11.7.6, 11.7.7 and 11.8.3. Breeding habitat has been modelled based on the above suitable vegetation communities that contain: • a maximum stand height ≥ 20 m • is represented by at least one survey record AND • is within 1 km of the nearest 3rd order stream (or above) or waterbody
Foraging habitat features: • riverine forests are frequently used by the species • prefers forests of intermediate density or ecotones between habitats of different densities to support fast attack and manoeuvring but also cover for ambushing • avoids very dense forest (e.g. rainforest) and very open habitats (e.g. cleared land). • resident pairs of goshawks prefer intact, extensive woodlands and forests with a mosaic of vegetation types that are open enough for fast	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.3a, 11.3.4, 11.3.6, 11.3.11, 11.3.17, 11.3.18, 11.3.19, 11.3.25, 11.4.1, 11.4.2, 11.4.3, 11.4.3a, 11.4.7, 11.4.8, 11.4.9, 11.4.9a, 11.4.10, 11.4.12, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.5.16, 11.5.20, 11.7.2, 11.7.4, 11.7.6, 11.7.7 and 11.8.3. Foraging habitat has been modelled based on the above suitable vegetation communities that: • Is a forest or woodland type (*not including open woodland) with a canopy cover ≥20% • Overlaps with the 'may occur' and/or 'likely to

Habitat feature	Model component (inclusions and exclusions)
manoeuvring flight in south-east Qld, *Araucaria* vine forests and open forests are a significant component of the vegetation mosaics frequented by the Red Goshawk • mixed sub-tropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers identified as preferred habitat • Red Goshawk prefers areas with a mosaic of vegetation types, often near wetlands, favouring forest or woodlands dominated by eucalypts of paperbarks.	occur' public distribution gride for red Goshawk.
REs and microhabitat features that are included as red goshawk habitat in desktop resources and literature (Boobook 2017b, 2017c, Loren Appleby *pers. comms.* 2020): 11.3.2, 11.9.2, 11.9.5, 11.10.7a, 11.10.9, 11.10.11 Two important considerations in the modelling of Red Goshawk habitat are canopy height and broad distribution	Inclusion of RE 11.3.2. Inclusion of stand height ≥ 20 m as a key feature for breeding habitat.

3.16 South-eastern Long-eared Bat (*Nyctophilus corbeni*)

Habitat feature	Model component (inclusions and exclusions)
Inhabits forest and woodlands from southern central Qld to eastern South Australia. Is patchily distributed, mostly within the Murray-Darling Basin.	Project area lies within this region.
Occurs within a wide range of inland woodland vegetation types including box/ironbark/cypress pine woodlands, Buloke woodlands, Brigalow woodlands, Belah woodlands, Smooth-barked Apple woodlands, Black Box woodlands, River Red Gum forests, and various types of tree mallee. 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	Inclusions of the following REs: 11.3.1, 11.3.2, 11.3., 11.3.18, 11.3.19, 11.3.25, 11.3.39, 11.4.3, 11.4.9, 11.4.10, 11.5.1, 11.5.1a, 11.5.4, 11.5.5, 11.5.5c, 11.5.16, 11.7.2, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.9.1, 11.9.2, 11.9.4a, 11.9.5, 11.9.7, 11.9.10, 11.10.1, 11.10.6, 11.10.7a, 11.10.9, 11.10.11.
Is more abundant in more extensive stands of vegetation compared to smaller woodland patches and has been found to be much more abundant in habitats that have a distinct tree canopy and a dense understorey. Is likely to prefer older (i.e. non-regrowth) vegetation	
Roosts solitarily, mainly in dead trees or dead branches of living trees, and under loose bark. Most roost sites are used for a single day, with the next roost site generally within 4 km.	

Habitat feature	Model component (inclusions and exclusions)
REs and microhabitat features that are included as south-eastern long-eared bat habitat in desktop resources and literature (Boobook 2017b, 2017c, 2018 Loren Appleby *pers. comms.* 2020): 11.3.2, 11.3.25, 11.3.27, 11.7.2, 11.7.4, 11.7.6, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.7a, 11.10.9 and 11.10.11. The species can inhabit a wide range of Inland woodland vegetation types throughout its range, preferred ecosystems in Qld include Cypress Pine and Brigalow/Belah communities as well as river red gums.	Inclusion of the following REs: 11.3.2, 11.3.25, 11.3.27, 11.7.2, 11.7.4, 11.7.6, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.7a, 11.10.9 and 11.10.11

3.17 Squatter Pigeon (*Geophaps scripta scripta*)

Habitat feature	Model component (inclusions and exclusions)
Occurs on the inland slopes of the Great Dividing Range, mainly in central and southern Qld	Project area is within this region.
Inhabits the grassy understorey of open eucalypt woodland and less often savannas. It is nearly always found near permanent water such as rivers, creeks and waterholes. Sandy areas dissected by gravel ridges, which have open and short grass cover allowing easier movement, are preferred.	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.9a, 11.4.10, 11.4.12, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.5.16, 11.5.20, 11.7.2, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.9.2, 11.10.1, 11.10.7a, 11.10.9 and 11.10.11. Habitat has been modelled based on the above suitable vegetation communities that also: • Contains <35% grass cover in the understorey • Occurs within land-zones 4, 5 and 7 • Comprises an overstorey dominated *Eucalyptus, Corymbia, Acacia* and/or *Callitris* species OR • Is identified in desktop resources or literatures • Is represented by at least three survey sites The following exclusions apply to habitat: • All areas that are at least 3 km from the nearest 3rd order stream (or above) waterbody • 'suitable' habitat that occurs within the 'may occur' class of the public grid and is not within 1 km of the nearest watercourse or waterbody.
Foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e. Qld RE Land Zone 5), and lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e. Qld Regional RE Zone 7). These areas contain the open-forest to woodland communities with patchy, tussock- grassy understories that support the subspecies' foraging and breeding requirements. These open- forest to woodland communities are mostly dominated in the overstorey by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, where optimum foraging habitat occurs within 3 km and optimum breeding habitat within 1 km of watercourses or waterbodies.	
Ground covering vegetation layer in Squatter Pigeon foraging and breeding habitat is considerably patchy consisting of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs. This patchy, ground layer of vegetation rarely exceeds 33% of the ground area, the remaining ground surface consisting of bare patches of gravelly or dusty soil and areas lightly covered in leaf litter and coarse, woody debris (e.g. fallen trees, logs and smaller debris).	
REs and microhabitat features that are included as	Inclusion of the following REs: 11.3.1, 11.3.2, 11.3.3,

Habitat feature	Model component (inclusions and exclusions)
squatter pigeon habitat in desktop resources and literature (Boobook 2017b, 2017c, Aurecon 2014): 11.3.1, 11.3.2, 11.3.3, 11.3.25, 11.9.2, 11.10.7a, 11.10.9. The species is generally absent form areas that contain greater than 33% non-native perennial grass.	11.3.25, 11.9.2, 11.10.7a and 11.10.9. Habitat has been modelled based on the above suitable vegetation communities that also contain <35% grass cover in the understorey.

3.18 White-throated Snapping Turtle (*Elseya albagula*)

Habitat feature	Model component (inclusions and exclusions)
Only found within Qld in three rivers: Fitzroy, Mary and Burnett as well as the associated drainages within the south-east.	Project area lies within this region. Areas outside of the river systems have been excluded from the model.
Prefer areas with clear, flowing, well-oxygenated water which is likely due to an ability to extract oxygen from water via cloacal respiration	A gap analysis of the species, including review of the SNES database and National Recovery Plan, was reviewed against species distribution to identify overlapping tenements and additional watercourses where the species has been recorded or has potential to occur. • include waters that are clear, flowing and well-oxygenated • include potential habitat within tenements that overlap the Project area.
They also prefer areas where there is suitable shelter and refuges such as fallen trees	

3.19 Yakka skink (*Egernia rugosa*)

Habitat feature	Model component (inclusions and exclusions)
Occurs in a wide range of communities within land zones 3, 4, 5, 7, 9 and 10. Can occur in land zone 8 but this is not its core habitat.	Inclusion of the following REs: 11.3.2, 11.3.6, 11.3.17, 11.3.18, 11.3.19, 11.3.39, 11.5.1, 11.5.1a, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.9.2, 11.9.7, 11.9.7a, 11.10.3, 11.10.7a, 11.10.1 11.10.9 and 11.10.11.
Is known to occur in RE 11.3.2.	
Uses vegetation types including Brigalow (*Acacia harpophylla*), Bendee (*A. catenulata*), Mulga (*A. aneura*), Lancewood (*A. shirleyi*), Belah (*Casuarina cristata*), Poplar Box (*Eucalyptus populnea*), Ironbark (*E. crebra, E melanophloia*) and White Cypress Pine (*Callitris glaucophylla*)	
Is commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. Often takes refuge in large hollow logs and can excavate deep burrow systems, sometimes under dense ground vegetation Associates colonies with large hollow logs, cavities or burrows under large fallen trees, tree stumps, logs,	Habitat has been modelled based on suitable vegetation communities that coarse woody debris length of > 300 m/ha. The inclusion of coarse woody debris accounts for the key microhabitat feature of large hollow logs and tree stumps.

Habitat feature	Model component (inclusions and exclusions)
stick-raked piles, large rocks and rock piles, dense ground-covering vegetation, and deeply eroded gullies, tunnels and sinkholes.	
Species is threatened by habitat reduction and degradation, requiring maintenance of large, healthy connected patches of suitable habitat. The draft referral guidelines identify know important habitat as any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified.	
REs that are included as yakka skink habitat in desktop resources and literature (Boobook 2018, Loren Appleby pers. comm. 2020), 11.3.2, 11.3.19, 11.3.39, 11.5.1, 11.5.4, 11.5.5, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.9.5/11.9.2 ecotone, 11.9.7, 11,.10.1, 11.10.7 11.10.9 and 11.10.11 1	Inclusion of the following REs: 11.3.2, 11.3.6, 11.3.17, 11.3.18, 11.3.19, 11.3.39, 11.5.1, 11.5.1a, 11.5.3, 11.5.4, 11.5.5, 11.5.5c, 11.7.4, 11.7.5, 11.7.6, 11.7.7, 11.9.2, 11.9.7, 11.9.7a, 11.10.3, 11.10.7a, 11.10.1, 11.10.9 and 11.10.11.
Microhabitat features for yakka skink identified in literature (Boobook 2018, Loren Appleby pers. comm. 2020): • Large-hollow bearing logs and piles, within lateritic scarps, sink holes and stick piles in non-remnant areas • Tree heights being lower than 16 m in height • Most reliant on hollow logs, compared with other shelter types including burrows and rock crevasses • Present at sites that correlated with specific soil textures (loamy and sandy soils), median tree heights, tree cover and volume of coarse woody debris	Habitat has been modelled based on suitable vegetation communities that include canopy height <16 m and/or coarse woody debris length of > 300 m/ha.

ATTACHMENT 2

THE OBJECTS AND PRINCIPLES OF THE *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999*

SECTIONS 3 AND 3A

3 Objects of the Act

(a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance;

(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;

(c) to promote the conservation of biodiversity;

(d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples;

(e) to assist in the co-operative implementation of Australia's international environmental responsibilities;

(f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and

(g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

3A Principles of Ecologically Sustainable Development

The following principles are principles of ecologically sustainable development.

(a) Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

(b) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

(c) The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

(d) The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.

(e) Improved valuation, pricing and incentive mechanisms should be promoted.

ATTACHMENT 3

MATTERS THAT MUST BE ADDRESSED IN A PER AND EIS

(SCHEDULE 4 OF THE EPBC REGULATIONS 2000)

1 General information

1.01 The background of the action including:

(a) the title of the action;

(b) the full name and postal address of the designated proponent;

(c) a clear outline of the objective of the action;

(d) the location of the action;

(e) the background to the development of the action;

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;

(g) the current status of the action; and

(h) the consequences of not proceeding with the action.

2 Description

2.01 A description of the action, including:

(a) all the components of the action;

(b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;

(c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;

(d) relevant impacts of the action;

(e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;

(f) any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action;

(g) to the extent reasonably practicable, any feasible alternatives to the action, including:

(i) if relevant, the alternative of taking no action;

(ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action; and

(iii) sufficient detail to make clear why any alternative is preferred to another;

(h) any consultation about the action, including:

(i) any consultation that has already taken place;

(ii) proposed consultation about relevant impacts of the action; and

(iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation; and

(i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

3 Relevant impacts

3.01 Information given under paragraph 2.01(d) must include

(a) a description of the relevant impacts of the action;

(b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;

(c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

(d) analysis of the significance of the relevant impacts; and

(e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

4 Proposed safeguards and mitigation measures

4.01 Information given under paragraph 2.01(e) must include:

(a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;

(b) any statutory or policy basis for the mitigation measures;

(c) the cost of the mitigation measures;

(d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;

(e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program; and

(f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation

measures proposed to be taken by State governments, local governments or the proponent.

5 Other Approvals and Conditions

5.01 Information given under paragraph 2.01(f) must include:

(a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:

(i) what environmental assessment of the proposed action has been, or is being carried out under the scheme, plan or policy; and

(ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;

(c) a statement identifying any additional approval that is required; and

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

6 Environmental record of person proposing to take the action

6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

(a) the person proposing to take the action; and

(b) for an action for which a person has applied for a permit, the person making the application.

6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

7 Information sources

7.01 For information given the PER must state:

(a) the source of the information; and

(b) how recent the information is; and

(c) how the reliability of the information was tested; and

(d) what uncertainties (if any) are in the information.