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Amended Biodiversity Development Assessment Report - Part B (Appendices A-H)

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Appendix A - BDAR Requirement Compliance Table

1.0 BDAR Requirement Compliance

1.1 BDAR Requirements Compliance Details

Compliance with the BDAR minimum information requirements of the BAM is documented in **Table A.1**.

Table A.1 Assessment of Compliance with BDAR Minimum Information Requirements

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
Introduction	Chapters 2 and 3	**Information**	
		Introduction to the biodiversity assessment including:	–
		☒ brief description of the proposal	**Section 2.0**
		☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	**Section 1.2.1** and **Section 1.2.2** and **Figure 1.1** and **Figure 1.2**
		☒ general description of the subject land	**Section 1.2.1**
		☒ sources of information used in the assessment, including reports and spatial data	**Section 1.5, Section 4.1.1,** and **Section 5.3.1**. Also referenced in text and listed in the References Section.
		☒ identification and justification for entering the BOS	**Section 1.3.1** and **Table 1.1**
		Maps and tables	
		☒ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	**Figure 1.2** and **Figure 3.1**
Landscape	Section 3.1 and Section 3.2, Appendix E	**Information**	
		Identification of site context components and landscape features, including:	–
		☒ general description of subject land topographic and hydrological setting, geology and soils	**Section 1.2.1**
		☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	**Section 3.2** and **Table 3.3** **Section 3.3** and **Table 3.4**
		☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	**Section 3.2, Table 3.3** and **Figure 3.1**
		☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	**Table 3.3** and **Figure 3.3**

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	**Section 3.2., Table 3.3, Figure 3.1,** and **Figure 3.3**
		☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	**Section 3.2., Table 3.3, Figure 3.4**
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	**Section 3.2, Table 3.3**
		☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	**Section 3.2, Table 3.3**
		☒ any additional landscape features identified in any SEARs for the proposal	**Section 3.2, Table 3.3**
		☒ NSW (Mitchell) landscape on which the subject land occurs	**Section 3.2, Table 3.3, Figure 3.2**
		☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	**Section 3.3, Section 4.1.2, Section 4.2** and **Section 5.3.3, Figure 4.1, Figure 5.3**
		Maps and tables	
		☒ Site Map ☒ Property boundary ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☒ Landscape features identified in BAM Subsection 3.1.3.	**Figure 1.1, Figure 1.2,** and **Figure 3.1**
		☒ Location Map ☒ Digital aerial photography at 1:1,000 scale or finer ☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☒ Landscape features identified in BAM Subsection 3.1.3 ☒ Additional detail (e.g. local government area boundaries) relevant at this scale	**Figure 3.1, Figure 3.2, Figure 3.3, Figure 3.4, Figure 3.5, Figure 3.6, Figure 3.7**

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries ☒ wetlands and important wetlands ☒ connectivity of different areas of habitat ☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☒ areas of outstanding biodiversity value occurring on the subject land and assessment area ☒ any additional landscape features identified in any SEARs for the proposal ☒ NSW (Mitchell) landscape on which the subject land occurs	**Figure 3.1, Figure 3.2, Figure 3.3, Figure 3.4, Figure 3.5. Figure 3.6** and **Figure 3.7**
		Data	
		☒ All report maps as separate jpeg files	To be issued to CPHR as separate data package
		Individual digital shape files of:	–
		☒ subject land boundary	To be issued to CPHR as separate data package
		☒ assessment area (i.e. subject land and 1500 m buffer area) boundary	To be issued to CPHR as separate data package
		☒ cadastral boundary of subject land	To be issued to CPHR as separate data package
		☒ areas of native vegetation cover	To be issued to CPHR as separate data package
		☒ landscape features	To be issued to CPHR as separate data package

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
Native vegetation	Chapter 4, Appendix A and Appendix H	**Information**	
		☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	**Section 4.2** and **Figure 3.7**
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	**Section 4.1.3, Section 4.2, Section 4.7**
		☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	**Section 4.1.1**
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	**Section 4.1.2, Table 4.1, Table 4.2, Table 4.3, Figure 4.1, Figure 4.2**
		☒ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	**Section 4.1.5**
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	**Section 4.3** and **Table 4.4**
		☒ vegetation class	**Section 4.3, Table 4.4**
		☒ extent (ha) within subject land	**Section 4.3** and **Table 4.4**
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	**Section 4.3.1 to Section 4.3.11**
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	**Section 4.3.1 to Section 4.3.11**
		☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	**Section 4.5** and **Table 4.26**
		☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	**Table 4.3**
		Describe the vegetation integrity assessment of the subject land, including:	–

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	**Method provided in Section 4.1,** Results provided in **Section 4.4** and **Table 4.25**
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	**Section 4.1.2** and **Table 4.1** **Section 4.3.1** to **Section 4.3.11**
		☒ area (ha) of each vegetation zone	**Section 4.4** and **Table 4.25**
		☒ assessment of patch size (as described in BAM Subsection 4.3.2)	**Section 4.1.4**
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	**Section 4.1.2.3, Table 4.2** and **Table 4.3**
		☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	**Section 4.1.5**
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	–
		☐ identify the PCT or vegetation class for which local benchmark data will be applied ☐ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	**Section 4.1.5**
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	**Section 4.1.5**
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	**Section 4.1.5**
		Maps and tables	
		☒ Map of native vegetation extent within the subject land at scale not greater than 1:1,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	**Figure 3.7** and **Appendix I**

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	**Figure 4.2** and **Appendix I**
		☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	**Figure 4.2** and **Appendix I**
		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	**Figure 4.2** and **Appendix I**
		☒ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	**Figure 4.3. Figure 4.4, Table 4.26** and **Appendix I**
		☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	**Figure 3.7, Appendix I**
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	**–**
		☒ composition condition score ☒ structure condition score ☒ function condition score ☒ presence of hollow bearing trees	**Section 4.4** and **Table 4.25**
		Data	
		☒ All report maps as separate jpeg files	To be issued to CPHR as separate data package
		☒ Plot field data (MS Excel format)	To be issued to CPHR as separate data package
		☒ Plot field datasheets	To be issued to CPHR as separate data package
		Digital shape files of:	-
		☒ PCT boundaries within subject land	To be issued to CPHR as separate data package
		☒ TEC boundaries within subject land	To be issued to CPHR as separate data package
		☒ vegetation zone boundaries within subject land	To be issued to CPHR as separate data package

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ floristic vegetation survey and vegetation integrity plot locations	To be issued to CPHR as separate data package
Threatened species	Chapter 5	**Information**	
		Identify ecosystem credit species likely to occur on the subject land, including:	–
		☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	**Section 5.1** and **Table 5.1**
		☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	**Section 5.1** and **Table 5.2**
		☒ justification for addition of any ecosystem credit species to the list	**Section 5.1** and **Table 5.2**
		Identify species credit species likely to occur on the subject land, including:	–
		☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	**Section 5.2** and **Table 5.3**
		☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	**Section 5.2** and **Table 5.4**
		☒ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	**Section 5.2** and **Table 5.4**
		☒ justification for addition of any species credit species to the list	**Section 5.2** and **Table 5.4**
		From the list of candidate species credit species, identify:	–
		☒ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) ☒ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) ☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)) ☒ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	**Section 5.2** and **Table 5.4**
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM Section 5.2.4)	**Section 5.4, Table 5.20** and **Table 5.21**

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	**Not applicable**
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	**Section 5.3**
		☒ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	**Section 5.3.4** and **Section 5.3.5**
		☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	**Section 5.3.2, Section 5.3.3,** and **Section 5.3.5**
		☒ survey personnel and relevant experience	**Page ii**
		☒ describe any limitations to surveys and how these were addressed/overcome	**Section 5.3.8**
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–
		☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	**Not applicable**
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	**Not applicable**
		☐ provide written confirmation from the decision-maker that they support the use of local data	**Not applicable**
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	–
		☒ the unit of measure for each species is documented	**Section 5.4.3** and **Table 5.22**
		for species assessed by area:	–

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	**Section 5.3.4**
		☒ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	**Section 5.3.4.1 to Section 5.4.2.10**
		for species assessed by counts of individuals:	–
		☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	**Not applicable**
		☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	**Not applicable**
		☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	**Not applicable**
		☒ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	**Section 5.4.2, Table 5.22 Section 10.1.2** and **Table 10.2**
		Maps and tables	
		☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	**Section 5.1, Table 5.1,** and **Table 5.2**
		☒ the ecosystem credit species removed from the list	**Section 5.1, Table 5.1,** and **Table 5.2**
		☒ the sensitivity to gain class of each species	**Section 5.1, Table 5.1,** and **Table 5.2**
		☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	**Section 5.2, Table 5.3** and **Table 5.4**
		☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	**Section 5.2, Table 5.3** and **Table 5.4**
		☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	**Section 5.4.2** and **Table 5.21**

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	**Section 5.4.2** and **Table 5.21**
		☒ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	**Figure 5.22, Figure 5.23** and **Appendix I**
		Data	
		☒ Digital shape files of suitable habitat identified for survey for each candidate species credit species	To be issued to CPHR as separate data package
		☒ Survey locations including GPS coordinates of any plots, transects, grids	To be issued to CPHR as separate data package
		☒ Digital shape files of each species polygon including GPS coordinates of located individuals	To be issued to CPHR as separate data package
		☒ Species polygon map in jpeg format	To be issued to CPHR as separate data package
		☒ Expert reports and any supporting data used to support conclusions of the expert report	To be issued to CPHR as separate data package
		☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	Field data captured digitally To be issued to CPHR as separate data package
Prescribed impacts	Chapter 6	**Information**	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	**Section 6.0** and **Table 6.1**
		☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	**Appendix D**
		☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	**Section 6.0** and **Table 6.1**
		☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	**Section 6.0** and **Table 6.1**
		☒ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	**Section 8.3.2** and **Table 8.8**
		Where the proposed development is for a wind farm:	–
		☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	**Appendix D**
		☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	**Appendix D**
		☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	**Appendix D**
		Where the proposal may result in vehicle strike:	–
		☒ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	**Section 6.0** and **Table 6.1**
		Maps and tables	

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	No applicable
		☒ Map showing location of potential vehicle strike locations	Not applicable
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	**Appendix D**
		Data	
		☒ Digital shape files of prescribed impact feature locations	To be issued to CPHR as separate data package
		☒ Prescribed impact features map in jpeg format	To be issued to CPHR as separate data package
Avoid and minimise impacts	Chapter 7	**Information**	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	–
		☒ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	**Section 7.1.3** and **Table 7.1**
		☒ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	**Section 7.1.3** and **Table 7.1**
		☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	**Section 7.1**
		☒ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	**Section 7.1** and **Figure 7.1**
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	**Section 7.2** and **Table 7.3**
		☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	**Section 7.1.3** and **Table 7.1**
		☒ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	**Section 7.3**
		Maps and tables	

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	**Section 7.1, Table 7.1** and **Section 7.2** and **Table 7.2**
		☒ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	**Figure 7.1** and **Figure 7.2**
		☒ Maps demonstrating indirect impact zones where applicable	**Not applicable**
		Data	
		Digital shape files of:	To be issued to CPHR as separate data package
		☒ alternative and final proposal footprint	To be issued to CPHR as separate data package
		☒ direct and indirect impact zones	To be issued to CPHR as separate data package
		☒ Maps in jpeg format	To be issued to CPHR as separate data package
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	**Information**	
		☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	**Section 8.1, Table 8.1** and **Table 8.2**
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	**Section 8.2** and **Table 8.6**
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	**Section 8.2, Table 8.3**
		☒ reporting any limitations or assumptions, etc. made during the assessment	**Section 8.2** and **Table 8.6**
		☒ identification of the threatened entities and their habitat likely to be affected	**Section 8.2** and **Table 8.6**
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	**Not applicable**
		☒ human-made structures	**Section 8.3.1**
		☒ non-native vegetation	**Section 8.3.1**
		☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	**Section 8.3.2**
		☒ movement of threatened species that maintains their life cycle	**Section 8.3.2**
		☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	**Section 8.3.3**
		☐ assessment of the impacts of wind turbine strikes on protected animals	**Section 8.3.4** and **Appendix D**
		☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	**Section 8.3**
		☒ evaluate the consequences of prescribed impacts	**Section 8.3** and **Appendix D**
		☒ describe impacts that are uncertain	**Section 8.3** and **Appendix D**
		☒ document limitations to data, assumptions and predictions	**Section 4.1.6** and **Section 5.3.8**
		Maps and tables	
		☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	**Section 10.1** and **Table 10.1**
		Data	
		N/A	–
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	**Information**	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	–

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ techniques, timing, frequency and responsibility ☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts	**Section 7.4** and **Table 7.4** **Section 9.1** and **Table 9.1** **Section 9.2** and **Table 9.2**
		☒ document any adaptive management strategy proposed	**Section 7.4.1** and **Table 7.4**
		Identification of measures for mitigating impacts related to:	–
		☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) ☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☒ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	**Section 7.4** and **Table 7.4** **Section 9.1** and **Table 9.1** **Section 9.2** and **Table 9.2**
		☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	**Section 9.2** and **Table 9.2**
		Maps and tables	
		☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	**Section 9.1** and **Table 9.1**
		Data	
		N/A	–
Impact summary	Chapter 9	**Information**	
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	–
		☒ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	Not appliable
		☒ for each TEC, report the extent of the TEC in NSW	Not applicable
		☒ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	Not applicable
		☒ for each threatened species, report the population size in NSW	**Section 8.4.3** and **Table 8.16**

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ documenting assumptions made and/or limitations to information ☒ documenting all sources of data, information, references used or consulted ☒ clearly justifying why any criteria could not be addressed	**Section 8.4.3** and **Table 8.16**
		☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	**Section 10.1, Table 10.1** and **Table 10.2**
		☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	**Section 10.2**
		☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3	**Section 10.2**
		Maps and tables	
		☒ Map showing the extent of TECs at risk of an SAII within the subject land	Not appliable
		☒ Map showing location of threatened species at risk of an SAII within the subject land	**Figure 8.5**
		Map showing location of:	–
		☒ impacts requiring offset	**Figure 8.1, Figure 8.2** and **Figure 8.3**
		☒ impacts not requiring offset	**Figure 8.1, Figure 8.2** and **Figure 8.3**
		☒ areas not requiring assessment	**Figure 1.3**
		Data	
		Digital shape files of:	-
		☒ extent of TECs at risk of an SAII within the subject land	No applicable
		☒ location of threatened species at risk of an SAII within the subject land	To be issued to CPHR as separate data package
		☒ boundary of impacts requiring offset	To be issued to CPHR as separate data package
		☒ boundary of impacts not requiring offset	To be issued to CPHR as separate data package
		☒ boundary of areas not requiring assessment	To be issued to CPHR as separate data package

BDAR Section	BAM Ref.	BAM Requirement	Reference(s) in the BDAR
		☒ Maps in jpeg format	To be issued to CPHR as separate data package
Impact summary	Chapter 10	**Information**	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☒ change in vegetation integrity score (BAM Subsection 8.1.1) ☒ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	**Section 10.1** and **Table 10.1**
		☒ biodiversity risk weighting for each	**Section 10.1** and **Table 10.1**
		☒ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	**Section 10.1** and **Table 10.1**
		Maps and tables	
		☒ Table of PCTs requiring offset and the number of ecosystem credits required	**Section 10.1** and **Table 10.1**
		☒ Table of threatened species requiring offset and the number of species credits required	**Section 10.1** and **Table 10.1**
		Data	
		☒ Submitted proposal in the BAM Calculator	**Section 3.1** and **Table 3.2**
Biodiversity credit report	Chapter 10	**Information**	
		☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	**Section 11.1** and **Table 11.1** **Section 11.2** and **Table 11.2**
		☒ BAM credit report in pdf format	**Appendix G**
		Maps and tables	
		☒ Table of credit class and matching credit profile	**Section 11.1** and **Table 11.1** **Section 11.2** and **Table 11.2**
		Data	
		☒ BAM credit report in pdf format	**Appendix G**

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Appendix B - Likelihood of Occurrence Assessment

Table 1.1 Likelihood of Occurrence Assessment Criteria

Category	Description
Recorded	The species was observed in the Project Area during the current survey.
High	It is highly likely that the species inhabits the Project Area and is dependent on identified suitable habitat (i.e., for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (within 30 km) and is known or likely to maintain resident populations in the Project Area. Also includes species known or likely to visit the Project Area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the Project Area. Species unlikely to maintain sedentary populations, however, may seasonally use resources within the Project Area opportunistically or during migration. The species is unlikely to be dependent on habitat within the Project Area (i.e., for breeding or important life cycle periods such as winter flowering resources), or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the Project Area, and the species has not been recorded recently in the locality (within 30 km). It may be an occasional visitor, but habitat similar to that within the Project Area is widely distributed in the local area, meaning that the species is not dependent on available habitat (i.e., for breeding or important life cycle periods such as winter flowering resources). Specific habitat is not present in the Project Area, or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the Project Area.

The outcomes of the Likelihood of Occurrence assessment for the Project is displayed within **Table 1.2** below. It is noted that separate Likelihood of Occurrence assessments have been prepared for the Planted Tree Streamlined BDAR Module and Small Area Streamlined BDAR Module, included as Appendix J and Appendix K of the Amended BDAR, respectively.

Table 1.2 Likelihood of Occurrence Assessment

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Threatened flora						
A spear grass *Austrostipa wakoolica*	E	E	Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Associated species *include Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans*.	BAM-C, Atlas, PMST	1	Moderate. Potential habitat is present on site and edaphic preferences are present in the Project Area.
Austral Pillwort *Pilularia novae-hollandiae*	E	-	Grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. Most records from table drains on the sides of roads.	BAM-C, Atlas	2	Moderate. Edaphic preferences are present seasonally in the Subject Land.
Bindweed *Convolvulus tedmoorei*	E	-	Grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers. Disturbance regimes are not known, although the species may require periodic flooding of its habitat to maintain the wet conditions suitable for seed set and germination.	BAM-C, Atlas	1	Moderate. Potential edaphic preferences are present however only two collections are known from 1969 and 1971.
Chariot Wheels *Maireana cheelii*	V	-V	Usually found on heavier, grey clay soils with *Atriplex vesicaria* (Bladder Saltbush). Recorded on the Hay Plain in *Atriplex vesicaria*, *Maireana aphylla* and *Acacia homalophylla* shrublands. Soils include heavy brown to red-brown clay-loams, hard cracking red clay, other heavy texture-contrast soils. Tends to grow in shallow depressions, often on eroded or scalded surfaces, and does not extend to the higher soils in the habitat. It has been found on the edges of bare, windswept claypans, in shallow depressions of eroded surfaces where rainwater collects and on a “shelf” in the crabhole complex of heavy grey soils.	BAM-C, Atlas, PMST, SEARs	44	Recorded.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Claypan Daisy *Brachyscome muelleroides*	V	V	Grows in damp areas on the margins of claypans in moist grassland with *Pycnosorus globosus, Agrostis avenacea* and *Austrodanthonia duttoniana.* Also recorded from the margins of lagoons in mud or water, and in association with *Calotis anthemoides*.	BAM-C	-	Moderate. Potential habitat is present in the development area, with similar species existing in the Project Area.
Lanky Buttons *Leptorhynchos orientalis*	E	-	Grows in woodland or grassland, sometimes on the margins of swamps. Communities include a Bimble Box plain in red-brown soil, dense *Acacia pendula* woodland with herbaceous understorey on red clay to clay-loam, open grassland areas on red soils, and red clay plains at the edge of a Canegrass swamp.	BAM-C, Atlas	-	Moderate. Suitable habitat and associated PCTs occur within the development site. Similar species occur in some areas of the Subject Land.
Menindee Nightshade *Solanum karsense*	V	V	Grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush, and open treeless plains with solonized brown soils. Habitats are generally lake beds or floodplains of heavy grey clays with a highly self-mulching surface. Also found on sandy floodplains and ridges and in calcareous soils, red sands, red-brown earths and loamy soils.	BAM-C, PMST	-	Low. It is unlikely for this species to occur in the Project Area as distribution does not extend East of Maude, NSW, which is over 100km away from the Subject Land.
Mossgiel Daisy *Brachyscome papillosa*	V	V	Recorded primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and Leafless Bluebush (*Maireana aphylla*) plains, but also in grassland and in Inland Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris* spp.) woodland.	BAM-C, Atlas, PMST, SEARs	18	Moderate. Appropriate edaphic habitat and flora composition occur in the Subject Land.
Red Darling Pea *Swainsona plagiotropis*	V	V	Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils. Recorded from roadsides, rail reserves, stock routes and areas of lightly grazed unimproved pasture comprising *Austrodanthonia, Enteropogon acicularis* and *Austrostipa* grassland communities.	BAM-C, Atlas	265	Moderate. Appropriate habitat occurs within the development area, however it is a modified state due to grazing.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Sand-hill Spider Orchid *Caladenia arenaria*	E	E	Occurs in woodland with sandy soil, especially that dominated by White Cypress Pine (*Callitris glaucophylla*).	BAM-C	-	Low. Sand-hill Spider Orchid is currently only known to occur in the Riverina between Urana and Narranderra. Species is unlikely to occur in the Subject Land
Silky Swainson-pea *Swainsona sericea*	V	-	Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South- West Slopes. Sometimes found in association with cypress-pines *Callitris* spp. Regenerates from seed after fire.	BAM-C, Atlas	21	Recorded.
Slender Darling Pea *Swainsona murrayana*	V	V	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated.	BAM-C, Atlas, PMST, SEARs	167	Recorded.
Small Scurf-pea *Cullen parvum*	E	-	In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (*Eucalyptus camaldulensis*) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm.	BAM-C, Atlas	1	Moderate. Suitable habitat was identified on Subject Land.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Turnip Copperburr *Sclerolaena napiformis*	E	E	Confined to remnant grassland habitats on clay-loam soils. Grows on level plains in tussock grassland of *Austrostipa nodosa* and *Chloris truncata*, in grey cracking clay to red-brown loamy clay. Sites are roadside travelling stock routes and reserves subject to sheep grazing. Associated species include *Austrodanthonia duttoniana, Enteropogon acicularis, Austrostipa nodosa, Chloris truncata, Lolium rigidum, Swainsona murrayana, S. plagiotropis, S. procumbens, Rhodanthe corymbiflora, Calotis scabiosifolia, Microseris lanceolata, Acacia pendula* and various chenopods.	BAM-C, Atlas, PMST	186	Moderate. Associated PCT's and suitable habitat occur in the Project Area. The Subject Land is also located within the current geographical range for the species.
Winged Peppercress *Lepidium monoplocoides*	E	E	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually open woodland dominated by *Allocasuarina leuhmannii* (Bulloak) and/or eucalypts, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses. Species is highly dependent on seasonal conditions. Occurs in periodically flooded and waterlogged habitats and does not tolerate grazing disturbance.	BAM-C, Atlas, PMST, SEARs	7	Recorded.
Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa*	V	-	*Eucalyptus leucoxylon subsp. pruinosa* is a tree species which, in New South Wales, occurs at the bases of sandy rises and on loamy clay flats on the floodplains of the Murray River and its tributaries in the Riverina Bioregion.	BAM-C, Atlas	1	Moderate. Suitable habitat occurs in the Project Area, floodplains of the Riverina Bioregion.
A burr-daisy *Calotis moorei*	E	E	The species grows in sandy soil on flats, low dunes, and small hills and appears to be associated with *Acacia* woodlands and chenopod shrublands.	Atlas	1	Moderate. No associated PCT's in the Project Area, however, the species is associated with similar floristic assemblages.
Velvet Thread-petal *Stenopetalum velutinum*	Ex	-	*Stenopetalum velutinum* is strongly associated with Buffel grass cover and sandy soils.	Atlas	1	Nil. Species is presumed extinct within NSW.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Spike-rush *Eleocharis obicis*	V	V	Grows in ephemerally wet situations such as roadside mitre drains and depressions, usually in low-lying grasslands. Sites include depressions with heavy clay soils on the Lachlan River floodplain, with *Eragrostis australasica, Atriplex vesicaria* and *A. nummularia* shrublands, low-lying claypans near an irrigation channel, and a shallow open ditch on a low ridge with *Eucalyptus populnea* in red sandy soil over clay.	BAM-C, Altas	8	Moderate. Suitable habitat occurs in the Subject Land.
Pine Donkey Orchid *Diuris tricolor*	V	-	The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (*Callitris* spp.). It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW.	BAM-C, Atlas		Low. Species unlikely to inhabit the Project Area due to absence of suitable habitat.
Threatened fauna						
Amphibians						
Sloane's Froglet *Crinia sloanei*	E	E	It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Atlas, PMST	1	Low. There are no suitable associated PCT's for the species onsite, therefore the species is unlikely to inhabit the Project Area.
Southern Bell Frog *Litoria raniformis*	E	V	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Tadpoles require standing water for at least 4 months for development and metamorphosis to occur but can take up to 12 months to develop.	BAM-C, Atlas, PMST, SEARs	88	Recorded.
Aves						
Australasian Bittern *Botaurus poiciloptilus*	E	E	Temperate freshwater wetlands and occasionally estuarine reedbeds, with a preference for permanent waterbodies with tall dense vegetation.	BAM-C, Atlas, MNES, PMST	20	Low. There is only very marginal habitat located in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Australian Bustard *Ardeotis australis*	E	-	Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams. Dispersive, with irregular widespread movements over long distances; movements are thought to be in response to habitat and climatic conditions; known to converge on areas with high mice numbers and in recently burnt areas.	BAM-C, Atlas	3	Moderate. There is suitable habitat present in the Project Area. This species may very occasionally occur in the Project Area. The nearest recent record is from adjacent the Sturt Hwy 30 km north of the Project Area in January 2024.
Australian Painted Snipe *Rostratula australis*	E	E	Shallow inland wetlands, either freshwater or brackish water bodies.	BAM-C, Atlas, PMST	7	Moderate. There is a restricted area of suitable habitat present in the Project Area. This species may very occasionally occur in the Project Area. The nearest records are from Hay and Wangenella.
Barking Owl *Ninox connivens*	V	-	Occurs throughout NSW, where it inhabits dry open sclerophyll forests and woodlands, favouring dense riparian stands of eucalypts or casuarinas along watercourses or around wetlands, where there are many large trees suitable for roosting or breeding.	BAM-C, Atlas	2	Recorded.
Black Falcon *Falco subniger*	V	-	Black Falcon's habitat is usually in the arid and semi arid zones. It is usually found near watercourses or utilising patches of isolated trees. It hunts over open wooded grasslands, saltbush plains, bluebush plains and other low vegetation.	BAM-C, Atlas	50	Recorded.
Black-chinned Honeyeater *Melithreptus gularis gularis*	V	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (E. *albens*), Inland Grey Box (E. *microcarpa*), Yellow Box (E. *melliodora*), Blakely's Red Gum (E. *blakelyi*) and Forest Red Gum (E. *tereticornis*).	BAM-C, Atlas	8	Low. There is no suitable habitat in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Black-tailed Godwit *Limosa* limosa	V	E, M	Primarily a coastal species that is usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps.	BAM-C, Atlas	1	Low. There is no suitable habitat in the Project Area.
Blue-billed Duck *Oxyura australis*	V	-	The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed but prefers to dive if approached. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer.	BAM-C, Atlas	12	Low. There is no suitable habitat in the Project Area.
Blue-winged Parrot *Neophema chrysostoma*	V	V	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and semi arid zones.	Atlas, PMST	16	Recorded.
Brolga *Grus rubicunda*	V	-	The Brolga was formerly found across Australia, except for the south-east corner, Tasmania and the south-western third of the country. It is still abundant in the northern tropics, but very sparse across the southern part of its range. Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.	BAM-C, Atlas	23	Moderate. There is suitable habitat in the Project Area. This species may very occasionally occur in the Project Area. This species was recorded in Oolambeyan N.P in 2021.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Brown treecreeper (south-eastern subspecies) *Climacteris picumnus victoriae*	V	V	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Atlas, PMST	158	Low. The listed subspecies is unlikely to occur in the Project Area.
Bush Stone-curlew *Burhinus grallarius*	E	-	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	BAM-C, Atlas	20	Low. There is some suitable habitat present in the Project Area however this species has declined in southern NSW and hasn't been recorded near the Project Area since the 1990s.
Caspian Tern *Hydroprogne caspia*	-	M	Widespread east of the Great Divide, mainly in coastal regions, and also in the Riverina and Lower and Upper Western Regions, with occasional records elsewhere, with breeding recorded in the Menindee Lakes region. The Caspian Tern is mostly found in sheltered coastal embayments, harbours, lagoons, inlets, bays, estuaries and river deltas, and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs	Atlas	6	Low. There is no suitable habitat present in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Common Greenshank *Triga neblaria*	-	E, M	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees.	Atlas, PMST	6	Low. There is only very marginal habitat located in the Project Area.
Common Sandpiper *Actitis hypoleucos*	-	M	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	PMST	-	Low. There is only very marginal habitat located in the Project Area.
Curlew Sandpiper *Calidris ferruginea*	E	CE, M	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	Atlas, PMST	2	Low. There is only very marginal habitat located in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Diamond Firetail *Stagonopleura guttata*	V	V	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (*Eucalyptus pauciflora*) Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	BAM-C, Atlas, PMST	27	Recorded.
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	V	-	Often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. Has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests, very occasionally in moist forests or rainforests. Understorey is typically open with sparse eucalypt saplings, acacias and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with coarse woody debris.	BAM-C, Atlas	19	High. There is suitable habitat in the Project Area. There is a record from 2014, 20km south east of the Project Area. This species is likely to occasionally occur in the Project Area.
Eastern Grass Owl *Tyto longimembris*	V	-	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.	Atlas	2	Low. There is no suitable habitat in the Project Area.
Flame Robin *Petroica phoenicea*	V	-	Prefers clearings or areas with open understories. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. The ground layer of this breeding habitat is dominated by native grasses with a sparse or dense shrub layer. In the winter birds migrate to open and drier lowlands.	Atlas	15	Recorded.
Freckled Duck *Stictonetta naevosa*	V	-	Utilises permanent freshwater swamps and creeks, preferably with dense vegetation for foraging and nesting. Associated with Cumbuni, Lignum and Tea-tree. Is normally distributed throughout the Paroo, Lachlan and other rivers within the Riverina. During droughts they are known to disperse through coastal NSW.	BAM-C, Atlas	25	Low. There is marginal habitat present in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Gilbert's Whistler *Pachycephala inornata*	V	-	The Gilbert's Whistler occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards and Wakool Rivers. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including wattles, hakeas, sennas and hop-bushes.	BAM-C, Atlas	1	Low. There is no suitable habitat in the Project Area.
Gull-billed Tern *Gelochelidon nilotica*	-	M	This migratory bird occurs in Australia as a winter migrant. Foraging occurs over wet fields and brushy areas. Largely associated with lakes, marshes and coastal areas.	Atlas	17	Moderate. There is a restricted area of suitable habitat in the Project Area. The nearest record is from Gum Creek 20 km north-east of the Project Area in 2012, however Umwelt recorded the species along Jerilderie Road, approximately 25km north west from the Project Area while travelling back to Hay during the 2024 summer BBUS for the Project.
Grey Falcon *Falco hypoleucus*	V	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	BAM-C, PMST	-	Low. There is potentially suitable habitat in the Project Area, however the Grey Falcon has not been recorded within 30km of the Project Area and is unlikely to occur at this location.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*	V	-	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones.	BAM-C, Atlas	684	Recorded.
Hooded Robin (south-eastern form) *Melanodryas cucullata cucullata*	V	-	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	BAM-C, Atlas, PMST	9	Low. There is marginal habitat present in the Project Area. There are very few records within 50 km of the Project Area nearest records are from the Booroorban area 35 km south-west of the Project Area.
Little Curlew *Numenius minutus*			The Little Curlew is most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used.. The Little Curlew congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. Birds may also rest in grassy, open woodlands and on bare blacksoil plains, or on dry or recently burnt grasslands on floodplains, mudflats, swamps. Resting has also been recorded under partly submerged vegetation. After freshwater pools dry up, roosting may occur in the shallows of reservoirs and the sea.	Atlas	1	Low. Marginal habitat is present in the Project Area, however this species is a rare vagrant to western NSW.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Little Eagle *Hieraaetus morphnoides*	V	-	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	BAM-C, Atlas	37	Recorded.
Latham's Snipe *Gallinago hardwickii*	-	V, M	Latham's Snipe occurs in a wide variety of permanent and ephemeral wetlands. They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat. As such, snipe may be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields and open forest.	Atlas, PMST	7	Moderate. There is suitable habitat in the Project Area. This species may very occasionally occur in the Project Area. The nearest records are from Wanganella.
Magpie Goose *Anseranas semipalmata*	V	-	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW.	BAM-C, Atlas	8	Moderate. A restricted area of suitable habitat is present in the Project Area. This species may very occasionally occur in the Project Area. The nearest records are from Wanganella.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Pink Cockatoo *Lophochroa leadbeateri*	V	E	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.	BAM-C, PMST	13	Moderate. Suitable habitat and foraging areas are present in the Project Area. Pink cockatoo have been recorded on the properties immediately west of the Project Area. This species may occasionally occur in the Project Area.
Malleefowl *Leipoa ocellata*	E	V	Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers.	Atlas, PMST	1	Low. There is no suitable habitat in the Project Area.
Common Greenshank *Tringa nebularia*		E, M	Considered widespread across coastal regions and inhabits all types of wetlands. The species is predominantly observed near or among mangroves or other sparse, emergent or fringing vegetation including sedges, saltmarsh and occasionally seagrass beds. The Common greenshank roosts in the coast ad inland in estuaries and mudflats, mangrove swamps and lagoons, billabongs, swamps, sewages farms and flooded crops.	Atlas, PMST	-	Low. There is only very marginal habitat located in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Marsh Sandpiper *Tringa stagnatilis*	-	M	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. Three of the five sites with highest recorded numbers are saltwater habitats (Hunter Estuary, NSW; Port Hedland Saltworks, Western Australia; Tullakool Evaporation Ponds, NSW). They are found infrequently around mangroves.	Atlas	3	Low. There is only very marginal habitat located in the Project Area.
Masked Owl *Tyto novaehollandiae*	V	-	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Pairs have a large home-range of 1000 hectares or more, depending on prey availability.	BAM-C, Atlas	2	Low. There is no suitable habitat in the Project Area.
Pacific Swift *Apus pacificus*	-	M	The Pacific Swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes.	Atlas, PMST	1	Moderate. This species may occasionally occur in the Project Area. The nearest records are from the Cobb Highway 35 km due west of the Project Area in 2023.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Painted Honeyeater *Grantiella picta*	V	V	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	BAM-C, Atlas, PMST, SEARs	60	High. There is suitable habitat present in the Project Area. The nearest record is from adjacent the site at Oolambeyan N.P in 2015. This species is likely to occasionally occur in the Project Area.
Pectoral Sandpiper *Calidris melanotos*	-	M	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands	Atlas, PMST	2	Low. There is only very marginal habitat located in the Project Area.
Pied Honeyeater *Certhionyx variegatus*	V	-	Inhabits wattle shrub, primarily Mulga (*Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.) also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs; can be locally common at times.	BAM-C, Atlas	8	Moderate. Suitable habitat present in the Project Area. The species may utilise the woodland or chenopod shrublands very occasionally. The nearest records are from the Wanganella area. This species may very occasionally occur in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Plains-wanderer *Pedionomus torquatus*	E	CE	Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species. Most of the grassland habitat of the Plains-wanderer is <5 cm high, but some vegetation up to a maximum of 30 cm is important for concealment, as long as grass tussocks are spaced 10-20 cm apart. During prolonged drought, the denudation of preferred habitats may force birds into marginal denser and taller grassland habitats that become temporarily suitable.	BAM-C, Atlas, PMST, SEARs	1,355	Recorded.
Redthroat *Pyrrholaemus brunneus*	V	-	In NSW the species has been recorded mainly in chenopod shrublands including Old Man Saltbush, Black Bluebush and Dillon Bush shrublands. Around Broken Hill it appears to be associated with the denser vegetation, particularly Acacias, found in drainage lines that run from the rocky hills. In other locations it is known from Canegrass and Lignum swamps and depressions, particularly on floodplains.	BAM-C	-	Low. The Project Area is located outside this species range. The nearest known population is located about 30 km north of Balranald.
Red-necked Stint *Calidris ruficollis*	-	M	In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation.	Atlas	1	Low. There is only very marginal habitat located in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Regent Parrot (eastern subspecies) *Polytelis anthopeplus monarchoides*	E	V	The species nests within River Red Gum forests along the Murray, Wakool and lower Murrumbidgee Rivers, and possibly the Darling River downstream of Pooncarie. Typical nest trees are large, mature healthy trees with many spouts (though dead trees are used) and are usually located close to a watercourse. Principal foraging habitat is mallee woodlands, though foraging also occurs in riverine forests and woodlands. Mallee woodland within 20 kilometres of nesting sites is critical foraging habitat for breeding birds. They may utilise cereal crops and will feed on spilt grain. Is claimed to be a pest in almond orchards.	BAM-C	-	Low. The Project Area is located outside this species range. The nearest record is from Moulamein.
Satin Flycatcher *Myiagra cyanoleuca*	-	M	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	PMST		Low. The Project Area is located outside this species range. There is no suitable habitat in the Project Area.
Sharp-tailed Sandpiper *Calidris acuminata*	-	V, M	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season.	Atlas, PMST	10	Moderate. There is a restricted area of suitable habitat in the Project Area. Suitable habitat occurs in the Project Area. This species has been recorded on the properties immediately west of the Project Area. This species may very occasionally occur in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Scarlet Robin *Petroica boodang*	V	-	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	BAM-C, Atlas	9	Low. There is no suitable habitat in the Project Area.
Speckled Warbler *Chthonicola sagittata*	V	-	The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding.	Atlas	3	Low. The Project Area is located outside this species range. There is no suitable habitat in the Project Area.
Southern Whiteface *Aphelocephala leucopsis*	V	V	Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter. Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains.	Atlas, MNES, PMST	141	Recorded.
Spotted Harrier *Circus assimilis*	V	-	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	BAM-C, Atlas	61	Recorded.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Square-tailed Kite *Lophoictinia isura*	V	-	The square-tailed kite ranges along the coastal and sub-coastal areas around much of the country. It has been observed in a variety of timbered habitats showing a preference for timbered watercourses.	BAM-C, Atlas	11	Moderate. There is suitable habitat in the Project Area. This species may very occasionally occur in the Project Area. The nearest recent record is from adjacent the Sturt Hwy 30 km north of the Project Area in 2017.
Superb Parrot *Polytelis swainsonii*	V	V	Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum forest. In the Riverina superb parrots nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum forest or woodland. On the South West Slopes and Southern Tablelands nest trees can be in open Box-Gum woodland or isolated living or dead paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground	BAM-C, Atlas, PMST, SEARs	605	Moderate. There is suitable habitat in the Project Area. The nearest record is from 10 km north-east of the Project Area in 2021. This species may very occasionally occur in the Project Area.
Swift Parrot *Lathamus discolor*	E	CE	In NSW the Swift Parrot has been recorded on the coast and south west slopes, occurring in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylo*n), and White Box (*E. albens*).	BAM-C, MNES, PMST, Atlas	-	Low. There is no suitable habitat in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Varied Sittella *Daphoenositta chrysoptera*	V	-	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland.	BAM-C, Atlas	22	Low. There is suitable habitat present in the Project Area however there are no records within 30km of the Project Area and the species is unlikely to utilise the available habitat.
White-bellied Sea-eagle *Haliaeetus leucogaster*	V	-	Habitat includes coastlines, estuaries, large rivers and lakes, swamps and the sea. It has occasionally been recorded over adjacent habitats. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. This species builds a large stick nest in a tall tree and very rarely on artificial structures.	BAM-C, Atlas	40	Moderate. The species may very occasionally utilise the Project Area for foraging. No suitable breeding habitat is present in the Project Area. The nearest records are from Carrathool and Wanganella.
White-fronted Chat *Epthianura albifrons*	V	-	Gregarious species usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground.	BAM-C, Atlas	74	Recorded.
White-throated Needletail *Hirundapus caudacutus*	-	V, M	Migratory and usually seen in eastern Australia from October to April. Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. More common in coastal areas, less so inland.	BAM-C, Atlas	5	Moderate. This species may occasionally occur in the Project Area. The nearest records are from Hay, Mabins Well and Wanganella.
Eastern Curlew *Numenius madagascariensis*	-	CE	Generally, occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.	PMST	-	Low. There is no suitable habitat in the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Wood Sandpiper *Tringa glareola*	-	M	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially *Melaleuca* and River Red Gums *Eucalyptus camaldulensis* and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. They are rarely found using brackish wetlands, or dry stunted saltmarsh. Typically they do not use coastal flats, but are occasionally recorded in stony wetlands. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains.	Atlas	1	Low. There is only very marginal habitat located in the Project Area.
Yellow Wagtail *Motacilla flava*	-	M	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range it is also found in large forest clearings.	PMST	-	Low. There is no suitable habitat in the Project Area. This species is a rare vagrant.
Mammals						
Spotted-tailed quoll *Dasyurus maculatus*	V	E	Utilises a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites	BAM-C, Atlas	1	Low. The Subject Landis located at edge of its range. The Subject Land and surrounding locality does not contain the densely wooded areas preferred by the species.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	V	-	Rainforest, sclerophyll forest and open woodland. Availability of tree hollows is important for access to roosting sites. Will utilise mammal burrows in treeless areas.	BAM-C, Atlas	4	Moderate. Suitable habitat present in the Project Area. Known to utilise mammal burrows and buildings, both which occur on site.
Koala *Phascolarctos cinereus*	E	E	Inhabits a range of eucalypt forest and woodland communities. Adequate floristic diversity, availability of feed trees (primarily *Eucalyptus tereticornis* and *E. viminalis*) and presence of mature trees very important. Preferred food tree species vary with locality and there are quite distinct regional preferences. They can persist in fragmented habitats, and even survive in isolated trees across a predominantly agricultural landscape.	BAM-C, Atlas, PMST	7	Moderate. Suitable habitat occurs in the Project Area.
Inland Forest Bat *Vespadelus baverstocki*	V	-	Roosts in tree hollows and abandoned buildings. Known to roost in very small hollows in stunted trees only a few metres high. The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas inhabited by the Little Forest Bat. However, other habitats may be used for foraging and/or drinking.	BAM-C, Atlas	2	Moderate. Potential suitable habitat occurs within 30km of the Project Area boundary. Species habitat requirements is not well known.
Southern Myotis *Myotis macropus*	V	-	This species generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. They forage over streams and pools catching insects and small fish.	BAM-C, Atlas	8	Moderate. Suitable habitat occurs in the Project Area with similar species occurring in the Subject Land.
Little Pied Bat *Chalinolobus picatus*	V	-	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water.	BAM-C, Atlas	2	Moderate. Associated with PCTs that occur on site.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Corben's Long-eared Bat *Nyctophilus corbeni*	V	V	Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	BAM-C, PMST	-	Low. Occurs in a wide range of inland woodland habitat types.
Reptiles						
Grey Snake *Hemiaspis damelii*	E	E	Floodplains and ephemeral wetlands associated with heavy clay soils are key habitat features for the Grey Snake. The species shelters in soil cracks, rocks, logs, flood debris, and abandoned burrows within these habitats. The Grey Snake has not been sighted in dry phase wetlands, suggesting its detectability and activity patterns may be related to wetland inundation regimes and suitable weather conditions.	PMST, SEARs	-	Moderate. Possible habitat occurs within the Coleambally Outfall Drain and Red Gum associated wetlands.
Pink-tailed Legless Lizard *Aprasia parapulchella*	V	V	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	BAM-C, PMST	-	Low. Habitat requirement is rocky ground which does not occur on the Project Area.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Threatened Ecological Communities						
Weeping Myall Woodlands	-	E	Weeping Myall trees often occur in monotypic stands, however other vegetation may also occur in the ecological community, though not as dominant species. These include: Western Rosewood (*Alectryon oleifolius subsp. elongatus*); Poplar Box (*Eucalyptus populnea*); or Black Box (*Eucalyptus largiflorens*) Grey Mistletoe (*Amyema quandang*) commonly occurs on the branches of Weeping Myall trees throughout the ecological community's range.	PMST, SEARs	-	Recorded.
Natural Grasslands of the Murray Valley Plains.	-	CE	The TEC is a type of natural temperate grassland that has semi-arid characteristics, due to the lower rainfall where it occurs. The structure is an open grassland to forbland in which trees and tall shrubs are sparse to absent. The vegetation is dominated by the ground layer with range of perennial grasses (*Rytidosperma, Austrostipa, Chloris,* and *Enteropogon*), forbs (*Arthropodium, Bulbine, Calotis, Chrysocephalum, eptorhynchos, Minuria, Ptilotus, Rhodanthe, Sida* and *Swainsona*) and small shrubs (*Atriplex* and *Maireana*). Within its range, the Natural Grasslands of the Murray Valley Plains ecological community occurs predominately on flat, alluvial lowland plains with heavy-textured grey, brown and red clays. Many occurrences are associated with Quaternary alluvial sediments.	PMST, SEARs		Nil. Vegetation In the Project Area was not found to conform to the TEC.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	-	E	The TEC occurs in landscapes of low-relief on productive soils derived from alluvial or colluvial materials but may occur on a range of substrates. The TEC tends to occupy drier sites of the belt of grassy woodlands in south-eastern Australia, within a rainfall zone of 375 -700 mm/year. A tree canopy dominated by *Eucalyptus microcarpa* (Grey Box) is typically present with an understory of chenopods, grasses and forbs.	PMST, SEARs	-	Nil. The TEC was not recorded in the Project Area during vegetation assessment.
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	-	E	The TEC is a community that encompasses a number of closely-related woodland communities in which Buloke (*Allocasuarina leuhmanni*) is dominant or co-dominant. Other trees that may be prominent are *Callitris gracillis, Callitris glaucophylla, Eucalyptus largiflorens, Eucalyptus leucoxylon* subsp. *pruinosa,* and *Eucalyptus microcarpa.* These woodlands can occur within a range of soils, climates, and broadly across south-eastern South Australia, north-western and northern-central Victoria, as well as sparsely in south-central New South Wales. The extent in NSW is uncertain due to extensive woodland degradation and clearing that has occurred in the region.	PMST, SEARs	-	The TEC was not recorded in the Project Area during vegetation assessment.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	CE	The TEC is known to occur within the relevant bioregions on hilly to undulating landscapes in areas where average rainfall is between 400 and 900 mm per annum, on moderate to highly fertile soils at altitudes of 170 m to 1200 m. Characteristic species include *Eucalyptus albens, E. melliodora, E. blakelyi, E. macrocarpa, E. moluccana, Austrostipa, Bothriochloa, Chloris, Cymbopogon, Dichanthium, Microlaena, Poa, Themeda, Rytidosperma or Sorghum*.	PMST, SEARs	-	The TEC was not recorded in the Project Area during vegetation assessment.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions.	-	CE	It is an open mallee eucalypt woodland with a canopy typically dominated by 'mallee box' Eucalyptus species and an understorey in which tussock grasses are prominent in wet years, low chenopod shrubs occur in variable densities, and taller shrubs are typically sparse. The ecological community is associated with relatively medium-heavy textured soils on near-level sandplains and average rainfall of 260 mm–450 mm within the Murray Darling Depression and Riverina Bioregions. Primary diagnostic species are *Eucalyptus porosa, E. behriana, E calycogona,* and *E. dumosa.*	SEARs		The TEC was not recorded in the Project Area during vegetation assessment.
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	E	-	*Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions is the name given to the ecological community that is dominated by *Acacia melvillei* (Yarran). *Acacia melvillei* Shrubland typically has an open canopy of shrubs or small trees, sometimes with scattered mid-stratum shrubs, and with a sometimes sparse, but highly variable ground layer dominated by grasses, chenopods and herbs. The structure and species composition of the community varies depending on disturbance history and temporal variability in rainfall. The open stratum of large shrubs or small trees may be reduced to isolated individuals or may be absent as a result of past clearing. The shrub/tree layer is dominated by *Acacia melvillei*, either in pure stands or with a range of other less abundant trees or tall shrubs. These may include *Acacia loderi, Alectryon oleifolius* subsp. *canescens, Casuarina pauper* and *Myoporum platycarpum.*	Atlas		The TEC was not recorded in the Project Area during vegetation assessment.
Artesian Springs Ecological Community in the Great Artesian Basin	E	-	Occurs at the edges of the Great Artesian Basin. Mostly occurs in South Australia and Queensland. Few occur in the Mulga Lands, Darling Riverine Plains, and Cobar Peneplain Bioregions of NSW. Springs can be classified as either artesian spring mounds or mud springs and can be active (permanently wet) or inactive (dry).	BioNet	-	The TEC was not recorded in the Project Area during vegetation assessment. Outside the current range for the TEC.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions	E	-	*Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression bioregions is the name given to the TEC. The community typically comprises an open tree canopy with a sparse and highly variable ground layer dominated by grasses and herbs, sometimes with scattered shrubs and/or small trees. The structure and species composition of the community varies depending on disturbance history and temporal variability in rainfall. The species composition of a site will be influenced by the size of the site, recent rainfall or drought conditions and by its disturbance (including grazing, land clearing and fire) history. The number and relative abundance of species will change with time since fire, and may also change in response to changes in fire frequency or grazing regime. The groundcover is highly variable in structure and composition. It is typically sparse, but may be more continuous within patches or following substantial rainfall events.	BioNet	-	The TEC was not recorded in the Project Area during vegetation assessment.
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E	-	Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, *Eucalyptus microcarpa*, is often found in association with *E. populnea* subsp. *bimbil*, *Callitris glaucophylla*, *Brachychiton populneus*, *Allocasuarina luehmannii* or *E. melliodora*, and sometimes with *E. albens*. Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent. The community generally occurs as an open woodland 15–25 m tall but in some locations the overstorey may be absent as a result of past clearing or thinning, leaving only an understorey.	BioNet		The TEC was not recorded in the Project Area during vegetation assessment.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E	-	This TEC occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 mm mean annual rainfall. The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The tree layer grows up to a height of about 10 m and invariably includes *Acacia pendula* (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs. The structure and composition of the community varies, particularly with latitude, as chenopod shrubs are more prominent south of the Lachlan River district, while other woody species and summer grasses are more common further north. In some areas the shrub and canopy stratum may have been reduced or eliminated by clearing or heavy grazing, leaving derived grassland that may still constitute this community.	BioNet		Recorded.
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregion	E	-	The TEC is a community dominated by White Cypress Pine (*Callitris glaucophylla*). Sandhill Pine is characterised by an open tree stratum dominated by *C. glaucophylla* in pure stands or with a range of other less abundant trees and shrubs. The community structure and species composition of the community varies depending on the disturbance history and temporal variability in rainfall. Typically occupies red-brown loamy sands with alkaline sub-soils on the alluvial plain of the Murray River and its tributaries, and on parts of the sandplain in south-western NSW. A number of species in this community are shared with TEC *Allocasuarina leuhmanni* Woodland in the Riverina and Murray-Darling Depression bioregions.	BioNet		Recorded.

Common Name *Scientific Name*	BC Act	EPBC Act	Habitat requirements	Source	Number of records (BioNet)	Likelihood of occurrence
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and	CE	-	Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum and a generally grassy understorey. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include *E. bridgesiana, E. polyanthemos, E. macrorhyncha, E. moluccana*, *E. rubida, E. goniocalyx,* and *E. youmanii*. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include *Themeda australis, Poa sieberiana, Rytidosperma* spp*., Austrostipa* spp., *Chrysocephalum apiculatum, Goodenia pinnatifida, Hypericum gramineum, Vittadinia muelleri, Wahlenbergia* spp. Shrubs are generally sparse or absent, though they may be locally common. Remnants generally occur on fertile lower parts of the landscape where soil fertility is relatively high compared to the surrounding landscape. Sites with particular characteristics, including varying age classes in the trees, patches of regrowth, old trees with hollows and fallen timber on the ground are very important as wildlife habitat.	BioNet		The TEC was not recorded in the Project Area during vegetation assessment.

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Appendix C - Credit Reports

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00047468/BAAS17068/24/00047469

Proposal Name
Bullawah Wind Farm - Stage 1 Linear Assessment_August 2025 Update

BAM data last updated *
05/08/2025

Assessor Name
Rachel Musgrave

Assessor Number
BAAS18032

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
01/09/2025

BAM Case Status
Finalised

Assessment Revision
7

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
01/09/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
164-Cotton Bush open shrubland of the semi-arid (warm) zone

PCTs With Customized Benchmarks

PCT
10-River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
13-Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
17-Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
24-Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone
44-Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion
46-Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion
160-Nitre Goosefoot shrubland wetland on clays of the inland floodplains
164-Cotton Bush open shrubland of the semi-arid (warm) zone

Predicted Threatened Species Not On Site

BAM Biodiversity Credit Report (Like for like)

Name
Polytelis anthopeplus monarchoides / Regent Parrot (eastern subspecies)

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
10-River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	2.2	29	0	29
13-Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	0.1	2	0	2
17-Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	2.1	0	77	77
24-Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains	Not a TEC	2.0	0	27	27
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	4.9	0	135	135
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Weeping Myall Woodlands	17.9	0	307	307

28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	20.4	0	503	503
44-Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Not a TEC	76.5	0	1842	1842
46-Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Not a TEC	138.8	0	3561	3561
160-Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Not a TEC	0.9	0	20	20
164-Cotton Bush open shrubland of the semi-arid (warm) zone	Not a TEC	3.9	0	71	71

10-River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Riverine Forests This includes PCT's: 2, 5, 7, 8, 9, 10, 11, 36, 78, 79, 112, 233, 234, 249, 356, 362, 4088, 4089	Inland Riverine Forests <50%	10_Moderate-Good	Yes	29	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

13-Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	13_Moderate-Good	Yes	2	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
17-Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Floodplain Shrublands This includes PCT's: 17, 115, 161, 241, 247, 375	Inland Floodplain Shrublands >=50% and <70%	17_Moderate-Good	No	77	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
24-Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Inland Floodplain Shrublands This includes PCT's: 17, 24, 25, 115, 160, 161, 240, 241, 247, 261, 271, 375	Inland Floodplain Shrublands <50%	24_Moderate-Good	No	27	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Moderate-Good	No	135	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

26-Weeping Myall open woodland of the Riverina Bior	
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	**Like-for-like credit retirement options**

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Weeping Myall Woodlands This includes PCT's: 26, 27, 1766	-	26_DNG	No	307	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	**Like-for-like credit retirement options**

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions This includes PCT's: 19, 21, 28, 48, 75	-	28_DNG	No	503	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

28-White Cypress Pine open woodland of sand plains, prio	
44-Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	**Like-for-like credit retirement options**

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Grasslands This includes PCT's: 44	Riverine Plain Grasslands >=70% and <90%	44_Moderate-Good	No	1842	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

46-Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	**Like-for-like credit retirement options**

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Grasslands This includes PCT's: 44, 45, 46, 165, 1203	Riverine Plain Grasslands <50%	46_Moderate-Good	No	3561	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

160-Nitre Goosefoot shrubland wetland on clays of the inland floodplains	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Floodplain Shrublands This includes PCT's: 17, 24, 25, 115, 160, 161, 240, 241, 247, 261, 271, 375	Inland Floodplain Shrublands <50%	160_Moderate-Good	No	20	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
164-Cotton Bush open shrubland of the semi-arid (warm) zone	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_Moderate-Good	No	71	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

BAM Biodiversity Credit Report (Like for like)

Species	Vegetation Zone/s	Area / Count	Credits
Hieraaetus morphnoides / Little Eagle	**10_Moderate-Good, 13_Moderate-Good, 26_DNG, 28_DNG, 44_Moderate-Good, 46_Moderate-Good, 26_Moderate-Good**	20.5	386.00
Lepidium monoplocoides / Winged Peppercress	**10_Moderate-Good, 26_DNG, 28_DNG, 44_Moderate-Good, 46_Moderate-Good**	3.5	88.00
Litoria raniformis / Southern Bell Frog	**10_Moderate-Good, 24_Moderate-Good, 26_DNG, 28_DNG, 44_Moderate-Good, 46_Moderate-Good, 26_Moderate-Good**	34.9	934.00
Maireana cheelii / Chariot Wheels	**10_Moderate-Good, 28_DNG, 46_Moderate-Good**	2.0	51.00
Ninox connivens / Barking Owl	**10_Moderate-Good, 26_DNG, 26_Moderate-Good**	2.8	49.00

Swainsona murrayana / Slender Darling Pea	**10_Moderate-Good, 13_Moderate-Good, 17_Moderate-Good, 24_Moderate-Good, 26_Moderate-Good, 26_DNG, 28_DNG, 44_Moderate-Good, 46_Moderate-Good, 160_Moderate-Good, 164_Moderate-Good**	166.1	4849.00
Swainsona sericea / Silky Swainson-pea	**26_DNG, 28_DNG, 44_Moderate-Good, 46_Moderate-Good, 164_Moderate-Good, 26_Moderate-Good**	4.2	117.00

Credit Retirement Options

Like-for-like credit retirement options

Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion
	Hieraaetus morphnoides / Little Eagle	Any in NSW
Lepidium monoplocoides / Winged Peppercress	Spp	IBRA subregion
	Lepidium monoplocoides / Winged Peppercress	Any in NSW
Litoria raniformis / Southern Bell Frog	Spp	IBRA subregion

	Litoria raniformis / Southern Bell Frog	Any in NSW
Maireana cheelii / Chariot Wheels	Spp	IBRA subregion
	Maireana cheelii / Chariot Wheels	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Swainsona murrayana / Slender Darling Pea	Spp	IBRA subregion
	Swainsona murrayana / Slender Darling Pea	Any in NSW
Swainsona sericea / Silky Swainson-pea	Spp	IBRA subregion
	Swainsona sericea / Silky Swainson-pea	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00047468/BAAS17068/24/00047470

Proposal Name
Bullawah Wind Farm - Stage 1 Site based - August 2025 Updates

BAM data last updated *
05/08/2025

Assessor Name
Rachel Musgrave

Assessor Number
BAAS18032

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
01/09/2025

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
01/09/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
164-Cotton Bush open shrubland of the semi-arid (warm) zone

PCTs With Customized Benchmarks

PCT
28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone
164-Cotton Bush open shrubland of the semi-arid (warm) zone

Predicted Threatened Species Not On Site

Name
Grantiella picta / Painted Honeyeater
Melanodryas cucullata cucullata / South-eastern Hooded Robin
Pachycephala inornata / Gilbert's Whistler
Daphoenositta chrysoptera / Varied Sittella
Haliaeetus leucogaster / White-bellied Sea-Eagle

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	0.5	0	13	13
164-Cotton Bush open shrubland of the semi-arid (warm) zone	Not a TEC	0.4	0	7	7

28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions This includes PCT's: 19, 21, 28, 48, 75	-	28_DNG	No	13	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

164-Cotton Bush open shrubland of the semi-arid (warm) zone

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_Moderate-Good	No	7	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00047468/BAAS17068/24/00047471

Proposal Name
Bullawah Wind Farm - Stage 2 Linear Assessment_August 2025

BAM data last updated *
05/08/2025

Assessor Name
Rachel Musgrave

Assessor Number
BAAS18032

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
01/09/2025

BAM Case Status
Finalised

Assessment Revision
7

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
01/09/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
164-Cotton Bush open shrubland of the semi-arid (warm) zone

PCTs With Customized Benchmarks

PCT
28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone
44-Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion
46-Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion
160-Nitre Goosefoot shrubland wetland on clays of the inland floodplains
164-Cotton Bush open shrubland of the semi-arid (warm) zone

Predicted Threatened Species Not On Site

Name
Grantiella picta / Painted Honeyeater
Melanodryas cucullata cucullata / South-eastern Hooded Robin
Pachycephala inornata / Gilbert's Whistler
Pomatostomus temporalis temporalis / Grey-crowned Babbler (eastern subspecies)
Daphoenositta chrysoptera / Varied Sittella

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	36.6	0	902	902
44-Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Not a TEC	92.8	0	2235	2235
46-Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Not a TEC	194.3	0	4985	4985
160-Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Not a TEC	1.6	0	36	36
164-Cotton Bush open shrubland of the semi-arid (warm) zone	Not a TEC	36.7	0	668	668

28-White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions This includes PCT's: 19, 21, 28, 48, 75	-	28_DNG	No	902	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

28-White Cypress Pine open woodland of sand plains, prior streams and dunes

44-Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Grasslands This includes PCT's: 44	Riverine Plain Grasslands >=70% and <90%	44_Moderate-Good	No	2235	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

46-Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Grasslands This includes PCT's: 44, 45, 46, 165, 1203	Riverine Plain Grasslands <50%	46_Moderate-Good	No	4985	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

160-Nitre Goosefoot shrubland wetland on clays of the inland floodplains

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Floodplain Shrublands This includes PCT's: 17, 24, 25, 115, 160, 161, 240, 241, 247, 261, 271, 375	Inland Floodplain Shrublands <50%	160_Moderate-Good	No	36	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

164-Cotton Bush open shrubland of the semi-arid (warm) zone

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_Moderate-Good	No	668	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Eleocharis obicis / Spike-Rush	**28_DNG, 44_Moderate-Good, 46_Moderate-Good**	7.3	193.00
Hieraaetus morphnoides / Little Eagle	**28_DNG, 44_Moderate-Good**	14.2	257.00
Litoria raniformis / Southern Bell Frog	**28_DNG, 44_Moderate-Good, 46_Moderate-Good**	17.3	492.00
Maireana cheelii / Chariot Wheels	**28_DNG, 44_Moderate-Good**	2.7	65.00
Swainsona murrayana / Slender Darling Pea	**28_DNG, 44_Moderate-Good, 46_Moderate-Good, 160_Moderate-Good, 164_Moderate-Good**	279.1	8209.00
Swainsona sericea / Silky Swainson-pea	**28_DNG, 44_Moderate-Good, 46_Moderate-Good**	5.6	165.00

Credit Retirement Options

Like-for-like credit retirement options

Eleocharis obicis / Spike-Rush	Spp	IBRA subregion
	Eleocharis obicis / Spike-Rush	Any in NSW
Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion
	Hieraaetus morphnoides / Little Eagle	Any in NSW

Litoria raniformis / Southern Bell Frog	Spp	IBRA subregion
	Litoria raniformis / Southern Bell Frog	Any in NSW
Maireana cheelii / Chariot Wheels	Spp	IBRA subregion
	Maireana cheelii / Chariot Wheels	Any in NSW
Swainsona murrayana / Slender Darling Pea	Spp	IBRA subregion
	Swainsona murrayana / Slender Darling Pea	Any in NSW
Swainsona sericea / Silky Swainson-pea	Spp	IBRA subregion
	Swainsona sericea / Silky Swainson-pea	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00047468/BAAS17068/25/00055452

Proposal Name
Bullawah Wind Farm - Euston road upgrades

BAM data last updated *
28/10/2024

Assessor Name
Rachel Musgrave

Assessor Number
BAAS18032

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
04/04/2025

BAM Case Status
Finalised

Assessment Revision
0

BOS entry trigger
BOS Threshold: Area clearing threshold

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
28/03/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Botaurus poiciloptilus / Australasian Bittern

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
13-Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	0.1	0	1	1

BAM Biodiversity Credit Report (Like for like)

13-Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	13_Degraded	No	1	Robinvale Plains, Murray Fans, Murray Scroll Belt, Murrumbidgee and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BayWa r.e.

r.e. think energy

Appendix D - Prescribed Impact Assessment

umwelt
Environmental & Social Consultants

BayWa r.e.

BULLAWAH WIND FARM PROJECT

Appendix D – Turbine Strike Prescribed Impact Assessment

FINAL

August 2025

BULLAWAH WIND FARM PROJECT

Appendix D – Turbine Strike
Prescribed Impact Assessment

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Bullawah Wind Farm Pty Ltd

Project Director: Nathan Baker
Project Manager: Thomas Buchan
Technical Director: Rachel Musgrave
Report No. 22110/R43A
Date: August 2025

Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Bill Wallach	4 April 2025	Nathan Baker	7 April 2025
Final V2 (RFI#2)	Rachel Musgrave	18 August 2025	Nathan Baker	19 August 2025

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1.0 Introduction

This document has been prepared to address Section 8.3.5 criterion a-c of the 'assess prescribed biodiversity impacts' section of the Biodiversity Assessment Method (BAM) (DPIE 2020a) for the Bullawah Wind Farm (the Project).

A total of 121 bird and 12 bat species are examined in this Prescribed Impact Assessment. This includes 11 threatened and 92 non-threatened bird species that were recorded in the Project Area during the 2022–2024 surveys and an additional 18 threatened and/or migratory bird species that were not recorded but may occur in the Project Area. A total of two threatened and ten non-threatened bat species recorded in the Project Area during the 2022–2024 surveys are assessed. No additional bat species are considered to occur within the Project Area.

This assessment considers the utilisation of the Project Area by these species, which includes the extent of landholdings, as well as adjoining lands where bird utilisation surveys allowed for visual inspection beyond the Project Area boundary. This broader context is necessary to sample given the mobility of the species' being assessed and the BAM criterion being considered (DPIE, 2020a).

The bird and bat survey methodology and results are presented in **Section 2.0** whilst the qualitative collision risk assessment methodology and results are detailed in **Section 8.0**.

The Development Footprint and proposed wind turbine locations which comprises the impact areas associated with the ground disturbances of Bullawah Wind Farm, assessed in accordance with the BAM (DPIE, 2020a) are shown in **Figure 1.1**.

This Prescribed Impact Assessment is appended to the Amended BDAR (August 2025 version) prepared by Umwelt which forms part of the broader response to a formal request for information (RFI) raised by NSW Department of Planning, Housing and Infrastructure (DPHI) on 23 June 2025 (i.e. RFI#2), which included feedback from CPHR on the Amended Project.

1.1 Turbine Specifications

Two turbine sizes are proposed for this Project. These have been analysed for the purpose of interpreting observations and species flight behaviour in relation to collision risk. The measurements detailed below.

1.1.1 Type A (Larger)

- up to 141 wind turbine generators (WTGs)
- maximum blade tip height of 300 metres (m) above ground level (AGL)
- lowermost blade tip height of up to 100 m AGL[1]up to 200 m rotor diameter
- tower (hub) height of up to 200 m AGL.

[1] The actual turbine dimensions will be confirmed during detailed design. This Prescribed Impacts Assessment has assumed a blade tip height of 100 m AGL.

The rotor swept area (RSA) – that is, the area swept by the rotating blades during turbine operation – using the maximum estimate of 200 m rotor diameter (or 100 m radius), equates to an area of approximately 23,235 m squared (m^2) per turbine or approximately 272 h of total aerial space for the maximum number of wind turbines being proposed, being 143.

1.1.2 Type B (Smaller)

- up to 141 wind turbine generators (WTGs)
- maximum blade tip height of 233 metres (m) above ground level (AGL)
- lowermost blade tip height of up to 66.5 m AGL up to 163 m rotor diameter
- tower (hub) height of up to 148 m AGL.

The RSA – that is, the area swept by the rotating blades during turbine operation – using the maximum estimate of 163 m rotor diameter (or 81.5 m radius), equates to an area of approximately 20,867 m^2 per turbine or approximately 298 h of total aerial space for the maximum number of wind turbines being proposed, being 143.

The location of the proposed WTG are shown in **Figure 1.1**.

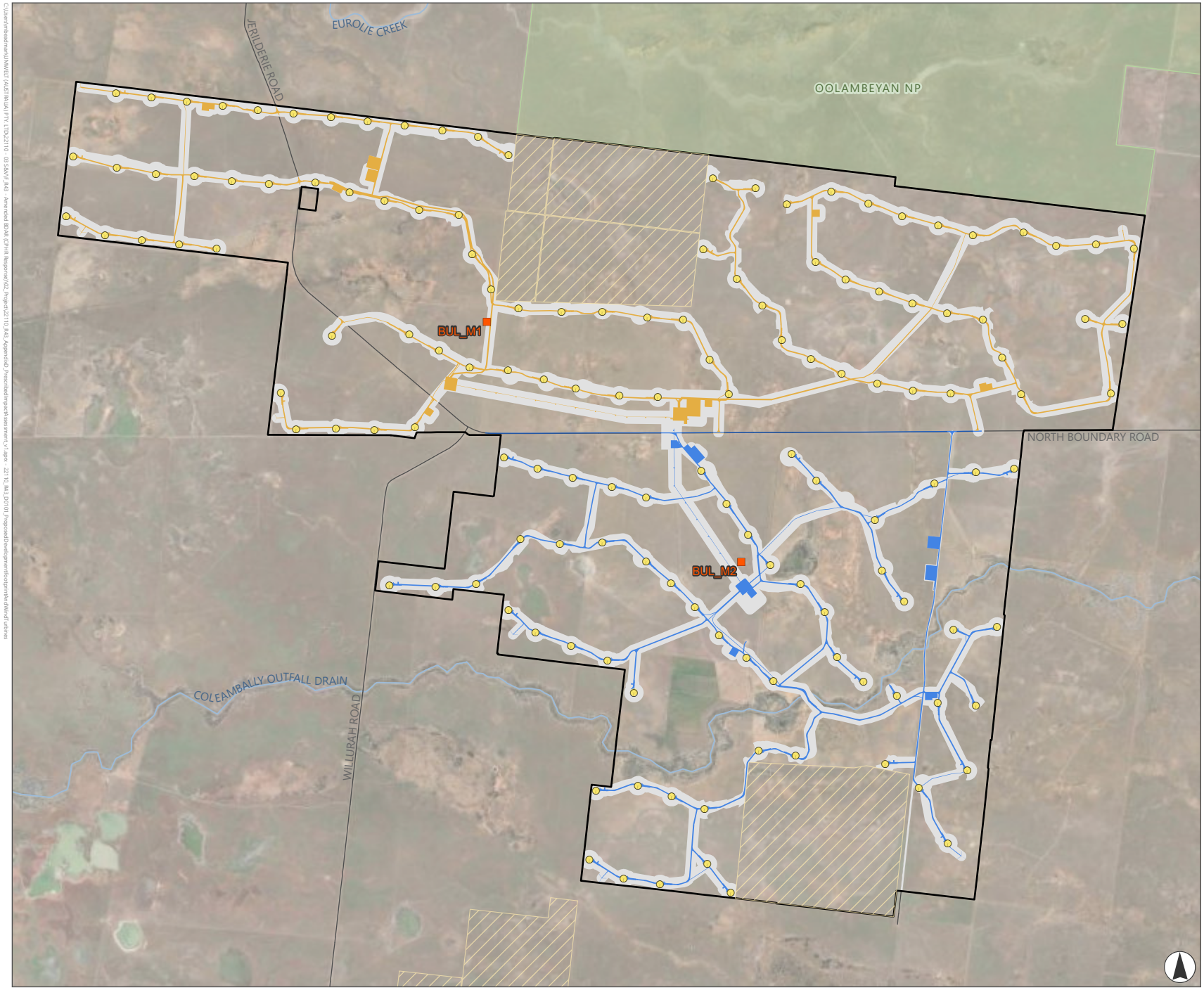
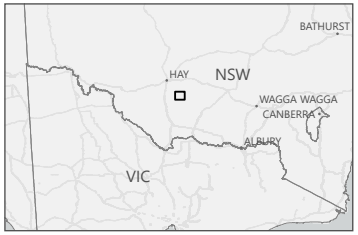


FIGURE 1.1A

Proposed Development Footprint and Wind Turbines

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Met Mast Location
- Conservation Agreement Area
- NPWS Reserves
- Road
- Hydroline



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Meters

Scale 1:110,000 at A4

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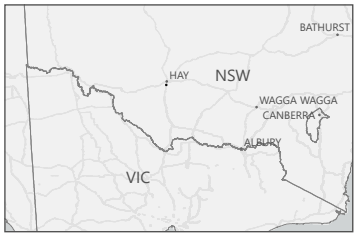
FIGURE 1.1B

Proposed Development Footprint and Wind Turbines

Legend

- Stage 1 (South) Development Footprint
- Road



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Meters

Scale 1:5,000 at A4

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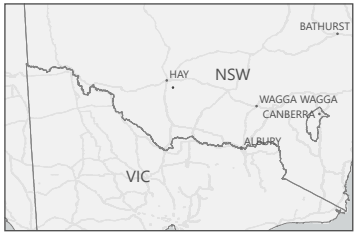
FIGURE 1.1C

Proposed Development Footprint and Wind Turbines

Legend

- Stage 1 (South) Development Footprint
- Road



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Scale 1:5,000 at A4

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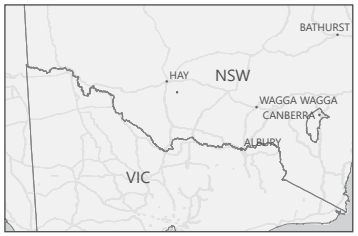
FIGURE 1.1D

Proposed Development Footprint and Wind Turbines

Legend

- Stage 1 (South) Development Footprint
- Road
- Hydroline



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Meters

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2.0 Bird and Bat Surveys at Bullawah Wind Farm

This section describes the bird and bat surveys that have been undertaken for the Project.

The BAM identifies impacts associated with a wind farm to the flyways and migration routes of bird and bat species as 'prescribed impacts' that require specific assessment in accordance with Section 6 of the BAM (DPIE 2020a). The BDAR is required to consider impacts to species that may use the Project Area as a flyway or migration route, including:

- resident threatened aerial species
- resident raptor species
- nomadic and migratory species that are likely to fly over the Project Area.

To facilitate addressing the requirements of Section 6 of the BAM, Umwelt implemented a comprehensive two-year bird and bat survey program from May 2022–February 2024. Surveys were conducted in:

- May, July and September 2022
- January, May, July and September 2023
- February 2024, **totalling eight seasonal survey events.**

The purpose of the bird and bat surveys was to identify 'at risk' species, being those that may be susceptible to collision-based impacts, through observation of flight behaviour across the Project Area.

2.1 Bird Surveys

2.1.1 Overview

A total of 453 vantage point surveys were conducted across 13 sites in the Project Area from May 2022–February 2024 to assess bird occurrence and flight behaviour across the Project Area (**Table 2.1** and **Figure 2.1**). The survey sites were distributed in a manner that maximised spatial coverage of the Project Area. The viewshed across the surrounding landscape, proximity to proposed turbine locations, proximity to different habitat types and access following wet weather were the key factors considered in the survey site selection process.

As outlined in **Table 2.1** there were ten core sites (VP1 – VP10) that were regularly surveyed during 2022–2024 (i.e., during at least 7/8 of the seasonal survey rounds) whilst the remaining three sites were surveyed as substitutes when access to the core sites was restricted by wet weather. A series of photographs showing the viewshed from the ten core survey sites (VP1 – VP10) is presented in **Appendix 1**.

2.1.2 Survey Method

Each site was surveyed on six occasions during each seasonal survey round with two surveys falling in each of the following periods (except in cases where wet weather restricted access):

- morning (dawn–9:59 am)
- midday (10.00 am–1:59 pm)
- afternoon (2.00 pm–dusk).

During each survey, an observer scanned nearby habitat and the surrounding landscape with the naked eye and binoculars for a period of 1 hour recording all bird species detected visually or aurally. The following information was recorded for each observation:

- species and abundance (count of individuals)
- observation type (visual or aural)
- distance of the bird from the observer (to the nearest 10 m within 50 m, to the nearest 20 m between 50–100 m, to the nearest 50 m between 100–250 m, to the nearest 100–200 m between 250–1,000 m and to the nearest 200–500 m beyond 1,000 m)
- direction of the bird relative to the observer (to the nearest 10° using a compass)
- estimated flight height when first detected and, where relevant or informative, estimated flight height range (i.e., minimum and maximum height) while the individual was under observation (or perching height). The observer estimates height above ground level (AGL):
    - to the nearest 5 m below 30 m AGL
    - to the nearest 10 m between 30–50 m AGL
    - to the nearest 20 m between 50–100 m AGL
    - to the nearest 50 m between 100–300 m AGL
    - to the nearest 100 m between 300–500 m AGL
    - to the nearest 200 m or 500 m above 500 m AGL.
- direction of flight (to the nearest 5°)
- flight pattern (i.e., local movement, directional flight, circling, swooping, varied, other)
- behaviour (i.e., flight, foraging, perching, mating, aggressive interactions, hollow inspection, nesting, on station).

During each survey temperature, wind speed and direction and precipitation were recorded.

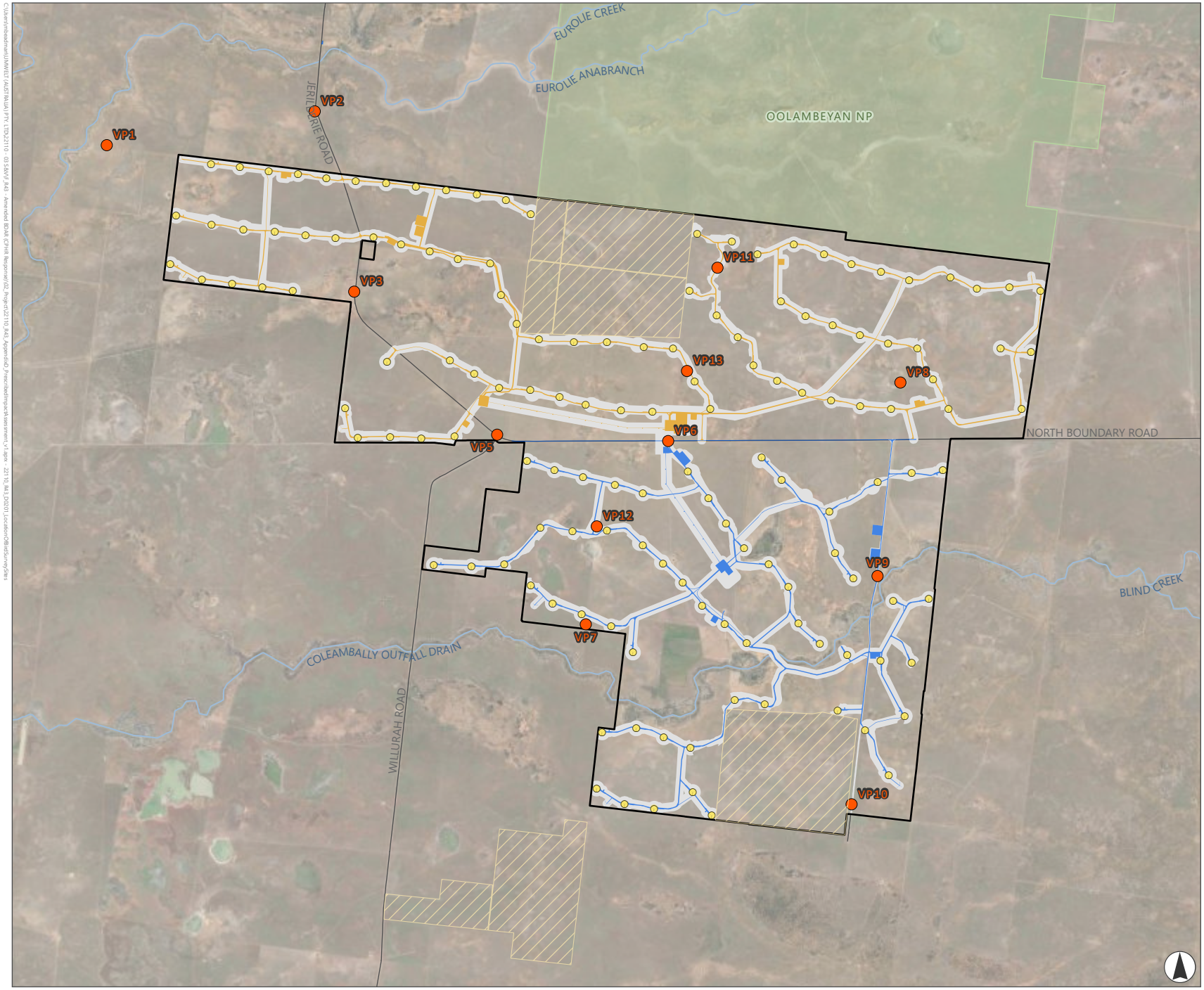
The information detailed above was also recorded for incidental observations of threatened birds in the Project Area.

Table 2.1 Bird Survey Effort (Surveys Hours) (May 2022–February 2024)

Site	May 2022	July 2022	Sept 2022	Jan 2023	May 2023	July 2023	Sept 2023	Feb 2024	Total
VP1	6	7	6	6	6	-	4	-	**35**
VP2	7	6	7	6	6	1	3	-	**36**
VP3	7	5	7	6	6	6	6	6	**49**
VP4	6	7	6	6	6	6	6	5	**48**
VP5	8	7	6	6	5	4	6	7	**49**
VP6	6	7	6	7	2	6	6	7	**47**
VP7	6	6	6	5	2	-	6	6	**37**
VP8	7	7	6	6	-	4	6	6	**42**
VP9	6	5	7	6	-	5	6	6	**41**
VP10	6	7	7	6	-	6	6	6	**44**
VP11	-	-	-	-	-	-	6	6	**12**
VP12	-	-	-	-	-	7	-	-	**7**
VP13	-	-	-	-	-	6	-	-	**6**
Total	**65**	**64**	**64**	**60**	**33**	**51**	**61**	**55**	**453**

FIGURE 2.1

Location of Bird Survey Sites



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Conservation Agreement Area
- NPWS Reserves
- Road
- Hydroline

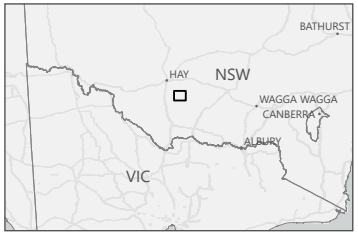


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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

2.1.3 Summary of Bird Survey Results

A total of 453 surveys were conducted across 13 sites from May 2022–February 2024 during which 8019 observations were recorded. A total of 211 incidental observations, primarily of threatened species or raptors were also recorded. A total of 103 bird species were recorded in the Project Area including 11 threatened species listed under the NSW *Biodiversity Conservation Act* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (**Table 2.2**).

Table 2.2 Bird Species Listed under the EPBC Act and/or the BC Act Recorded in the Project Area

Species name	Scientific name	EPBC Act Status	BC Act Status	Number of records in the Project Area (May 2022–Feb 2024)		
				Survey	Incidental	Total
black falcon	*Falco subniger*	-	Vulnerable	59	50	**109**
blue-winged parrot	*Neophema chrysostoma*	Vulnerable	Vulnerable	0	2	**2**
barking owl	*Ninox connivens*		Vulnerable	1	0	**1**
diamond firetail	*Stagonopleura guttata*	Vulnerable	Vulnerable	1	3	**4**
flame robin	*Petroica phoenicea*	-	Vulnerable	0	1	**1**
grey-crowned babbler	*Pomatostomus temporalis*	-	Vulnerable	28	5	**33**
little eagle	*Hieraaetus morphnoides*	-	Vulnerable	2	2	**4**
plains-wanderer	*Pedionomus torquatus*	Critically Endangered	Endangered	0	2	**2**
southern whiteface	*Aphelocephala leucopsis*	Vulnerable	Vulnerable	49	20	**69**
spotted harrier	*Circus assimilis*	-	Vulnerable	14	23	**37**
white-fronted chat	*Epthianura albifrons*	-	Vulnerable	77	23	**100**

2.2 Bat Utilisation

2.2.1 Overview

A total of 41 ultrasonic call detection surveys were caried out across nine sites in from May 2022 to February 2024 to assess microbat utilisation across the Project Area (**Table 2.3** and **Figure 2.2**). The survey sites were distributed in a manner that maximised spatial coverage of the Project Area with the aim of maximising variation of sampling within different habitat types across the Project Area. The proximity to proposed turbine locations, proximity to different habitat types and access following wet weather were the key factors considered in the survey site selection process.

As outlined in **Table 2.3** there were seven core sites (BAT1–BAT7) that were regularly surveyed during 2022–2024 (i.e., during at least 7/8 of the seasonal survey rounds) whilst the remaining two sites were surveyed as substitutes when access to the core sites was restricted by wet weather. Two of the nine sites surveyed are located on meteorological masts, with microphones installed at 50 m and 100 m AGL.

2.2.2 Survey Method

During bat utilisation surveys at each site, bat echolocation recorders were either deployed at or near ground level or at height. The bat recorders used on the Project were Anabat units, either Chorus, Swifts or Express; however, Wildlife Acoustic SM4-Bat units were also used on meteorological masts following the establishment of permanent microphone cables that were installed by Australian Radio Towers (ART) on behalf of Bullawah Wind Farm Pty Ltd (BWF) ahead of the Summer 2023/24 BBUS program. This equipment installed could only be used with Wildlife Acoustic SM4-Bat units.

All nine bat survey sites had bat recorders deployed ~1–2 m off the ground (besides sites BUL-M1 and BUL-M2 being the SM4 bat units at different heights on meteorological masts). This deployment often utilised fenceposts or nearby trees. The meteorological mast BUL-M1 had one recorder deployed at approximately 50 m and another at approximately 100 m. The other meteorological mast at BUL-M2 has one recorder deployed at approximately 50 m and another at approximately 100 m. The meteorological masts both included two microphones mounted at 50 m and 100 m Australian height datum (AHD), microphone cables and surge protectors. During BBUS programs, a bat recorder is connected to each of the microphone cables.

Call data was downloaded and sent to EchoEcology or Balance Environmental for expert identification.

2.2.3 Summary of Bat Survey Results

Table 2.3 below provides a summary of the bat utilisation survey effort. It presents the number of survey nights the bat recorder units deployed, as well as the number of nights with calls indicating the number of the survey nights with recorded bat ca to be analysed. **Figure 2.2** presents the location of sites.

Table 2.3 Bullawah Wind Farm – Bat Utilisation Survey Effort

Survey Program and Bat Recorder	Unit	Survey Height	Number of Survey Nights	Number of Nights with Data
Autumn 2022 23–29 May 2022				
BAT1	ANA18	~1 m	5	4
BAT2	ANA03	~1 m	6	6
BAT3	ANA12	~1 m	5	5
BAT5	ANA04	~1 m	6	6
Inside a removed section of the project area (145.062510, -34.780461)	ANA16	~1 m	5	5
Subtotal	**5**	**~1**	**27**	**26**
Winter 2022 8–12 July 2022				
BAT2	ANA03	~1 m	4	4
Inside a removed section of the project area (145.0663834, -34.7823106)	ANA04	~1 m	4	3
BAT5	ANA16	~1 m	4	3
Subtotal	**3**	**~1 m**	**12**	**10**

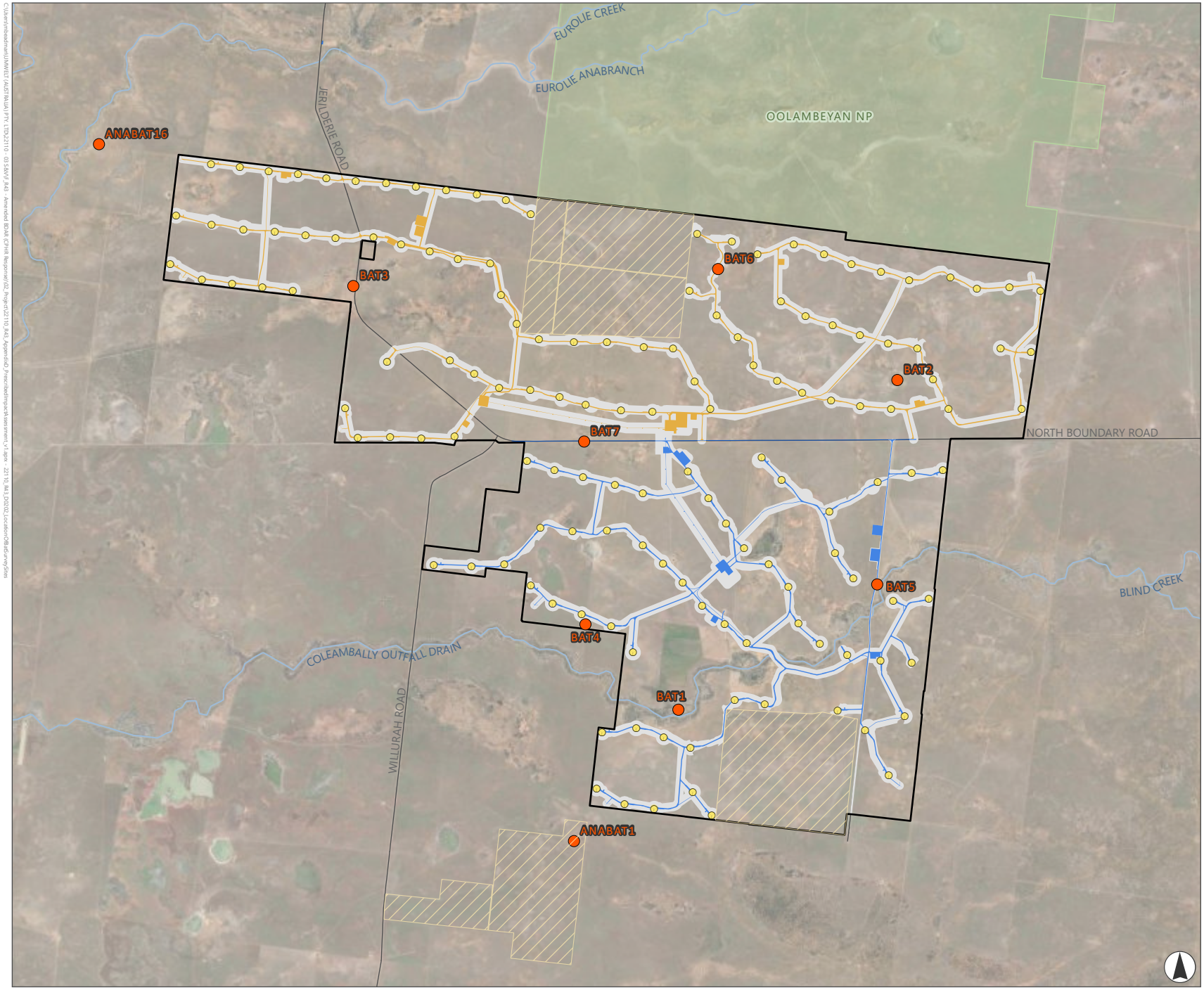
Survey Program and Bat Recorder	Unit	Survey Height	Number of Survey Nights	Number of Nights with Data
Spring 2022 20–23 September 2022				
Inside a removed section of the project area (145.19429, -34.94317)	UMBAT12	~1 m	5	5
BAT3	ANA2	~1 m	5	5
Inside a removed section of the project area (145.0662751, -34.7823827)	UMBAT15	~1 m	4	4
Unknown location (no fieldmaps point or gps data found in logfiles)	Bris8	~1 m	4	4
Unknown location (no fieldmaps point or gps data found in logfiles)	Brisa	~1 m	4	4
Unknown location (no fieldmaps point or gps data found in logfiles)	Brisb	~1 m	4	3
Subtotal	**6**	**~1 m**	**26**	**25**
Summer 2023 17–23 January 2023				
BAT2	BUMBAT09	~1 m	7	7
BAT4	BUMBAT12	~1 m	6	6
BAT5	BUMBAT04	~1 m	7	7
BAT7	BUMBAT07	~1 m	7	7
Subtotal	**4**	**~1**	**27**	**27**
Autumn 2023 22–28 March 2023				
BAT2	Chorus5	~1 m	6	6
BAT3	Sydchorus31	~1 m	6	6
BAT4	Sydchorus33	~1 m	7	7
BAT5	Sydchorus34	~1 m	7	7
BAT7	Sydchorus30	~1 m	7	7
Inside a removed section of the project area (145.066, -34.781575)	Sydchorus32	~1 m	7	7
Subtotal	**6**	**~1 m**	**40**	**40**
Winter 2023 17–22 August 2023				
BAT1	ANA1	~1 m	6	6
BAT2	ANA2	~1 m	6	6
BAT3	ANA3	~1 m	6	6
BAT4	ANA4	~1 m	6	6
BAT5	ANA5	~1 m	6	6
BAT7	ANA7	~1 m	6	6
Subtotal	**6**	**~1 m**	**36**	**36**

Survey Program and Bat Recorder	Unit	Survey Height	Number of Survey Nights	Number of Nights with Data
Spring 2023 31 October–7 November 2023				
BAT1	Sydchorus1	~1 m	7	7
BAT2	Sydchorus4	~1 m	7	7
BAT3	Sydchorus	~1	0	0 *Error
BAT4	Sydchorus3	~1 m	7	7
BAT5	Sydchorus1	~1	7	7
BAT6	Sydchorus7	~1	7	7
BAT7	Sydchorus6	~1	7	7
Subtotal	**7**	**~1**	**42**	**42**
Summer 2024 / Autumn 2024 13 February–17 May 2024				
BUL-M2	SM4BAT_SYD02	~100 m	92	Awaiting data*
BUL-M2	SM4BAY_SYD03	~50 m	**92**	**76**
BUL-M1	MM1a	~50 m	94	53
BUL-M1	MM1b	~100 m	94	48
Subtotal	**4**	**~100 m**	**372**	**177**
Summer 2024 17–27 February 2024				
BAT1	Sydchorus28	~1 m	11	11
BAT2	Sydchorus29	~1 m	11	11
BAT3	Sydchorus22	~1 m	9	6
BAT4	Sydchorus23	~1 m	10	10
BAT5	Sydchorus26	~1 m	9	5
BAT7	Sydchorus30	~1 m	12	12
Subtotal	**6**	**~1 m**	**62**	**55**

** Errors have been noted for units that were deployed for survey programs and identified to have had recording issues during deployment, resulting in no data being recorded. Following each occurrence, the particular unit was reviewed by Umwelt, including microphones, and servicing requirements was sought from Titley (unit manufacturer) where necessary.*

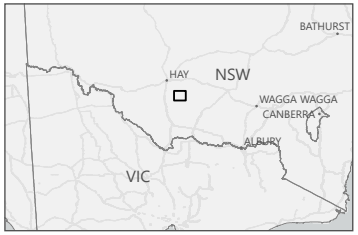
FIGURE 2.2

Location of Bat Survey Sites



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Bat Survey Location
- Conservation Agreement Area
- NPWS Reserves
- Road
- Hydroline



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3.0 Candidate List of Protected Species Utilising the Project Area

The candidate list of protected bird and bat species that were considered as part of the prescribed impact assessment include:

- resident aerial species
- resident raptor species
- threatened/listed species observed during surveys or that are likely to fly over the Development Corridor
- nomadic and migratory species that are likely to fly over the Development Corridor.

3.1 Species Recorded or Predicted to Occur and Considered in the Assessment

The following data sources were examined to assess which species, in addition to those recorded in the Project Area in 2022–2024, may occur in the Project Area:

- Ecosystem credit predicted species database (BAM-C).
- Protection Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) (DAWE 2023).
- BioNet Atlas Threatened Biodiversity Profile Data Collection (DPE 2022a).

Candidate bird and bat species lists comprising species that were either recorded or are predicted to occur in the vicinity of the Project Area are provided in **Table 3.1** and **Table 3.2** respectively. The candidate bird and bat lists comprise 144 and 18 species, respectively. Of these a total of 121 bird and 17 bat species were considered further in this assessment due to their known presence in the Project Area or their likelihood of occurrence being moderate or high.

Table 3.1 Candidate Bird Species List

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
apostlebird	*Struthidea cinerea*	-	Recorded in 2022–24	**Table 8.22**
Australasian bittern	*Botaurus poiciloptilus*	BAM-C, PMST, BioNet	Low	-
Australasian pipit	*Anthus novaeseelandiae*	-	Recorded in 2022–24	**Table 8.22**
Australian bustard	*Ardeotis australis*	BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
Australian hobby	*Falco longipennis*	-	Recorded in 2022–24	**Table 8.22**
Australian magpie	*Gymnorhina tibicen*	-	Recorded in 2022–24	**Table 8.22**
Australian owlet-nightjar	*Aegotheles cristatus*	-	Recorded in 2022–24	**Table 8.22**
Australian painted snipe	*Rostratula australis*	BAM-C, PMST, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
Australian pelican	*Pelecanus conspicillatus*	-	Recorded in 2022–24	**Table 8.22**
Australian raven	*Corvus coronoides*	-	Recorded in 2022–24	**Table 8.22**
Australian ringneck	*Barnardius zonarius*	-	Recorded in 2022–24	**Table 8.22**
Australian white Ibis	*Threskiornis moluccus*	-	Recorded in 2022–24	**Table 8.22**
Australian wood duck	*Chenonetta jubata*	-	Recorded in 2022–24	**Table 8.22**
banded lapwing	*Vanellus tricolor*	-	Recorded in 2022–24	**Table 8.22**
barking owl	*Ninox connivens*	BAM-C, BioNet	Recorded in 2022–24	**Section 8.2.1**
barn owl	*Tyto alba*	-	Recorded in 2022–24	**Table 8.22**
black falcon	*Falco subniger*	BAM-C, BioNet,	Recorded in 2022–24	**Section 8.2.2**
black kite	*Milvus migrans*	-	Recorded in 2022–24	**Table 8.22**
black-chinned honeyeater	*Melithreptus gularis gularis*	BioNet	Low	-
black-faced cuckoo-shrike	*Coracina novaehollandiae*	-	Recorded in 2022–24	**Table 8.22**
black-faced woodswallow	*Artamus cinereus*	-	Recorded in 2022–24	**Table 8.22**
black-shouldered kite	*Elanus axillaris*	-	Recorded in 2022–24	**Table 8.22**

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
black-tailed godwit	*Limosa limosa*	BioNet	Low	-
black-tailed native-hen	*Tribonyx ventralis*	-	Recorded in 2022–24	**Table 8.22**
blue bonnet	*Northiella haematogaster*	-	Recorded in 2022–24	**Table 8.22**
blue-billed duck	*Oxyura australis*	BAM-C, BioNet	Low	-
blue-faced honeyeater	*Entomyzon cyanotis*	-	Recorded in 2022–24	**Table 8.22**
blue-winged parrot	*Neophema chrysostoma*	PMST, BioNet	Recorded in 2022–24	**Section 8.2.3**
brolga	*Grus rubicunda*	BAM-C, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
brown falcon	*Falco berigora*	-	Recorded in 2022–24	**Table 8.22**
brown goshawk	*Accipiter fasciatus*	-	Recorded in 2022–24	**Table 8.22**
brown songlark	*Cincloramphus cruralis*	-	Recorded in 2022–24	**Table 8.22**
brown treecreeper	*Climacteris picumnus*	PMST, BioNet	Low. The listed subspecies is unlikely to occur in the Project Area.	**Table 8.21**
bush stone-curlew	*Burhinus grallarius*	BioNet	Low	-
Caspian tern	*Hydroprogne caspia*	BioNet	Low	-
chestnut-rumped thornbill	*Acanthiza uropygialis*	-	Recorded in 2022–24	**Table 8.22**
cockatiel	*Nymphicus hollandicus*	-	Recorded in 2022–24	**Table 8.22**
common bronzewing	*Phaps chalcoptera*	-	Recorded in 2022–24	**Table 8.22**
common greenshank	*Tringa nebularia*	PMST, BioNet	Low	-
crested pigeon	*Ocyphaps lophotes*	-	Recorded in 2022–24	**Table 8.22**
crimson rosella	*Platycercus elegans*	-	Recorded in 2022–24	**Table 8.22**
curlew sandpiper	*Calidris ferruginea*	PMST, BioNet	Low	-
diamond firetail	*Stagonopleura guttata*	BAM-C, PMST, BioNet, -	Recorded in 2022–24	**Section 8.2.4**
double-barred finch	*Taeniopygia bichenovii*	-	Recorded in 2022–24	**Table 8.22**

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
dusky woodswallow	*Artamus cyanopterus*	BAM-C, BioNet	High. This species is likely to occasionally occur in the Project Area.	**Table 8.21**
eastern barn owl	*Tyto javanica*	-	Recorded in 2022–24	**Table 8.22**
eastern grass owl	*Tyto longimembris*	BioNet	Low	**-**
emu	*Dromaius novaehollandiae*	-	Recorded in 2022–24	**Table 8.22**
fairy martin	*Petrochelidon ariel*	-	Recorded in 2022–24	**Table 8.22**
flame robin	*Petroica phoenicea*	BioNet	Recorded in 2022–24	**Section 8.2.5**
freckled duck	*Stictonetta naevosa*	BAM-C, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
galah	*Eolophus roseicapilla*	-	Recorded in 2022–24	**Table 8.22**
Gilbert's whistler	*Pachycephala inornata*	BAM-C, BioNet	Low	**-**
golden whistler	*Pachycephala pectoralis*	-	Recorded in 2022–24	**Table 8.22**
great cormorant	*Phalacrocorax carbo*	-	Recorded in 2022–24	**Table 8.22**
grey butcherbird	*Cracticus torquatus*	-	Recorded in 2022–24	**Table 8.22**
grey falcon	*Falco hypoleucos*	BAM-C, PMST	Low	**-**
grey shrike-thrush	*Colluricincla harmonica*	-	Recorded in 2022–24	**Table 8.22**
grey teal	*Anas gracilis*	-	Recorded in 2022–24	**Table 8.22**
grey-crowned babbler	*Pomatostomus temporalis temporalis*	BAM-C, BioNet, -	Recorded in 2022–24	**Section 8.2.6**
ground cuckoo-shrike	*Coracina maxima*	-	Recorded in 2022–24	**Table 8.22**
gull-billed tern	*Gelochelidon nilotica*	BioNet	Moderate. This species may occasionally occur in the Project Area.	**Table 8.21**
hooded robin	*Melanodryas cucullata cucullata*	BAM-C, PMST, BioNet	Low	**-**
Horsfield's bronze-cuckoo	*Chalcites basalis*	-	Recorded in 2022–24	**Table 8.22**
Horsfield's bushlark	*Mirafra javanica*	-	Recorded in 2022–24	**Table 8.22**

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
Latham's snipe	*Gallinago hardwickii*	PMST, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
laughing kookaburra	*Dacelo novaeguineae*	-	Recorded in 2022–24	**Table 8.22**
little black cormorant	*Phalacrocorax sulcirostris*	-	Recorded in 2022–24	**Table 8.22**
little button-quail	*Turnix velox*	-	Recorded in 2022–24	**Table 8.22**
little crow	*Corvus bennetti*	-	Recorded in 2022–24	**Table 8.22**
little curlew	*Numenius minutus*	BioNet	Low	**-**
little eagle	*Hieraaetus morphnoides*	BAM-C, BioNet, BBUS	Recorded in 2022–24	**Section 8.2.7**
little pied cormorant	*Microcarbo melanoleucos*	-	Recorded in 2022–24	**Table 8.22**
little raven	*Corvus mellori*	-	Recorded in 2022–24	**Table 8.22**
magpie goose	*Anseranas semipalmata*	BAM-C, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
magpie-lark	*Grallina cyanoleuca*	-	Recorded in 2022–24	**Table 8.22**
malleefowl	*Leipoa ocellata*	PMST, BioNet	Low	**-**
marsh sandpiper	*Tringa stagnatilis*	BioNet	Low	**-**
masked lapwing	*Vanellus miles*	-	Recorded in 2022–24	**Table 8.22**
masked owl	*Tyto novaehollandiae*	BAM-C, BioNet	Low	**-**
masked woodswallow	*Artamus personatus*	-	Recorded in 2022–24	**Table 8.22**
mistletoebird	*Dicaeum hirundinaceum*	-	Recorded in 2022–24	**Table 8.22**
nankeen kestrel	*Falco cenchroides*	-	Recorded in 2022–24	**Table 8.22**
nankeen night-heron	*Nycticorcax caledonicus*	-	Recorded in 2022–24	**Table 8.22**
noisy miner	*Manorina melanocephala*	-	Recorded in 2022–24	**Table 8.22**
Pacific black duck	*Anas superciliosa*	-	Recorded in 2022–24	**Table 8.22**
Pacific swift	*Apus pacificus*	BioNet	Moderate. This species may occasionally occur in the Project Area.	**Table 8.21**

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
painted honeyeater	*Grantiella picta*	BAM-C, PMST, BioNet	High. This species is likely to occasionally occur in the Project Area.	**Table 8.21**
pectoral sandpiper	*Calidris melanotos*	BioNet	Low	-
pied butcherbird	*Cracticus nigrogularis*	-	Recorded in 2022–24	**Table 8.22**
pied cormorant	*Phalacrocorax varius*	-	Recorded in 2022–24	**Table 8.22**
pied honeyeater	*Certhionyx variegatus*	BAM-C, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
pink cockatoo	*Lophochroa leadbeateri*	BAM-C, PMST, BioNet	Moderate. This species may occasionally occur in the Project Area.	**Table 8.21**
plains-wanderer	*Pedionomus torquatus*	BAM-C, PMST	Recorded in 2022–24	**Section 8.2.8**
rainbow bee-eater	*Merops ornatus*	-	Recorded in 2022–24	**Table 8.22**
red-backed kingfisher	*Todiramphus pyrrhopygius*		Recorded in 2022–24	**Table 8.22**
red-browed finch	*Neochmia temporalis*	-	Recorded in 2022–24	**Table 8.22**
red-necked stint	*Calidris ruficollis*	BioNet	Low	-
red-rumped parrot	*Psephotus haematonotus*	-	Recorded in 2022–24	**Table 8.22**
redthroat	*Pyrrholaemus brunneus*	BAM-C	Low	-
regent parrot	*Polytelis anthopeplus monarchoides*	BAM-C	Low	-
royal spoonbill	*Platalea regia*	-	Recorded in 2022–24	**Table 8.22**
rufous songlark	*Cincloramphus mathewsi*	-	Recorded in 2022–24	**Table 8.22**
rufous whistler	*Pachycephala rufiventris*	-	Recorded in 2022–24	**Table 8.22**
sacred kingfisher	*Todiramphus sanctus*	-	Recorded in 2022–24	**Table 8.22**
scarlet robin	*Petroica boodang*	BAM-C, BioNet	Low	-
sharp-tailed sandpiper	*Calidris acuminata*	PMST, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
singing honeyeater	*Gavicalis virescens*	-	Recorded in 2022–24	**Table 8.22**

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
southern boobook	*Ninox boobook*		Recorded in 2022–24	**Table 8.22**
southern whiteface	*Aphelocephala leucopsis*	PMST, BioNet, -	Recorded in 2022–24	**Section 8.2.9**
speckled warbler	*Pyrrholaemus sagittatus*	BioNet	Low	**-**
spotted harrier	*Circus assimilis*	BAM-C, BioNet	Recorded in 2022–24	**Section 8.2.10**
spotted pardalote	*Pardalotus punctatus*	-	Recorded in 2022–24	**Table 8.22**
square-tailed kite	*Lophoictinia isura*	BAM-C, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
straw-necked ibis	*Threskiornis spinicollis*	-	Recorded in 2022–24	**Table 8.22**
striated pardalote	*Pardalotus striatus*	-	Recorded in 2022–24	**Table 8.22**
striped honeyeater	*Plectorhyncha lanceolata*	-	Recorded in 2022–24	**Table 8.22**
stubble quail	*Coturnix pectoralis*	-	Recorded in 2022–24	**Table 8.22**
sulphur-crested cockatoo	*Cacatua galerita*	-	Recorded in 2022–24	**Table 8.22**
superb fairy-wren	*Malurus cyaneus*	-	Recorded in 2022–24	**Table 8.22**
superb parrot	*Polytelis swainsonii*	BAM-C, PMST, BioNet	Moderate. This species may very occasionally occur in the Project Area.	**Table 8.21**
swift parrot	*Lathamus discolor*	BAM-C, PMST	Low	**-**
tawny frogmouth	*Podargus strigoides*	-	Recorded in 2022–24	**Table 8.22**
tree martin	*Petrochelidon nigricans*	-	Recorded in 2022–24	**Table 8.22**
varied sittella	*Daphoenositta chrysoptera*	BAM-C, BioNet	Low	**-**
wedge-tailed eagle	*Aquila audax*	-	Recorded in 2022–24	**Table 8.22, Section 8.3.1**
welcome swallow	*Hirundo neoxena*	-	Low	**Table 8.22**
western gerygone	*Gerygone fusca*	-	Low	**Table 8.22**
whistling kite	*Haliastur sphenurus*	-	Recorded in 2022–24	**Table 8.22**
white-bellied sea-eagle	*Haliaeetus leucogaster*	BAM-C, BioNet	Moderate. This species may occasionally occur in the Project Area.	**Table 8.21**

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
White-browed woodswallow	*Artamus superciliosus*	-	Recorded in 2022–24	**Table 8.22**
white-faced heron	*Egretta novaehollandiae*	-	Recorded in 2022–24	**Table 8.22**
white-fronted chat	*Epthianura albifrons*	BAM-C, BioNet, -	Recorded in 2022–24	**Section 8.2.11**
white-necked heron	*Ardea pacifica*	-	Recorded in 2022–24	**Table 8.22**
white-plumed honeyeater	*Ptilotula penicillata*	-	Recorded in 2022–24	**Table 8.22**
white-throated needletail	*Hirundapus caudacutus*	BAM-C, BioNet	Moderate. This species may occasionally occur in the Project Area.	**Table 8.21**
white-winged chough	*Corcorax melanorhamphos*	-	Recorded in 2022–24	**Table 8.22**
white-winged fairy-wren	*Malurus leucopterus*	-	Recorded in 2022–24	**Table 8.22**
willie wagtail	*Rhipidura leucophrys*	-	Recorded in 2022–24	**Table 8.22**
wood sandpiper	*Tringa glareola*	BioNet	Low	**-**
yellow-billed spoonbill	*Platalea flavipes*	-	Recorded in 2022–24	**Table 8.22**
yellow-rumped thornbill	*Acanthiza chrysorrhoa*	-	Recorded in 2022–24	**Table 8.22**
yellow-throated miner	*Manorina flavigula*	-	Recorded in 2022–24	**Table 8.22**
zebra finch	*Taeniopygia guttata*	-	Recorded in 2022–24	**Table 8.22**

Table 3.2 Candidate Bat Species List

Common Name	Scientific Name	Data source (BAM-C, PMST, BioNet)	Likelihood of occurrence in the Project Area	Location of Species' Risk Assessment
Definitive Identification				
white-striped free-tailed bat	*Austronomus australis*	-	Recorded in the Project Area	**Section 8.5.10**
chocolate wattled bat	*Chalinolobus morio*	-	Recorded in the Project Area	**Section 8.5.4**
Gould's wattle bat	*Chalinolobus gouldii*	-	Recorded in the Project Area	**Section 8.5.5**
inland free-tailed bat	*Ozimops petersi*	-	Recorded in the Project Area	**Section 8.5.1**
southern free-tailed bat	*Ozimops planiceps*	-	Recorded in the Project Area	**Section 8.5.2**
Ride's free-tailed bat	*Ozimops ridei*	-	Recorded in the Project Area	**Section 8.5.3**
inland broad-nosed bat	*Scotorepens balstoni*	-	Recorded in the Project Area	**Section 8.5.12**
little broad-nosed bat	*Scotorepens greyii*	-	Recorded in the Project Area	**Section 8.5.13**
large forest bat	*Vespadelus darlingtoni*	-	Recorded in the Project Area	**Section 8.5.8**
little forest bat	*Vespadelus vulturnus*	-	Recorded in the Project Area	**Section 8.5.6**
Possible or Species Group Identification				
little pied bat	*Chalinolobus picatus*	BAM-C, BioNet	BioNet, BAMC	**Section 8.4.4**
southern myotis	*Myotis macropus*	BBUS, BAM-C, BioNet	Species Group, however targeted surveys within areas of suitable habitat did not record the species.	-
Corben's long-eared bat	*Nyctophilus corbeni*	PMST	Species Group	**Section 8.4.2**
lesser long-eared bat	*Nyctophilus geoffroyi*	BBUS	Species Group	**Section 8.5.7**
Gould's long-eared bat	*Nyctophilus gouldi*	BBUS	Species Group	**Section 8.5.11**
yellow-tailed sheath-tailed bat	*Saccolaimus flaviventris*	BAM-C, BioNet	Species Group	**Section 8.4.1**
inland forest bat	*Vespadelus baverstocki*	BAM-C, BioNet	Species Group	**Section 8.5.12**
southern forest bat	*Vespadelus regulus*	BBUS	Species Group	**Section 8.5.9**

4.0 Wind Turbine Strike Impact Assessment

Criterion a (i): Predict the impact on species living in, or likely to fly over, the proposed development site, including bat or bird strike and barotrauma

To assess the likelihood and consequence of impacts on aerial species, a qualitative risk-based assessment based on an assessment methodology developed by the Arthur Rylah Institute (Lumsden *et al.* 2019) has been conducted. The assessment approach comprises consideration of the likelihood of blade strike based on a species' recorded flight behaviour and status in the Project Area, as well as consideration of existing turbine strike data from Australia (**Section 8.1.1**). The relative consequence of potential collisions and/or barotrauma is assessed with consideration of a species' total population size and degree of concentration in certain areas, conservation status and demographic resilience (**Section 8.1.1**).

The risk of blade strike for threatened bird species that were recorded in the Project Area is assessed in **Section 8.2**. Risk ratings for 19 threatened and/or migratory bird species that were not recorded in the Project Area during the 2022–2024 surveys which may occasionally occur in the Project Area are provided in **Section 8.2.12**. Risk ratings for the non-threatened species that were recorded in the Project Area are provided in **Section 8.3**. The risk of blade strike for threatened and non-threatened bat species recorded in the Project Area is examined in **Section 8.4** and **Section 8.5** respectively.

The results of the risk assessment for the 11 threatened bird species and the 17 threatened and protected bat species that were recorded in the Project Area are summarised in **Table 4.1**.

Table 4.1 Risk Assessment Summary

Common Name	Species Name	Likelihood	Consequence	Risk Rating
Birds				
barking owl*	*Ninox connivens*	Low	Moderate	Minor
black falcon*	*Falco subniger*	High	Moderate	High
blue-winged parrot*	*Neophema chrysostoma*	Moderate	Moderate	Moderate
diamond firetail*	*Stagonopleura guttata*	Low	Low	Negligible
flame robin*	*Petroica phoenicea*	Low	Low	Negligible
grey-crowned babbler*	*Pomatostomus temporalis*	Low	Low	Negligible
little eagle*	*Hieraaetus morphnoides*	High	Moderate	High
plains-wanderer*	*Pedionomus torquatus*	Low	High	Moderate
southern whiteface*	*Aphelocephala leucopsis*	Low	Low	Negligible
spotted harrier*	*Circus assimilis*	Moderate	Moderate	Moderate
white-fronted chat*	*Epthianura albifrons*	Low	Low	Negligible
wedge-tailed eagle	*Aquila audax*	High	Low	Moderate
Bats				
white-striped freetail-bat	*Austronomus australis*	High	Moderate	High
inland free-tailed bat	*Ozimops petersi*	Moderate	Moderate	Moderate

Common Name	Species Name	Likelihood	Consequence	Risk Rating
southern free-tailed bat	*Ozimops planiceps*	Moderate	Moderate	Moderate
Ride's free-tailed bat	*Ozimops ridei*	Moderate	Moderate	Moderate
chocolate wattled bat	*Chalinolobus morio*	Moderate	Low	Minor
Gould's wattle bat	*Chalinolobus gouldii*	High	Low	Moderate
little forest bat	*Vespadelus vulturnus*	Moderate	Low	Minor
lesser long-eared bat	*Nyctophilus geoffroyi*	Moderate	Low	Minor
large forest bat	*Vespadelus darlingtoni*	Low	Low	Negligible
southern forest bat	*Vespadelus regulus*	Low	Low	Negligible
yellow-bellied sheathtail bat*	*Saccolaimus flaviventris*	High	Moderate	High
Corben's long-eared bat*	*Nyctophilus corbeni*	Moderate	Moderate	Moderate
inland forest bat*	*Vespadelus baverstocki*	Moderate	Moderate	Moderate
little pied bat*	*Chalinolobus picatus*	Low	Moderate	Minor
Gould's long-eared bat	*Nyctophilus gouldi*	Moderate	Low	Minor
inland broad-nosed bat	*Scotorepens balstoni*	Moderate	Low	Minor
little broad-nosed bat	*Scotorepens greyii*	Moderate	Low	Minor

** Threatened species (BC Act and/or EPBC Act).*

5.0 Rate of Impact

Criterion a (ii) Predict the rate and timing of impact per turbine per year for species likely to be affected

The results of a risk-based assessment pertaining to potential impacts are included within the response in **Section 8.2**.

Where available, mortality estimates from other Australian wind farms have been considered within the responses below for estimating relative risk. Mortality estimates include data from two of 15 Victorian wind farms at which mortality monitoring has been undertaken and mortality rates for particular species determined (Moloney *et al.* 2019).

It is noted that mortality rates are likely to vary considerably between wind farms, depending on a range of variables such as their proximity to key habitat features (e.g. important cave roosts), turbine size, landscape position and the inherent spatial variability in species abundance and utilisation of airspace (Richardson 2000, Drewitt and Langston 2006, Krijgsveld *et al.* 2009). For this reason, it is not advisable to extrapolate or predict mortality estimates provided in Moloney *et al.* (2019) for other wind farms though consideration of such data when estimating relative risk is considered appropriate.

6.0 Consequences of Impacts

Criterion a (iii) Predict the consequences of impacts for the persistence of populations

The consequences of impacts for the persistence of the assessed species depends on a range of poorly understood or unknown factors including:

- the relative importance of the Project Area for the long-term persistence of the greater population in the bioregion
- the degree of connectivity regarding the movement of individuals between the Project Area and surrounding areas
- whether likely mortality rates from blade strike in the Project Area would exceed the rate of replacement of individuals either in situ or through dispersal from elsewhere.

Given the lack of data with which to predict estimates and the inherent high uncertainty associated with predictions if attempted, the precise consequence of impacts for the persistence of bioregional populations is not predicted here. Instead, the relative consequence of impacts for each of the assessed bird and bat species is estimated within the risk assessment (**Section 8.0**).

7.0 Cumulative Impacts

Criterion a (iv) Predict the cumulative impacts of the proposed development alongside existing wind farms on species mortality, movement pattern and use of adjacent habitat

There are eight wind farms currently under assessment or that have been recently approved that are located within 75 km of the Project in the South West REZ (**Table 7.1**). The final composition of renewable energy development in the South West REZ will largely be determined by the NSW Government allocation of access rights to the limited transmission infrastructure present. The intended capacity of the South West REZ is 2.5 gigawatts with registered interest well in excess of this. It is therefore expected that there will be more proposed projects than the intended capacity and cumulative impacts required to build the South West REZ to its maximum capacity will potentially be less than that predicted for the full extent of all projects currently proposed.

In order to adequately forecast or assess cumulative impacts of the Project with other wind farms operating or proposed in the region, it is first necessary for the effects of all other relevant wind farms to be quantified to a consistent standard and to be available (Moloney *et al*. 2019). Given the scarcity of available mortality monitoring data in south-east Australia and the fact that none of the projects in the South West REZ are currently operational, there is little primary information from which cumulative impacts can be predicted with a sufficient degree of confidence.

A summary outlining which threatened species have been recorded at nearby wind farms during pre-construction surveys and the total number of turbines currently proposed in the region is provided below.

Up to a total of 1440 turbines are currently proposed across the eight proposed wind farms located within 75 km of the Project. It is possible that populations of particular species susceptible to blade strike will be impacted at the local and regional scale through cumulative impacts. The threatened bird and bat species recorded at the three closest proposed wind farm sites for which BDARs have been submitted (i.e. excludes any at Scoping stage) are listed in **Table 7.2**. Several of these species have been recorded at or are likely to occur at each of these sites. Of the threatened species recorded in the Project Area the black falcon is potentially at the highest risk of cumulative impacts (relating to blade strike), given:

A) the Riverina is a breeding stronghold for the species in NSW

B) black falcon typically occur at low densities across their range

C) black falcon are known to be particularly susceptible to collisions with man-made structures, including wind turbines

D) black falcon were recorded throughout much of the Project Area (year-round) and are highly likely to occur at all seven of the proposed wind farms within 75 km of the Project.

The local populations of particular non-threatened species that are known to be susceptible to turbine strike and are likely to occur at most Project Areas in the region, such as wedge-tailed eagle, are also at risk of cumulative impacts in the region.

Table 7.1 Nearby Proposed Wind Farm Projects

Project	Distance	Operational impacts
Bullawah Wind Farm (RtS stage) THIS PROJECT	0 km	Includes up to 141 wind turbines and approximately 815.1 MW capacity (as per Project EIS).
Pottinger Wind Farm (Assessment Stage)	<1 km	Operation of 247 wind turbines impact area of 688 ha.
The Plains Wind Farm (RtS stage)	<1 km	Includes up to 226 wind turbines and approximately 1,800 MW capacity.
Dinawan Wind Farm (RtS stage)	Nearest boundary is approximately 9 km away	Operation of 1.5 GW wind farm on approximately 22,000 ha. 267 WTGs.
Argoon Wind Farm (EIS Stage)	Nearest boundary is approximately 29 km away	Operation of 901 MW solar farm, 460 MW/2300 MWh BESS with a Project Area of approximately 10,885 ha. Operation of 106 turbines.
Yanco Delta Wind Farm (Approved)	Nearest boundary is approximately 15 km away	Operation of 208 WTGs, 800 MW/800 MWh BESS with a disturbance of approximately 238 ha.
Conargo Wind Farm (EIS Stage)	Nearest boundary is approximately 17 km away	An SSD wind farm, consisting of up to 53 WTG and ancillary infrastructure, and a total generation capacity of 300 MW.
Booroorban (Saltbush) Wind Farm (EIS Stage)	Nearest boundary is approximately 19 km away	An SSD wind farm, consisting of up to 70 WTG and ancillary infrastructure, and a total generation capacity of 400 MW. Peak construction workforce of 280 FTE, and operational workforce of 28 FTE.
Tchelery Wind Farm (EIS Stage)	Nearest boundary is approximately 60 km away	Operation of 120 WTGs with a total capacity of 800 MW across a 27,400 ha Project Area.

Table 7.2 Threatened Bird and Bat Species Recorded at Nearby Proposed Wind Farms

Project	Bullawah Wind Farm	Pottinger Wind Farm	The Plains Wind Farm	Yanco Delta Wind Farm
barking owl	X	-	-	-
black falcon	X	X	X	X
blue-winged parrot	X	-	-	-
brown treecreeper	-	X	-	-
diamond firetail	X	-	-	X
dusky woodswallow	-	X	-	X
flame robin	X	-	-	X
grey-crowned babbler	X	X	-	X
little eagle	X	-	-	X
pink cockatoo	-	X	-	-
plains-wanderer	X	X	-	-
sharp-tailed sandpiper	-	X	X	-
southern whiteface	X	X	X	-
spotted harrier	X	X	-	X
square-tailed kite	-	-	-	X
superb parrot	-	-	-	X
white-fronted chat	X	X	X	X
varied sittella	-	-	-	X
Corben's long-eared bat	X	X	X	-
inland forest bat	-	X	-	-
little pied bat	-	X	-	-
southern myotis	-	X	X	Assumed present
yellow-bellied sheathtail bat	X	X	X	Assumed present

8.0 Likelihood and Nature of Impacts

Criterion a (v) likelihood and nature of impacts on aerial species living in, or likely to fly over, the proposed development site, including barriers to migratory pathways, and breeding, feeding and resting resources

8.1 Comparison to Operating Wind Farms

In the absence of operating wind farms in the Riverina, data has been sourced from wind farms in south-eastern and central-western NSW, Victoria and north-west Tasmania where mortality monitoring has taken place. The following risk assessment considers published and unpublished mortality data from these regions, as well as behavioural factors, to assess turbine blade strike risk, risks relating to barotrauma, and the impact of the proposed development on migratory pathways.

8.1.1 Risk Assessment Method

The relative risk of blade strike for the 122 bird and 12 bat species assessed here was estimated using two criteria to ascribe likelihood of risk and four criteria to ascribe consequence of risk (**Table 8.1** and **Table 8.2**). These six criteria were employed in a study conducted with the aim of developing a science-based approach to aid decision-making regarding turbine collision risk for birds and bats in Victoria (Lumsden et al. 2019). The criteria used by Lumsden et al. (2019) to determine the relative risk for 'species of interest' were:

- Criterion A – Flight Height.
- Criterion B – Status in Project Area.
- Criterion C – Geographic Population Concentration.
- Criterion D – Demographic Resilience.
- Criterion E – Population Size.
- Criterion F – Listed Conservation Status.

Each criterion was either adopted unchanged or was adjusted for the purposes of this current assessment as appropriate to ensure the particulars of each criterion were relevant to specific aspects of the Project such as geographic location. For the purposes of this assessment, Criterion A, C and F were slightly altered, Criterion B was substantially altered and the thresholds and spatial scale for Criterion E were adjusted.

Table 8.1 Criteria Used to Ascribe Likelihood of Risk

Criterion A – flight height	Criterion B – status in Project Area
Known or likely frequency of flights within RSA height	Status or frequency of occurrence in the Project Area

Table 8.2 Criteria Used to Ascribe Consequence of Risk

Criterion C – geographic population concentration	Criterion D – demographic resilience	Criterion E – population size	Criterion F – conservation status
Highly localised or concentrated population (for whole or part of lifecycle), such that siting of wind farm could have significant consequence to regional, national or international population	Impact on population relative to demographic capacity to replace fatalities (i.e., generalised combination of dispersal capacity of potential replacements, fecundity and generation time)	Known or estimated size of national or global population	Listed conservation status under the EPBC Act and/or the BC Act

Each of the species was ranked either Low, Moderate or High for each criterion depending on which is most appropriate in consideration of the assessed species' ecology and observed or predicted utilisation of the Project Area. Descriptions for each ranking are outlined in **Table 8.3**.

Criterion A (flight height) was assessed by identifying the frequency of flights observed between **100 m** (being the assumed lowermost blade tip height) and **300 m** (being maximum blade tip height) for Turbine type A (larger) and **60 m** and **250 m** for Turbine Type B in the Project Area, and assessing this with consideration of observed and reported flight behaviour from elsewhere in Australia. Given that flight height data for bird and bat species in Australia is scant and observation data from pre-construction surveys at wind farms areas is largely unavailable, estimates of flight height require an adequate number of observations from the assessed site coupled with consideration of expert opinion on known flight behaviour for each species assessed. This Criterion is important as flight height is the primary variable through which a relative estimate of collision risk can be reached.

Criterion B (status in Project Area) was assessed by determining the status or estimating the frequency of occurrence in the Project Area. This Criterion is included as it is an essential component for estimating overall blade strike risk. Data from field surveys conducted by Umwelt in 2022, 2023 and 2024 were primarily used to establish the ranking for this criterion. In the absence of species observations, likelihood of occurrence was predicted based on historical and local observations, known ranges and/or presence of suitable foraging or nesting habitat.

Criterion C (geographic population concentration) was assessed by estimating the degree to which a species' population may be concentrated due to site related factors such as geographic location, habitat type, proximity to important habitat or roost locations (i.e., significant wetlands, roost caves) and how this relates to the specific landscape in which the Project Area is located. Lumsden *et al*. (2019) noted that this criterion is intended to account for situations where the degree to which a taxon is geographically concentrated may influence the risk posed by the particular location of a wind farm. Where large flocks or aggregations are involved the concentration of individuals may be for short seasonal periods but may nonetheless substantially heighten risk to a large portion of a species' total population. This is particularly important if a large proportion of a species' population passes through a localised area, such as a migratory corridor, over the course of each seasonal passage.

Criterion D (demographic resilience) was assessed through consideration of known aspects of each assessed species breeding biology and, most specifically, the nature of species' life-history traits. This criterion is included in the risk assessment as it is necessary to estimate the capacity to which a species may replace individuals lost to mortality resulting from blade strike.

Criterion E (population size) is included to account for the variation in the significance of mortality of a given number of individuals between species as a result of the large variation in assessed species' national or global populations. This, when assessed in combination with Criterion D provides a measure through which the relative vulnerability of a species to loss of individuals can be estimated.

Criterion F (listed conservation status) refers to the status of bird and bat species listed under the EPBC Act or the BC Act. In instances where a species listing differs between Acts, for example one that is listed vulnerable under the EPBC Act and endangered under the BC Act the most threatened listing category is selected for the purposes of this assessment – the order being critically endangered, endangered and vulnerable. Species listed as migratory and/or marine under the EPBC Act are not assigned a rank for this criterion.

Table 8.3 Descriptions of Each Score for Criterion A–F

Likelihood/ Consequence Score	Criterion A (Flight Height)	Criterion B (Status in Project Area)	Criterion C (Geographic Population Concentration)	Criterion D (Demographic Resilience)	Criterion E (Population Size)	Criterion F (Listed Conservation Status)
Low	Species that do not or rarely (<5% of flights) fly at RSA height.	Species that rarely (recorded within <5% of surveys) occur in the Project Area.	Species that are widely distributed within areas of suitable habitat and the habitat itself is relatively widely dispersed.	Species that form breeding territories and that have a reasonable proportion of the population as nonbreeding 'floaters' that can rapidly replace breeding territorial adults if lost; species that may or may not form breeding territories and that are short-lived and have high fecundity; species that have capacity for long range or widespread juvenile or sub-adult dispersal.	Total population (i.e., whether that corresponds to the national population of Australian endemics or a migrant's global population) is estimated to number more than 20,000 individuals.	Species not listed or listed as near threatened or data deficient under the EPBC Act or the BC Act.
Moderate	Species which regularly fly below RSA height (>90% of flights) and occasionally fly at RSA height (<10% of flights).	Species that occasionally occur in, or occasionally move through the Project Area (recorded within <10% of surveys).	Species that may be more widespread or have greater flexibility in the range of suitable habitat availability, but where a high proportion of their population is likely to be concentrated at sites where they do occur.	Species with life-history characteristics that sit between the low and high descriptions here.	Total population is estimated to number between 5,000 and 20,000 individuals.	Species listed as vulnerable under the EPBC Act or the BC Act.

Likelihood/ Consequence Score	Criterion A (Flight Height)	Criterion B (Status in Project Area)	Criterion C (Geographic Population Concentration)	Criterion D (Demographic Resilience)	Criterion E (Population Size)	Criterion F (Listed Conservation Status)
High	Species in which a high proportion of flight activity is at RSA height (>10% of flights within RSA).	Species that regularly occur in, or regularly move through the Project Area (present in >10% of surveys).	Bat species that have major aggregations at a few caves, or bird or bat species that have either very restricted distributions or those where a substantial proportion of a population may move through certain areas (i.e., migratory pathways).	Species that form breeding territories but where there is limited capacity for a lost breeding adult to be readily replaced; species that do not form breeding territories and that are long-lived and/or have low fecundity; species that may have short-distance juvenile or sub-adult dispersal capacity only.	Total population is estimated to number less than 5,000 individuals.	Species listed as endangered or critically endangered under the EPBC Act or the BC Act.

8.1.2 Estimating Overall Risk

Estimates of overall risk for each assessed species were determined by following an approach similar to that employed by Lumsden *et al*. (2019) with the most notable exception being the difference in spatial scale for which resulting estimates of risk are intended to be relevant to (i.e., state-wide vs site-specific). Elements of the likelihood and consequence of collision were combined to form an overall qualitative risk rating (Low/Moderate/High) specific to the Project for the likelihood of collision and the consequence of collision. Likelihood of collision questions (Criterion A and B) and consequence of collision questions (Criterion C to F) were combined in a generally additive process to determine whether the overall likelihood and consequence of collisions was Low, Moderate or High.

The following describes how the **likelihood of collision** scores were determined:

- **High**: Either criteria A or B is High and neither can be Low.
- **Moderate**: All other combinations not described in High or Low.
- **Low**: Both Criteria A and B are Low, or in cases where Criterion A is Low because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and/or observations from the Project Area.

The following describes how the **consequence of collision** scores were determined:

- **High:** The majority of Criteria C, D, E and F are High, or the risk associated with Criterion C for localised concentration is High. It was considered that the consequences of high mortality due to wind turbine collisions for species that have a limited distribution and/or have the capacity to be highly concentrated is sufficiently large such that, if a species' risk associated with this element was High, the consequences of collision should also be set to High, irrespective of the risks of the other criteria.
- **Moderate**: The majority of Criteria C, D, E and F were Moderate.
- **Low**: The majority of Criteria C, D, E and F were Low.

In cases where risk achieved two of two criteria, the higher risk rating was designated, e.g., two Moderate and two High criteria would result in a high rating.

Once the overall scores for the likelihood and consequence of collision specific to the Project had been assigned for a species, the results were then placed into a risk matrix to determine the overall risk rating and level of concern (**Table 8.4**). Five overall risk ratings were used, namely Negligible, Minor, Moderate, High, and Very High, based on the combination of the scores for likelihood and consequence.

Table 8.4 Risk Matrix

Risk Matrix		Consequence of Collisions		
		Low	Moderate	High
Likelihood of collisions	Low	Negligible	Minor	Moderate
	Moderate	Minor	Moderate	High
	High	Moderate	High	Very High

8.2 Assessment of Likelihood and Consequence of Impact – Threatened Bird Species

8.2.1 Barking Owl (*Ninox connivens*)

8.2.1.1 Information on barking owl from Australian Wind Farms

There are no records of blade strike of barking owl in the available literature.

8.2.1.2 Status and Flight Behaviour in the Project Area

The barking owl is rarely recorded in the central part of the Riverina Bioregion. The majority of records are restricted to the far south-east of the region along the Murray River. The species is predominantly associated with forests and woodlands, and forages predominantly among trees on terrestrial, arboreal and aerial prey, occasionally foraging above canopies (Birdlife Australia, 2023a). One barking owl was recorded in the Project Area at Coleambally Creek on 25 February 2024, as shown in **Figure 8.2**. It is considered likely that the species would forage, roost and breed within hollow-bearing trees and denser vegetation along this riparian corridor, and it's associated vegetated drainage channels.

8.2.1.3 Likelihood and Consequence of Impacts

The overall risk rating for barking owl is Minor, based on a Low likelihood and Moderate consequence of collisions (**Table 8.5**). The rationale for responses to each criterion is as follows:

a. The barking owl is likely to rarely fly at RSA height. Criterion A is assigned low.

b. The barking owl is likely a rare visitor to the Project Area. Hence, Criterion B is assigned Low.

c. The barking owl is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the barking owl align with the Moderate rating for Criterion D.

e. The barking owl population size has not been quantified, but it is not believed to approach the thresholds for Vulnerable under the population size criterion (<10,000 mature individuals with a continuing decline estimated to be >10% in ten years or three generations, or with a specified population structure) (BirdLife International 2024). Criterion E is assigned Low.

f. The barking owl is listed as Vulnerable under the BC Act.

Table 8.5 Barking Owl Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X	X	X		X	
Moderate				X		X
High						
Risk Rating						
Likelihood	Low					
Consequence	Moderate					
Risk Rating	Minor					

8.2.2 Black Falcon (*Falco subniger*)

8.2.2.1 Information on black falcon from Australian Wind Farms

Black falcon are known to be susceptible to collisions with human infrastructure such as powerlines and fences (Debus 2014). There are two published records of blade strike in south-east Australia. A review of mortality monitoring conducted at 15 wind farms in Victoria from 2003–2018 found one record of blade strike (Moloney *et al*. 2019). This case was of a carcass detected at a wind farm in south-western Victoria during a monitoring program conducted from March 2013 to February 2015 (Wood 2015). No black falcon had been recorded at the site during pre- or post-construction bird surveys (Wood 2015). The second record of blade strike is from a wind farm on the Central Tablelands of NSW in 2019 where the species had previously been recorded on one occasion during bird surveys at the site (Nature Advisory 2020).

8.2.2.2 Status and Flight Behaviour in the Project Area

The black falcon is an uncommon breeding resident across the Riverina Bioregion. Black falcon were regularly recorded in the Project Area during the 2022–2024 bird surveys. The species was recorded on 109 occasions, including 59 times during vantage point surveys and 50 times incidentally. The location of observations of black falcon in the Project Area is shown in **Figure 8.1**.

Black falcon were recorded at all 10 of the regularly surveyed sites (VP1-VP10), and at one of the three infrequently surveyed sites (VP11–VP13) (**Table 8.6**). Black falcon were recorded during each of the eight seasonal survey events. The overall reporting rate across all vantage point surveys was 11% (51/453).

One nest site was recorded in the Project Area however as nest sites were not specifically monitored during the 2022–2024 bird survey program factors such as breeding timing during 2022–2024, breeding success rates and use of different nest sites in the Project Area is unknown.

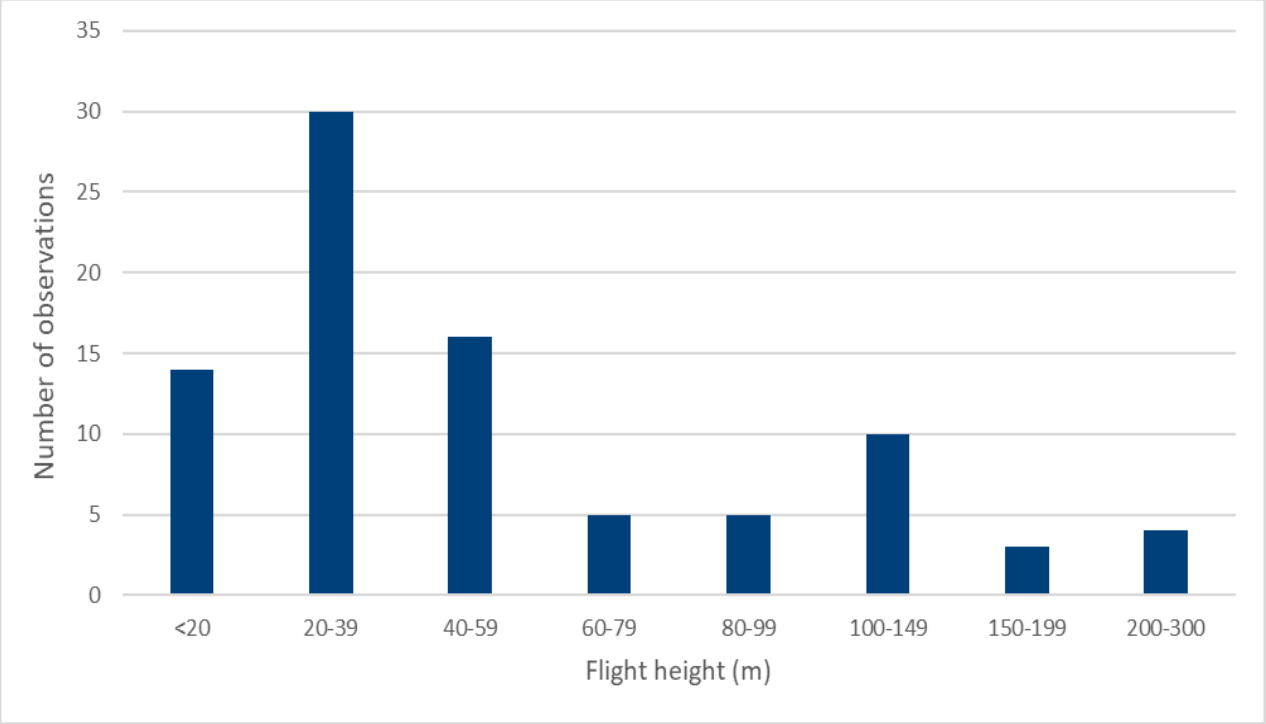
The black falcon undertakes active flight with fast, direct, with rapid, shallow, rather stiff wing-beats interrupted by glides; flight more powerful in fast pursuit, with faster, stronger, deeper wing-beats. At times, flight can be rather leisurely, with slower deeper and more easy crow-like wing-beats. The species often soars at great heights for long periods, hanging in wind. Hunting flight includes spectacular high-speed, sometimes nearly vertical, stoop to level out and chase birds or snatch prey from ground without landing. The species occurs in wooded lands, open country and terrestrial wetlands of tropical and temperate Australia, with a stronghold in arid and semi-arid zones, generally below 500 m asl. Mainly occurs over open plains and undulating land with large tracts of low vegetation, such as grassland, pasture, crops, herbfields, saltbush and bluebush plains, and saltmarsh. Also in forest, woodland and wooded farmlands, but only if open or very open, and is often associated with wetlands (lakes, reservoirs, swamps, rivers, creeks, dams, waterholes, irrigation channels, flooded rice fields), especially in arid zone where prey concentrates at water. Irrigation channels and watercourses used as hunting flyways, and banks and fringing trees provide cover for surprise attack. The species feeds where prey freshly exposed or disturbed; follow grass-fires, driven stock, farm machinery, walkers, and other raptors (Birdlife Australia, 2023b). Within the project, the species forages across a wide range of habitat types including grassland, woodland and waterbodies, with all preferred habitats present, and moves from these foraging habitats to roost habitats within woodland and along the existing high volage transmission line.

A summary of black falcon observations in the Project Area is presented below:

- 75% (82/109) of observations were of individuals, 24% (26/109) were of pairs, and 1% (1/109) was of three birds.
- Black falcon were recorded in flight on 87 occasions and whilst perched on 11 occasions. Behaviour was not recorded for the remaining 11 observations. The height of observed birds at the moment when first detected during each observation is shown in Graph 8.1. A total of 108 individual bird flights were observed. Of these:
    - 35% (38/108) occurred within the RSA of turbine type A
    - 48% (52/108) occurred within the RSA of turbine type B.

Table 8.6 Number of Black Falcon Observations at Each Survey Site

	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12	VP13
Number of obs.	1	2	3	4	14	14	6	5	2	7	1	0	0
Proportion of surveys recorded	1/35 (3%)	2/36 (6%)	3/49 (6%)	3/48 (6%)	13/49 (27%)	12/47 (26%)	4/37 (11%)	4/42 (10%)	2/41 (5%)	7/44 (16%)	1/12 (8%)	0/7	0/6



Graph 8.1 Number of Observations of Black Falcon (At Moment of Initial Detection) in Each Height Class

8.2.2.3 Likelihood and Consequence of Impacts

The overall risk rating for black falcon is High, based on a High likelihood and Moderate consequence of collisions (**Table 8.7**). The rationale for responses to each criterion is as follows:

a. The black falcon is a highly aerial species that is known to fly below and at typical RSA height. 35% of flights observed (38/108) occurred within the RSA of Turbine Type A, and 48% (52/108) occurred within the RSA of Turbine Type B. A High ranking is assigned to Criterion A.

b. Black falcon were regularly recorded in the Project Area during the 2022–2024 surveys. The species was recorded on 109 occasions. Hence, Criterion B is assigned High.

c. The black falcon is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the black falcon overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Marchant and Higgins 1993). Hence, Criterion D is assigned Moderate.

e. The population is estimated to number 1,000–10,000 individuals, roughly equating to 670–6,700 mature individuals (BirdLife International 2024).

f. Black falcon is listed as Vulnerable under the BC Act. It is not listed under the EPBC Act.

Should an impact trigger occur on the Project for black falcon, a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.7**, the Residual Risk rating for the black falcon is considered to be reduced from High to Moderate. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.7 Black Falcon Risk Assessment

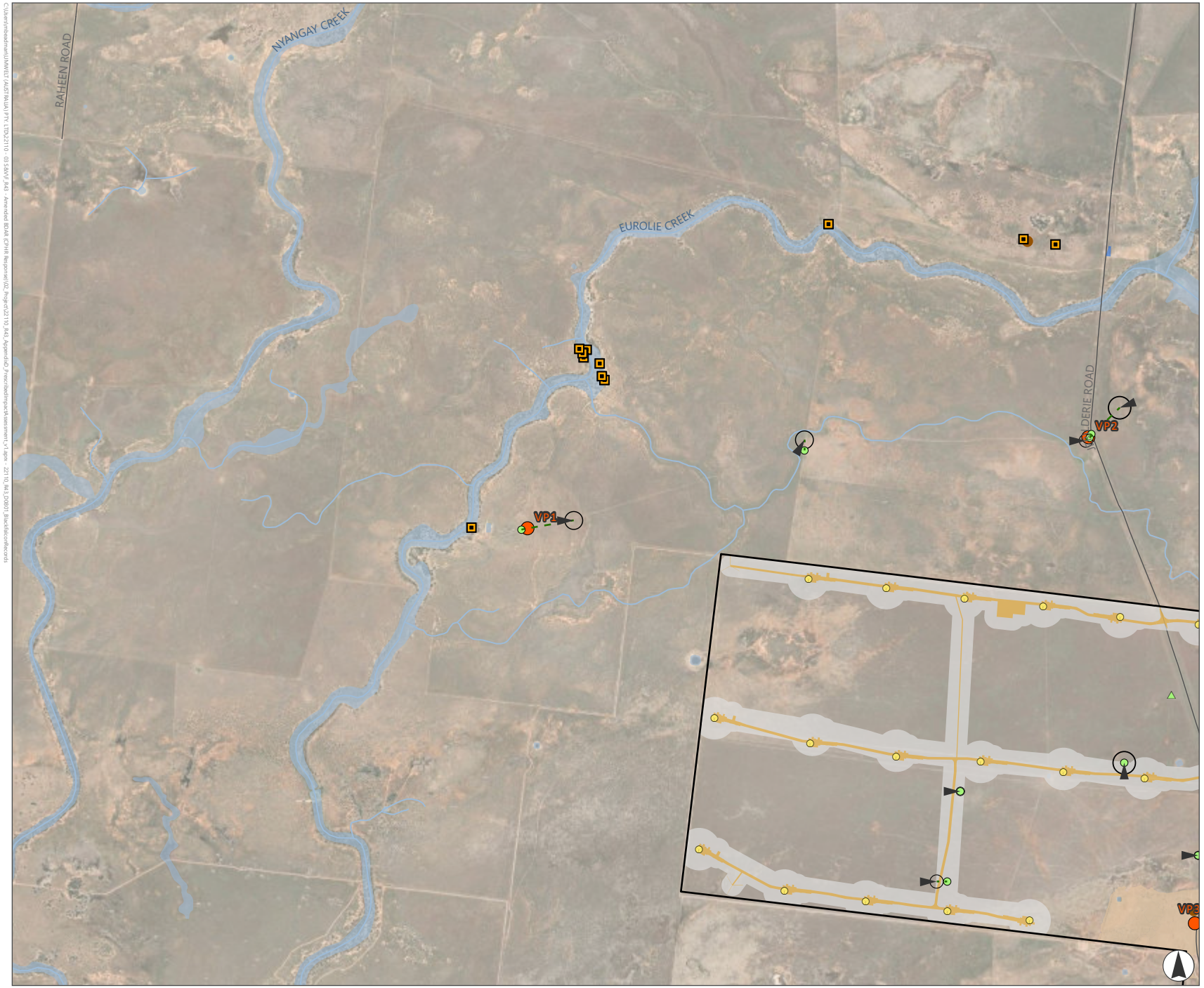
	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X			
Moderate				X	X	X
High	X	X				
Risk Rating						
Likelihood	High					
Consequence	Moderate					
Risk Rating	High					

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species may include: • Carrion removal program. • Raptor perch management. • In consultation with landowners and where feasible, modifications to agricultural land management activities, particularly back burning, slashing, ploughing, clearing etc.. • Removal of any identified breeding nests, to be specifically offset or artificially reproduced elsewhere. • Collation and analysis of cumulative impacts on black falcon from surrounding wind farms, a regional mitigation approach to address regional impacts on the species. • Radar consideration. • Camera consideration. • Curtailment under particular conditions. • Temporary shutdown of turbines. • Painting turbine blades.					
Residual Risk Rating	Moderate					

[1] *Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.*

FIGURE 8.1A

Black Falcon Records in the Project Area (2022 – 2025 Surveys)



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Black Falcon Record (Arrow indicates direction)
- Black Falcon Record

Flight Height (m)

- 0 - 10
- 11 - 30
- 31 - 80
- 81 - 150

- Observer Location
- Observer Direction and Distance
- Waterbody
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Road
- Hydroline

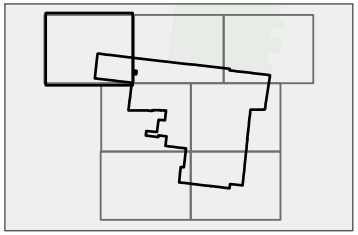


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FIGURE 8.1B

Black Falcon Records in the Project Area (2022 – 2025 Surveys)

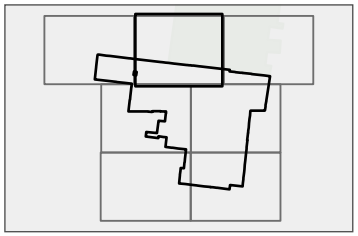
Legend

- Project Boundary
- Subject Land
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Black Falcon Record (Arrow indicates direction)

Flight Height (m)

- 0 - 10
- 11 - 30
- 31 - 80
- 81 - 150

- Observer Location
- Observer Direction and Distance
- Conservation Agreement Area
- NPWS Reserves
- Waterbody
- Stick Nests
- Woodland and Swamp Plant Community Types
- Hydroline



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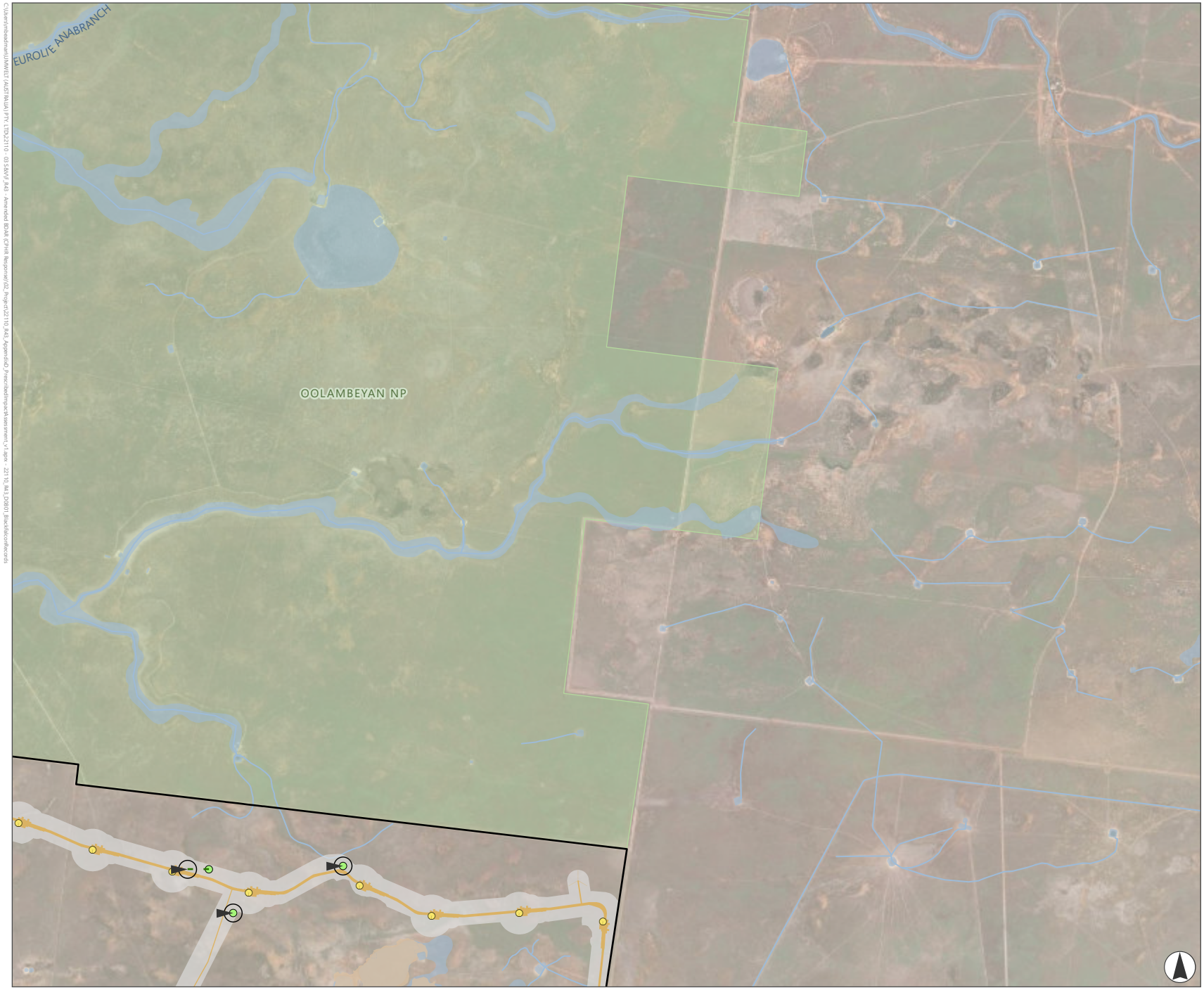

FIGURE 8.1C

Black Falcon Records in the Project Area (2022 – 2025 Surveys)

Legend

- Project Boundary
- Subject Land
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Black Falcon Record (Arrow indicates direction)

Flight Height (m)

- 31 - 80
- Observer Location
- Observer Direction and Distance
- NPWS Reserves
- Waterbody
- Woodland and Swamp Plant Community Types
- Hydroline

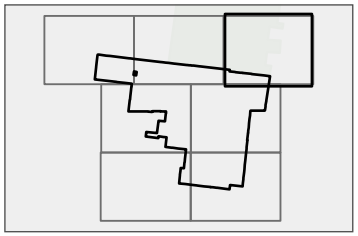

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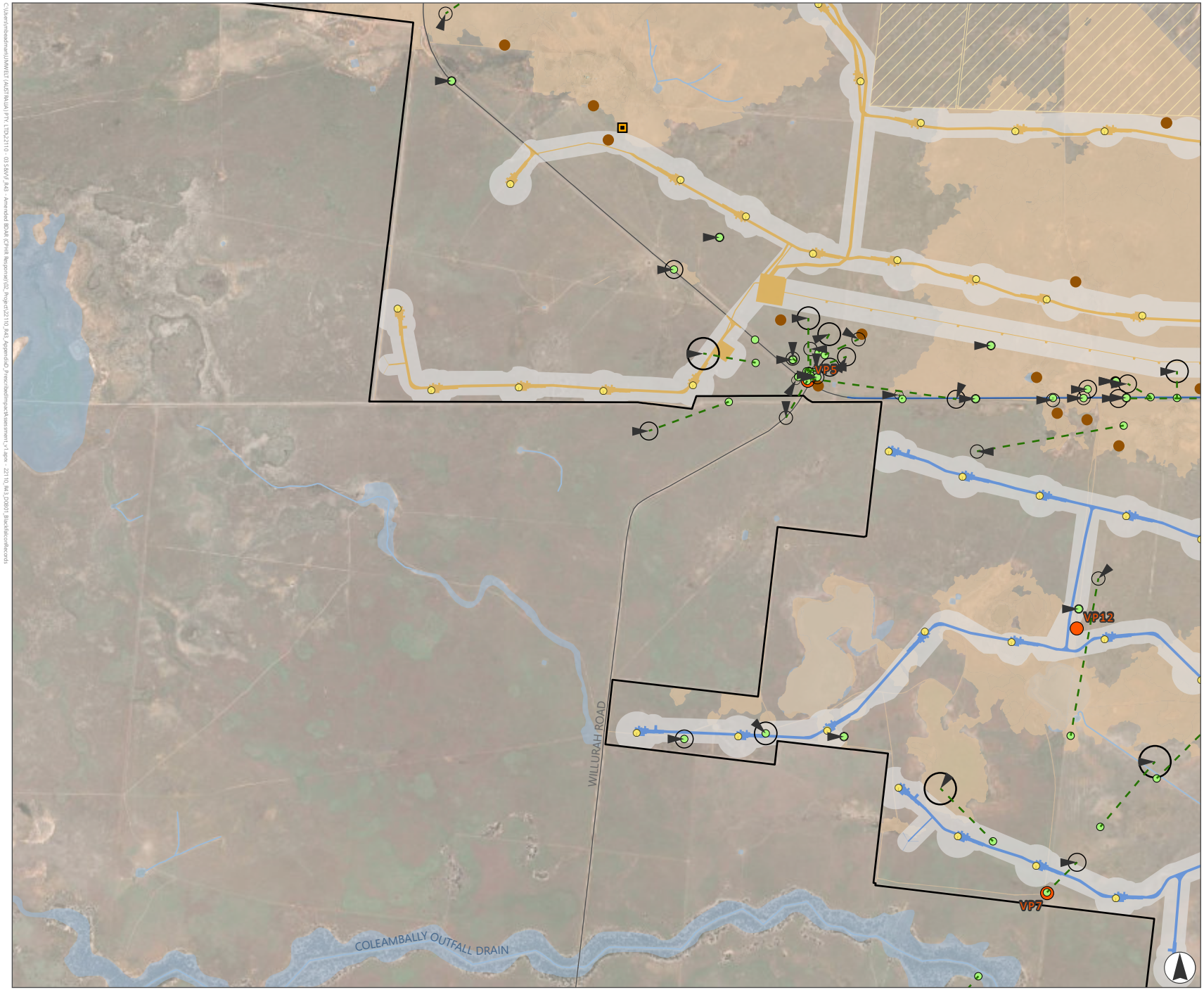
FIGURE 8.1D

Black Falcon Records in the Project Area (2022 – 2025 Surveys)



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Black Falcon Record (Arrow indicates direction)

Flight Height (m)

- 0 - 10
- 11 - 30
- 31 - 80
- 81 - 150
- 151 - 300

- Observer Location
- Observer Direction and Distance
- Conservation Agreement Area
- Waterbody
- Black Falcon Stick Nests
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Road
- Hydroline

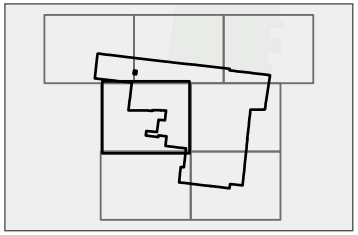


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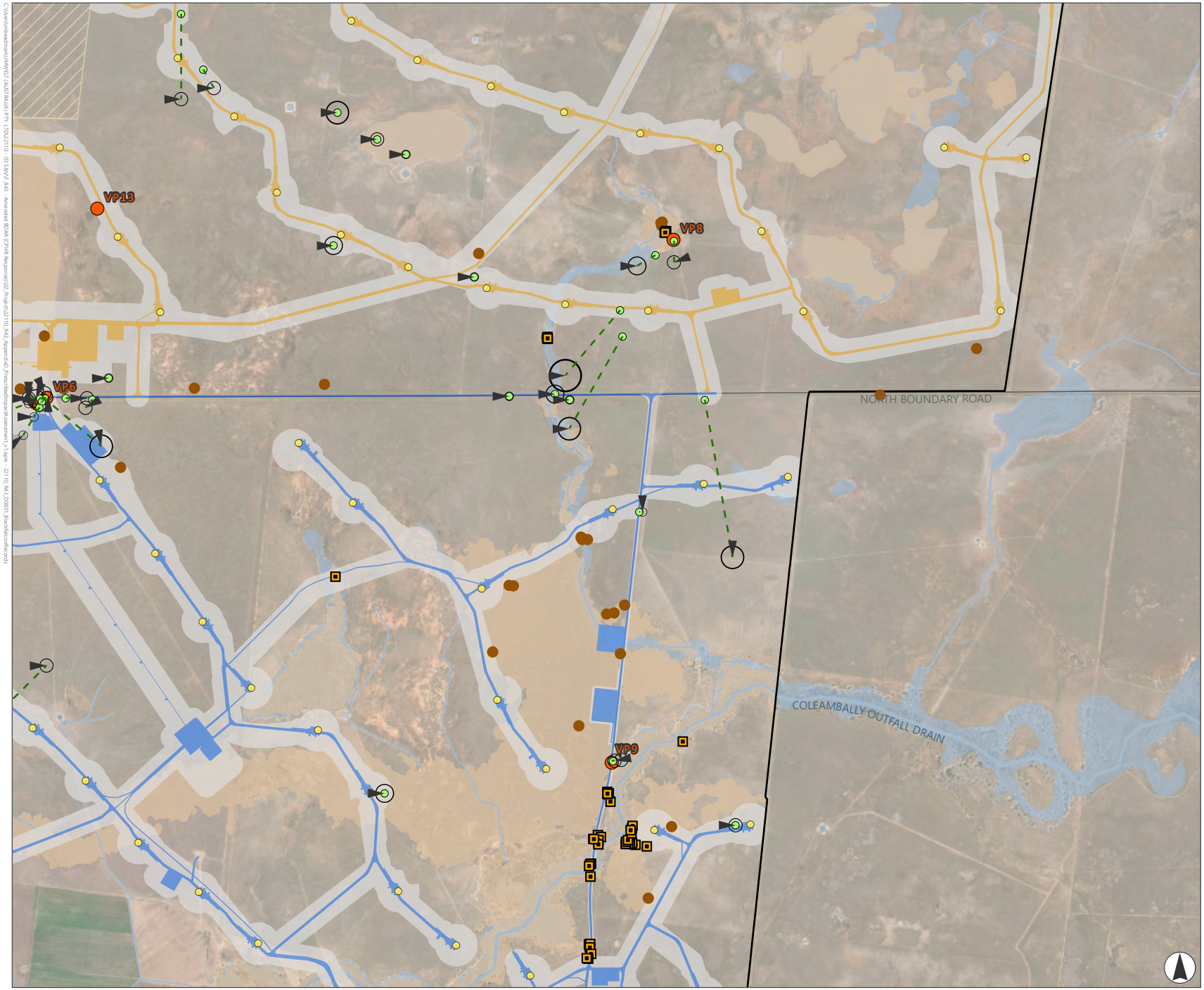
FIGURE 8.1E

Black Falcon Records in the Project Area (2022 – 2025 Surveys)



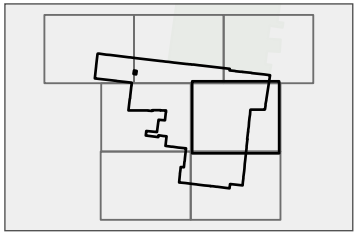
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Black Falcon Record (Arrow indicates direction)

Flight Height (m)

- 0 - 10
- 11 - 30
- 31 - 80
- 81 - 150
- 151 - 300

- Observer Location
- Observer Direction and Distance
- Conservation Agreement Area
- Waterbody
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Road
- Hydroline



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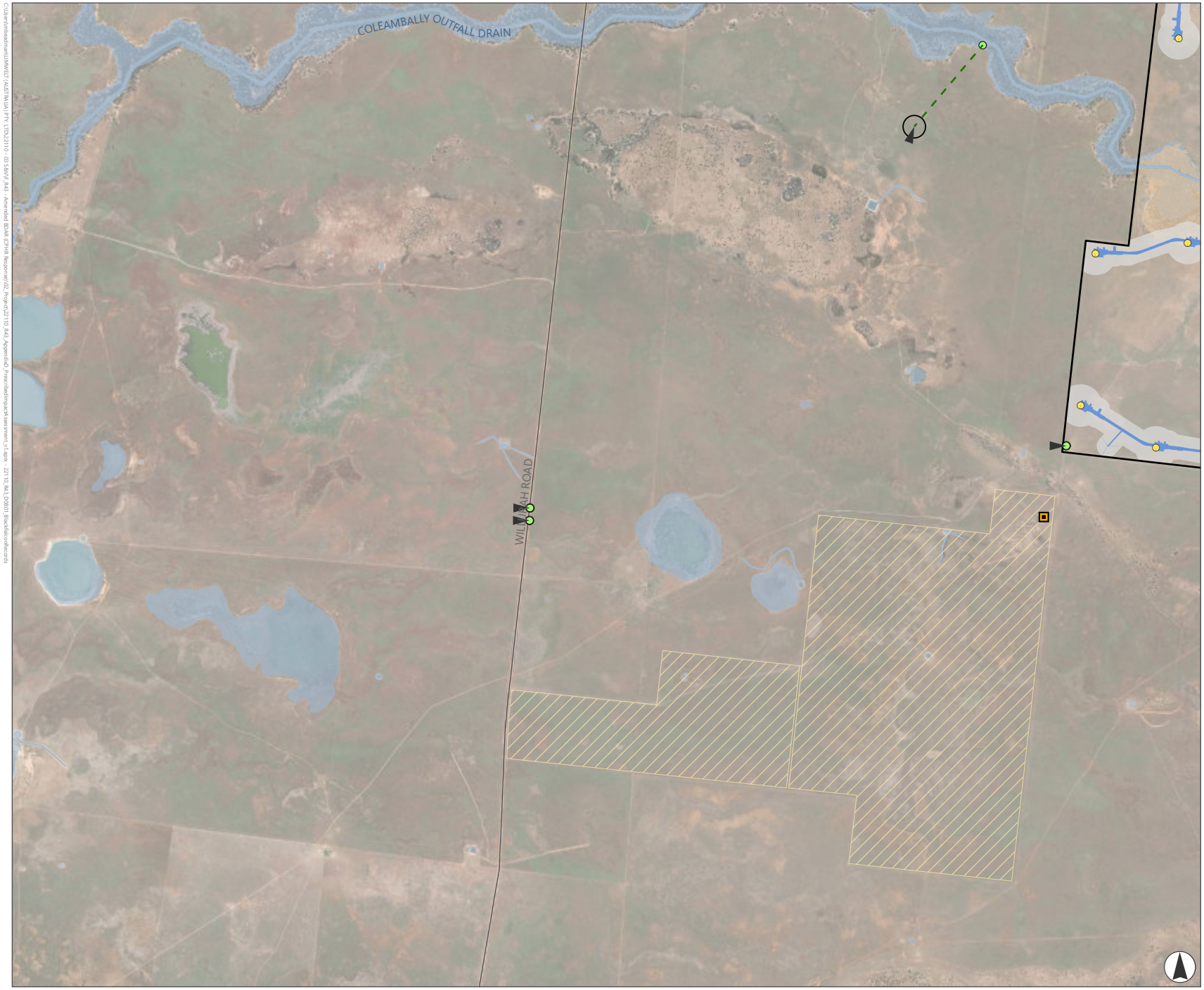

FIGURE 8.1F

Black Falcon Records in the Project Area (2022 – 2025 Surveys)

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Black Falcon Record (Arrow indicates direction)

Flight Height (m)

- 0 - 10
- 81 - 150

- Observer Location
- Observer Direction and Distance
- Conservation Agreement Area
- Waterbody
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Road
- Hydroline

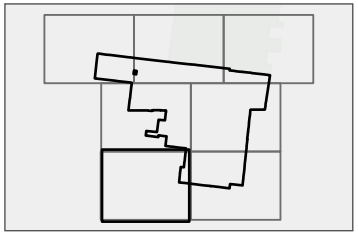

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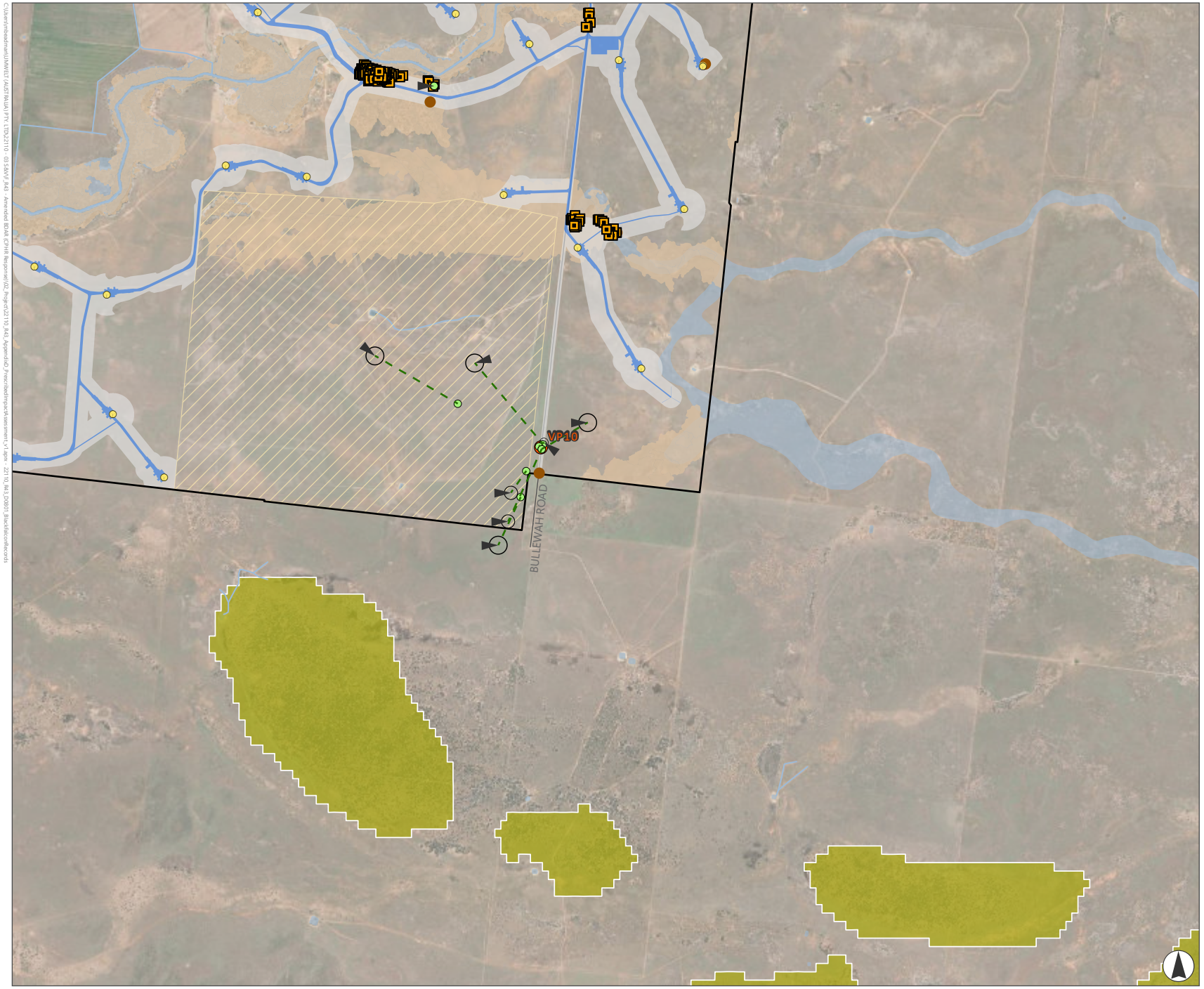
FIGURE 8.1G

Black Falcon Records in the Project Area (2022 – 2025 Surveys)



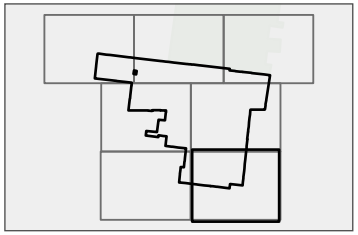
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Black Falcon Record (Arrow indicates direction)

Flight Height (m)

- 0 - 10
- 11 - 30
- 31 - 80

- Observer Location
- Observer Direction and Distance
- Conservation Agreement Area
- Waterbody
- Floodplain Wetland
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Road
- Hydroline



0 975 1,950

Meters

Scale 1:50,000 at A4

GDA2020 MGA Zone 55

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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

8.2.3 Blue-winged Parrot (*Neophema chrysostoma*)

8.2.3.1 Information on blue-winged parrot from Australian Wind Farms

There are no records of blade strike of blue-winged parrot in the available literature.

8.2.3.2 Status and Flight Behaviour in the Project Area

The blue-winged parrot is a rare winter migrant to the Riverina Bioregion. Blue-winged parrot were recorded on two occasions in the Project Area during the 2022–2024 surveys (**Figure 8.2**). One individual was recorded foraging on the ground beside Willurah Road in the central-western part of the Project Area on 10 July 2022. The second observation was of an individual foraging adjacent VP 5 on North Boundary Road in the central part of the Project Area on 23 September 2023.

The species is usually seen in pairs or small parties, sometimes in large flocks numbering in thousands during winter. Often associates with other species of *Neophema*. The species inhabits a variety of habitats from coast to semi-arid zone. It forages mostly on the ground. If disturbed in open habitat, the species will rise high into air and fly some distance, often out of sight. Normal flight is swift and direct with rapid shallow wing-beats; and the species often flies at considerable heights; birds flushed in open habitats typically ascend rapidly before levelling off and flying into distance; typically plummet straight down from great height to alight on ground. Flight over short distances much lower, with erratic buoyant action; birds spread tail when alighting. When travelling long distances, the species flies high in swift, direct manner with little undulation (Birdlife Australia, 2023c).

Occupy coastal, subcoastal and inland habitats, ranging into semi-arid zones. Throughout much of range, inhabit grasslands and grassy woodlands and forest; often near wetlands, both near coast and in semi-arid zones. After breeding, move to more open and drier habitats. Throughout range, often in open natural grasslands; also farmland, which may have sparsely scattered trees, especially pastures but also cultivated paddocks and crops; also recorded on grassy verges of roads; sometimes in modified grassy habitats, such as golf courses and gardens. Also often in open sclerophyll forests and woodlands with understorey or ground-cover of grass or heath, and in grassy clearings in forest or woodlands (Birdlife Australia, 2023c).

Within the Project Area, the species would forage across the majority of the site on occasion, and may use woodland areas for roosting.

8.2.3.3 Likelihood and Consequence of Impacts

The overall risk rating for blue-winged parrot is Minor, based on a Low likelihood and Moderate consequence of collisions (**Table 8.8**).

a. The flight behaviour of the blue-winged parrot in the Project Area is unknown because both observations were of individuals foraging. The species is migratory and is known to fly at RSA height, with at least one recorded instance of a blue-winged parrot carcass being detected beneath a turbine in Tasmania (Nature Advisory, 2021). A precautionary approach has been applied and it is assumed that the species would fly at RSA height of both turbine types A and B, and Criterion A is assigned High.

b. The blue-winged parrot is a rare visitor to the Project Area. Hence, Criterion B is assigned Low.

c. The blue-winged parrot is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the blue-winged parrot overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Higgins 1999). Hence, Criterion D is assigned Moderate.

e. While there are no quantitative data available on the population size, it is estimated that there are approximately 10,000 (7,500–15,000) mature individuals (Holdsworth et al. 2021).

f. Blue-winged parrot is listed as Vulnerable under the EPBC Act and the BC Act.

Should an impact trigger occur on the Project for blue-winged parrot a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.8**, the Residual Risk rating for the blue-winged parrot is considered to be reduced to Moderate. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.8 Blue-winged Parrot Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X	X			
Moderate				X	X	X
High	X					
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					
Risk Rating	Moderate					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Radar consideration.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.2.4 Diamond Firetail (*Stagonopleura guttata*)

8.2.4.1 Information on diamond firetail from Australian Wind Farms

There are no records of blade strike of diamond firetail in the available literature.

8.2.4.2 Status and Flight Behaviour in the Project Area

The diamond firetail is an uncommon resident /partial nomad in the south-eastern half of the Riverina Bioregion (it is very rare in the north-west of the region). It is most frequently recorded in woodland and vegetated watercourses in the extreme south-east of the region and is generally scarce within 50 km of the Project Area. Diamond firetail were recorded on four occasions along Coleambally Creek in the Project Area during the 2022–2024 surveys (**Figure 8.2**):

- 23 August 2023: one bird was observed foraging in woodland adjacent Coleambally Creek approximately 5 km west of Bullewah Road.
- 21 September 2023: three birds were observed foraging in woodland adjacent the Bullewah Road bridge over Coleambally Creek.
- 24 September 2023: one bird was heard in woodland adjacent the Bullewah Road bridge over Coleambally Creek.
- 14 February 2024:one bird was observed foraging and flying at approximately 2 m AGL during a survey at VP9 adjacent the Bullewah Road bridge over Coleambally Creek.

The species occurs in small flocks throughout year; also occur in pairs or singly during breeding season and in small family parties after breeding, can form larger flocks outside breeding season, usually of up to *c*. 50 birds but sometimes of hundreds. Commonly associate with Double-barred finches *Taeniopygia bichenovii* in mixed-species flocks, and occasionally with other finches. The species forages mainly on ground, close to trees or other vegetation, moving rapidly across ground by hopping; sometimes lunge to grasp seed-heads or alight on food plants to take seeds from standing grasses. Flight rapid and undulating or bouncing, on short and rounded wings. When flushed, flocks fly up in small tight group directly to nearby tree, with audible whirring of wings and red of rump and uppertail-coverts flashing prominently (Birdlife Australia 2023d).

Often inhabit open woodlands and forests, usually dominated by eucalypts such as red gums (particularly River Red Gum and Blakely's Red Gum) and other gums (e.g. Yellow Gum, Spotted Gum, Manna Gum), stringybarks (especially Broad-leaved Stringybark), ironbarks and box eucalypts (especially Yellow, Grey and White Box) and other species such as Moreton Bay Ash, and typically with open or sparse (though occasionally dense) understorey of shrubs, small trees or regrowth, and grass ground-cover (e.g. of Kangaroo Grass *Themeda australis* and including mallee woodlands. Sometimes also in woodlands dominated by casuarinas, such as Buloke or Belah, and cypress-pines *Callitris*, such as White Cypress-pine *Callitriscolumellaris*, sometimes in mixed associations with eucalypts. The species also often occurs in lightly timbered grasslands, including farmland with scattered or remnant patches of trees (Birdlife Australia 2023d).

Within the Project Area, flight movements would likely all occur far below RSA height of both turbine types A and B.

8.2.4.3 Likelihood and Consequence of Impacts

The overall risk rating for diamond firetail is Negligible, based on a Low likelihood and Low consequence of collisions (**Table 8.9**). Note that despite a Moderate rating being assigned for Criterion B, the overall rating for consequence is deemed to be Low. This is because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and observations from the Project Area.

a. The diamond firetail is likely to only very rarely fly at RSA height if at all. Hence, Criterion A is assigned low.

b. The diamond firetail is known to occur in the Project Area. As it is likely that it is an occasional visitor in low numbers to the Project Area, Criterion B is assigned Moderate.

c. The diamond firetail is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the diamond firetail align with the Low rating for Criterion D.

e. The population is estimated at 68,000–272,000 mature individuals, with a best estimate of 136,000 (Hodder et al. 2021).

f. The diamond firetail is listed as Vulnerable under the EPBC Act and the BC Act.

Table 8.9 Diamond Firetail Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X		X	X	X	
Moderate		X				X
High						
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

8.2.5 Flame Robin (*Petroica phoenicea*)

8.2.5.1 Information on flame robin from Australian Wind Farms

There are no records of blade strike of flame robin in the available literature.

8.2.5.2 Status and Flight Behaviour in the Project Area

The flame robin is an uncommon partial migrant in the Riverina Bioregion that is typically recorded in low numbers during winter in the far south-east of the region. It is rarely recorded in the central and northern parts of the Riverina Bioregion. One flame robin was recorded on North Boundary Road approximately 700 m west of VP6 during July 2023 (**Figure 8.2**).

In non-breeding season, the species is usually in more open habitats than those occupied during breeding season, and predominantly grasslands or habitats with grassy ground cover or sparse understorey, including grasslands, with or without sparsely scattered trees; and often in farmland, especially pastureland. Also regularly recorded in dry open sclerophyll forests and woodlands dominated by eucalypts such as River Red Gum, Blakely's Red Gum, Mugga, Red Ironbark, Grey Box, Yellow Box, Red Box *Eucalyptus polyanthemos*, Yellow Gum, Red Stringybark *E. macrorhyncha* or Messmate, and usually with open ground cover of grasses or sedges, sparse understorey of low shrubs or bare ground; often in clearings within such habitats.

Within the Project Area, the species would occasionally forage and roost within the woodland and grassland plant communities across the site, with flight movements typically occurring below RSA height for both turbine types A and B.

8.2.5.3 Likelihood and Consequence of Impacts

The overall risk rating for is Negligible, based on a Low likelihood and Low consequence of collisions (**Table 8.10**).

a. The flame robin is likely to rarely fly at RSA height. It is highly uncertain at what height this species flies whilst migrating. Criterion A is assigned low.

b. The flame robin is a rare visitor to the Project Area. Hence, Criterion B is assigned Low.

c. The flame robin is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the flame robin align with the Low rating for Criterion D.

e. Newman *et al*. (2020) considered the best population estimate to be 8,700,000 mature individuals (range: 1,200,000–9,600,000).

f. The flame robin is listed as Vulnerable under the BC Act.

Table 8.10 Flame Robin Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X	X	X	X	X	
Moderate						X
High						
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

8.2.6 Grey-crowned Babbler (*Pomatostomus temporalis*)

8.2.6.1 Information on grey-crowned babbler from Australian Wind Farms

There are no records of blade strike of grey-crowned babbler in the available literature.

8.2.6.2 Status and Flight Behaviour in the Project Area

The grey-crowned babbler is an uncommon resident across the south-eastern half of the Riverina Bioregion. Grey-crowned babbler were recorded on 33 occasions in the Project Area during the 2022–2024 surveys, including 28 times during vantage point surveys and 5 times incidentally (**Figure 8.2**).

Grey-crowned babblers were recorded at four of the regularly surveyed sites (VP1-VP10), and at none of the three infrequently surveyed sites (VP11-VP13) (**Table 8.11**). Grey-crowned babblers were recorded during six of the eight seasonal survey events. They were not recorded during the Summer 2023 and Autumn 2023 surveys. The overall reporting rate across all vantage point surveys was 6% (26/453).

Grey-crowned babbler were recorded in flight on four occasions. All four observations were of birds flying below 10 m AGL.

Table 8.11 Number of Grey-crowned Babbler Observations at Each Survey Site

	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12	VP13
Number of obs.	4	1	1	0	0	0	0	0	22	0	0	0	0
Proportion of surveys recorded	4/35 (11%)	1/36 (3%)	1/49 (2%)	0/48	0/49	0/47	0/37	0/42	20/41 (49%)	0/44	0/12	0/7	0/6

8.2.6.3 Likelihood and Consequence of Impacts

The overall risk rating for the grey-crowned babbler is Negligible, based on a Low likelihood and Low consequence of collisions (**Table 8.12**). Note that despite a High rating being assigned for Criterion B, the overall rating for consequence is deemed to be Low. This is because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and observations from the Project Area.

a. The grey-crowned babbler is highly unlikely to fly at RSA height. Hence, Criterion A is assigned low.

b. The grey-crowned babbler is resident in the Project Area. Hence, Criterion B is assigned High.

c. The grey-crowned babbler is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the grey-crowned babbler align with the Low rating for Criterion D.

e. The grey-crowned babbler population size has not been quantified, but it is not believed to approach the thresholds for Vulnerable under the population size criterion (<10,000 mature individuals with a continuing decline estimated to be >10% in ten years or three generations, or with a specified population structure) (BirdLife International 2024). Criterion E is assigned Low.

f. Grey-crowned babbler is listed as Vulnerable under the BC Act.

Table 8.12 Grey-crowned Babbler Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X		X	X	X	
Moderate						X
High		X				
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

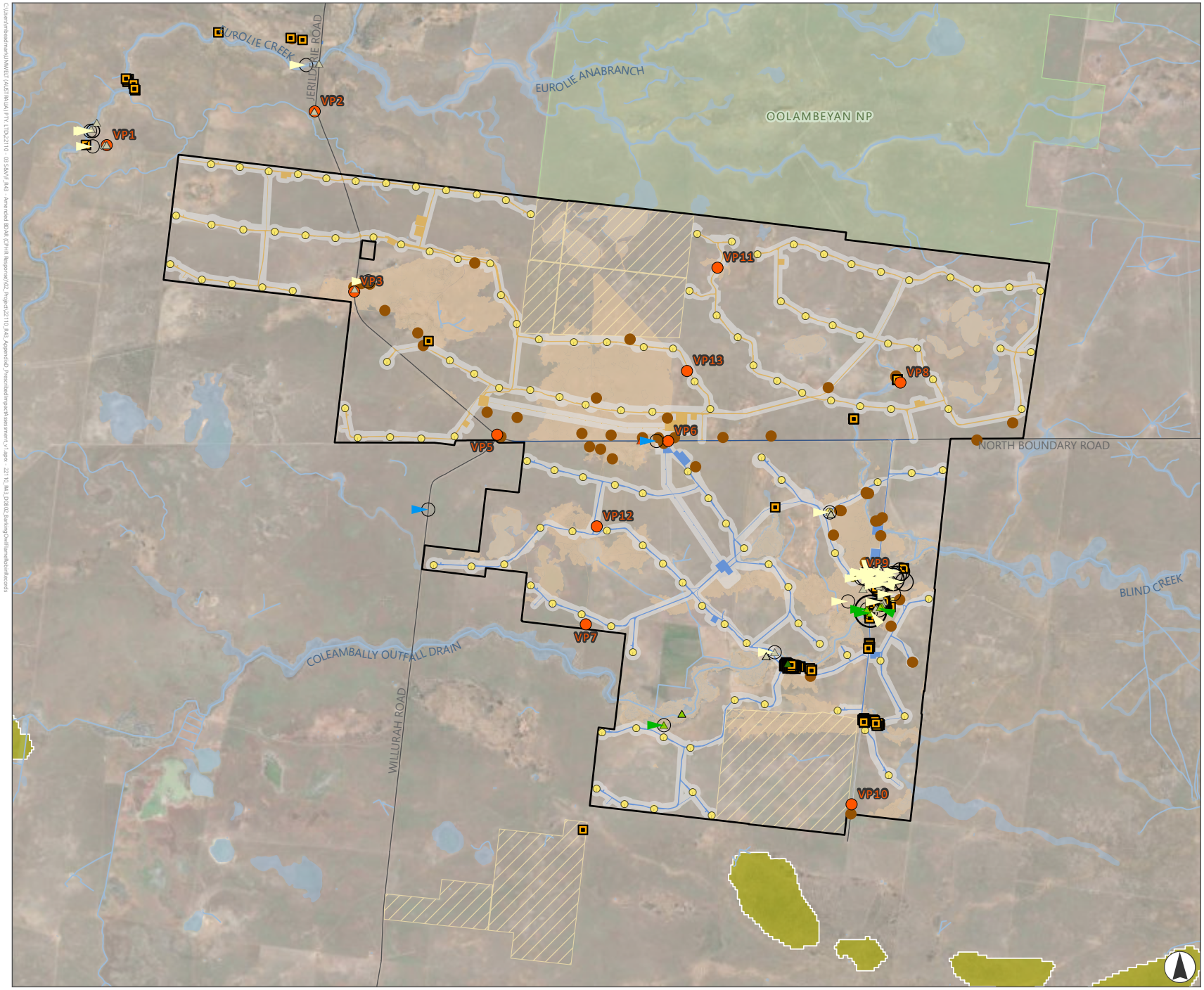

FIGURE 8.2

Location of Blue-winged Parrot, Barking Owl, Diamond Firetail, Flame Robin and Grey-crowned Babbler Records in the Project Area (2022 – 2025 Surveys)

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Barking Owl Record
- Flame Robin Record
- Grey-crowned Babbler Record
- Diamond Firetail Record
- Blue-winged Parrot Record (Arrow indicates direction)
- Diamond Firetail Record (Arrow indicates direction)
- Grey-crowned Babbler Record (Arrow indicates direction)

Flight Height (m)

- 0 - 1
- 2 - 3
- 4 - 5
- 6 - 10

- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- NPWS Reserves
- Waterbody
- Floodplain Wetland
- Road
- Hydroline

0 2,500 5,000

Meters

Scale 1:135,000 at A4

GDA2020 MGA Zone 55

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8.2.7 Little Eagle (*Hieraaetus morphnoides*)

8.2.7.1 Information on little eagle from Australian Wind Farms

Moloney *et al.* (2019) reported one record of blade strike of little eagle from post-construction mortality monitoring of 15 wind farms in Victoria from 2003 to 2018. Smales (2014) reported two records of blade strike of little eagle from eight wind farms in south-eastern Australia (i.e., Victoria and South Australia). It is likely that these reports are referring to the same record of blade strike in Victoria.

8.2.7.2 Status and Flight Behaviour in the Project Area

The little eagle is an uncommon resident / nomad / partial migrant in the Riverina Bioregion. Little eagle were recorded on four occasions in the Project Area during the 2022–2024 surveys (**Figure 8.3**). Little eagle were recorded on two occasions during vantage point surveys and three times incidentally:

- 5 September 2023: one bird was observed in the north-central section of the Project Area adjacent to Oolambeyan National Park flying between 5–100 m AGL.
- 17 October 2023: two birds were observed in the centre of the Project Area on North Boundary Road approximately 2 km east of the North Boundary Road / Willurah Road intersection. No flight details were recorded.
- 16 February 2024: one bird was observed flying at 20 m AGL during a morning survey at VP6.
- 16 February 2024: one bird was observed flying between 40–60 m AGL during a midday survey at VP5.
- Of the individual flights of the species where flight heights were recorded, 33% (1/3) flights were within the RSA of turbine type A and 67% (2/3) flights were within the RSA of turbine type B.

8.2.7.3 Likelihood and Consequence of Impacts

The overall risk rating for little eagle is High, based on a High likelihood and Moderate consequence of collisions (**Table 8.13**). The rationale for responses to each criterion is as follows:

a. The little eagle is likely to either occasionally or regularly fly at RSA height. Hence, Criterion A is conservatively assigned High.

b. The little eagle is an uncommon visitor to the Project Area. Hence, Criterion B is assigned Moderate.

c. The little eagle is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the little eagle overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Marchant and Higgins 1993). Hence, Criterion D is assigned Moderate.

e. In 2009, the population of little eagle was estimated to number 10,000 to 100,000 individuals, based upon an estimate made by Ferguson and Christie (2001), although the data quality is listed as poor (Birdlife International 2024). Given the uncertainty of this estimate and the decline of little eagle in NSW (Barrett et al. 2007) and the ACT (Olsen and Fuentes 2005). Criterion E is conservatively assigned Moderate (based on the lower population estimate).

f. Little eagle is listed as Vulnerable under the BC Act.

Should an impact trigger occur on the Project for little eagle, a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.13**, the residual risk rating for the little eagle is considered to be reduced from High to Moderate. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.13 Little Eagle Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X			
Moderate		X		X	X	X
High	X					
Unmitigated Risk Rating						
Likelihood	High					
Consequence	Moderate					
Risk Rating	High					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Carrion removal program. • Raptor perch management. • In consultation with landowners and where feasible, modifications to agricultural land management activities, particularly back burning, slashing, ploughing, clearing…etc.. • Removal of any identified breeding nests, to be specifically offset or artificially reproduced elsewhere. • Radar consideration.					
Residual Risk Rating	Moderate					

1 Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.2.8 Plains-wanderer (*Pedionomus torquatus*)

8.2.8.1 Information on plains-wanderer from Australian Wind Farms

There are no records of blade strike of plains-wanderer in the available literature.

8.2.8.2 Status and Flight Behaviour in the Project Area

The plains-wanderer is a rare resident / nomad in the Riverina Bioregion. The Riverina Bioregion, and in particular, the central portion of the region (in which the Project Area is located), is the species' primary stronghold (Baker-Gabb *et al*., 1990; Bennett 1983). The north-central region of Victoria comprises a secondary stronghold (DoE 2016).

Targeted surveys for plains-wanderer were carried out in November 2024, with 18 individuals recorded. In addition to this, plains-wanderers were recorded incidentally on two occasions (May 2022 and July 2022) in the far western part of the Project Area (**Figure 8.3**). Both male, female and juvenile individuals have been recorded within the Project Area.

8.2.8.3 Likelihood and Consequence of Impacts

The overall risk rating for plains-wanderer is Moderate, based on a Low likelihood and High consequence of collisions (**Table 8.14**).

a. Little is known about the flight behaviour of plains-wanderer though it is likely to only rarely fly at RSA height if at all. Plains-wanderer have been documented maintaining sustained flight as high as 40 m above ground (Llewellyn 1975). Hence, Criterion A is assigned Low.

b. The Project Area supports critical plains-wanderer habitat. The species is known to be present in the Project Area. Hence, Criterion B is assigned High.

c. The plains-wanderer has a reasonable large range however a relatively high proportion of their population is likely to be concentrated at sites where they do occur. Hence, Criterion C is assigned Moderate.

d. The life-history characteristics of the plains-wanderer overlap with certain aspects of both the descriptions for a Moderate and High rating for Criterion D (Marchant and Higgins 1993). Hence, Criterion D is conservatively assigned High.

e. The population of plains-wanderer is estimated to be 250 mature individuals (range 100–500) (Parker et al. 2021). Hence, Criterion E is assigned as High.

f. Plains-wanderer is listed as Endangered under the BC Act and as Critically Endangered under the EPBC Act.

Should an impact trigger occur on the Project for plains wanderer, a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures that will de detailed in the approved BBAMP to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.14**, the residual risk rating for the plains wanderer is considered to be reduced from Moderate to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.14 Plains-wanderer Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X					
Moderate			X			
High		X		X	X	X
Risk Rating						
Likelihood	Low					
Consequence	High					
Risk Rating	Moderate					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species may include: • Radar consideration. • Collation and analysis of cumulative impacts on Plains-wanderer from surrounding wind farms, a regional mitigation approach to address regional impacts on the species. • Detailed radio telemetry.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

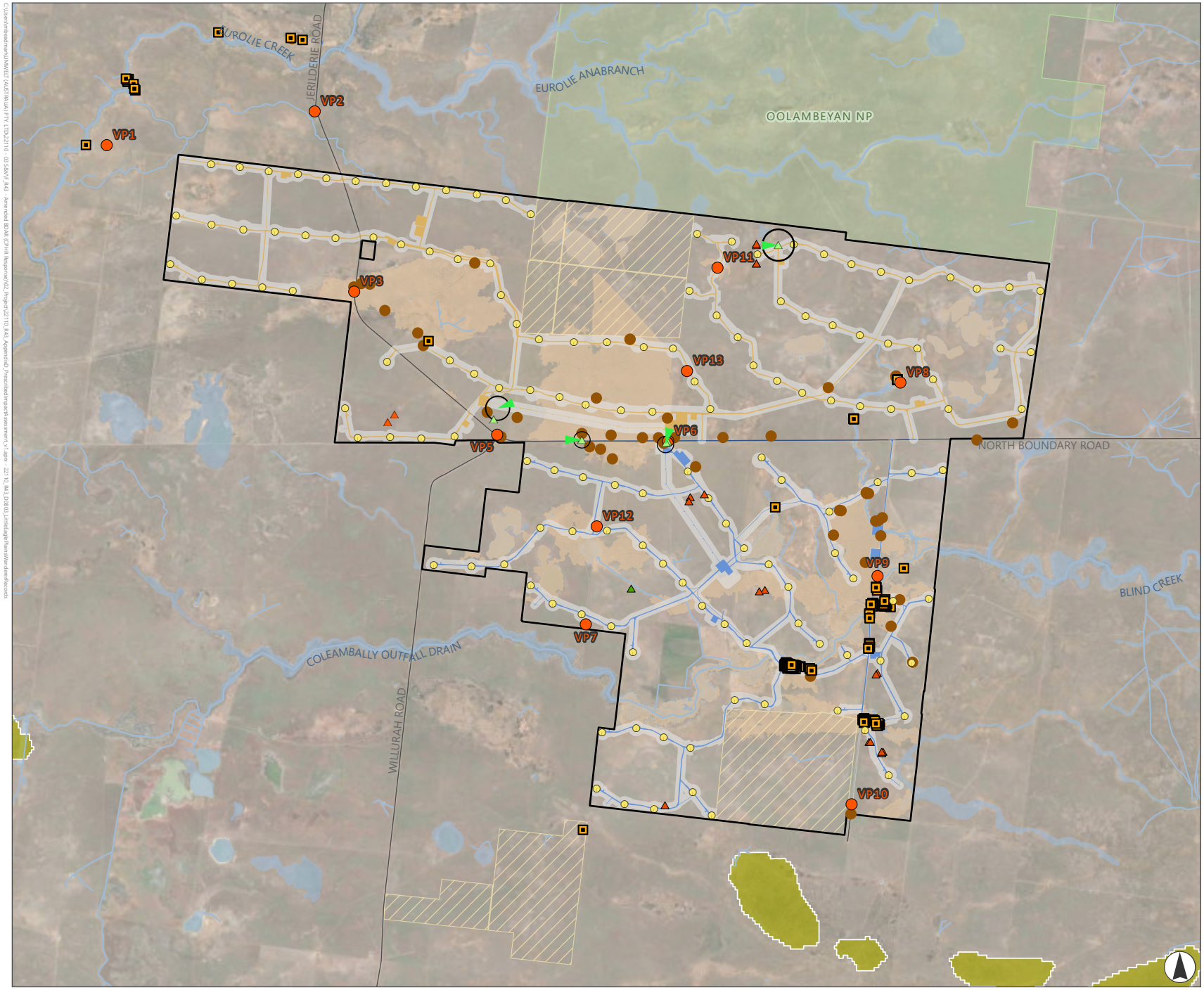


FIGURE 8.3

Location of Little Eagle and Plains-wanderer Records in the Project Area (2022 -2025 Surveys)

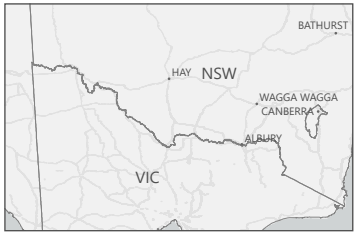
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Plains Wanderer Record (2)
- Little Eagle Record
- Little Eagle Record (Arrow indicates direction)

Flight Height (m)

- 0 - 20
- 21 - 40
- 41 - 60

- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- NPWS Reserves
- Waterbody
- Floodplain Wetland
- Road
- Hydroline



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8.2.9 Southern Whiteface (*Aphelocephala leucopsis*)

8.2.9.1 Information on southern whiteface from Australian Wind Farms

There are no records of blade strike of southern whiteface in the available literature.

8.2.9.2 Status and Flight Behaviour in the Project Area

The southern whiteface is a widespread but uncommon breeding resident across the Riverina Bioregion. Southern whiteface were regularly recorded in the Project Area during the 2022–2024 bird surveys. The species was recorded on 69 occasions, including 49 times during vantage point surveys and 20 times incidentally. The location of observations of southern whiteface in the Project Area is shown in (**Figure 8.4**).

Southern whiteface were recorded at four of the regularly surveyed sites (VP1-VP10), and at none of the three infrequently surveyed sites (VP11-VP13) (**Table 8.15**). Southern whiteface were recorded during seven of the eight seasonal survey events. They were not recorded during the Autumn 2023 surveys. The overall reporting rate across all vantage point surveys was 10% (45/453).

A summary of southern whiteface observations in the Project Area is presented below:

- 97% (67/69) of observations were of individual birds. Only two observations were of more than one individual with the maximum flock size recorded being 4.
- Southern whiteface were recorded in flight on 23 occasions and whilst perched on 20 occasions. Behaviour was not recorded for the remaining 26 observations. All observed flights were at or below 15 m AGL, which is lower than the RSA height of Turbine Types A and B.

Table 8.15 Number of Southern Whiteface Observations at Each Survey Site

	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12	VP13
Number of obs.	6	0	0	0	0	18	0	1	24	0	0	0	0
Proportion of surveys recorded	6/35 (17%)	0/36	0/49	0/48	0/49	15/47 (32%)	0/37	1/42 (2%)	23/41 (56%)	0/44	0/12	0/7	0/6

8.2.9.3 Likelihood and Consequence of Impacts

The overall risk rating for the southern whiteface is Negligible, based on a Low likelihood and Low consequence of collisions (**Table 8.16**). Note that despite a Moderate rating being assigned for Criterion B, the overall rating for consequence is deemed to be Low. This is because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and observations from the Project Area.

a. The southern whiteface is highly unlikely to fly at RSA height. Hence, Criterion A is assigned Low.

b. Southern whiteface were regularly recorded in the Project Area during the 2022–2024 surveys. The species was recorded on 69 occasions. Hence, Criterion B is assigned High.

c. The southern whiteface is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the southern whiteface align with the Low rating for Criterion D

e. The population of the south-eastern subspecies is estimated at 200,000–800,000 mature individuals, with a best estimate of 400,000 (Ehmke et al. 2021).

f. Southern whiteface is listed as vulnerable under the BC Act and vulnerable under the EPBC Act.

Table 8.16 Southern Whiteface Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X		X	X	X	
Moderate						X
High		X				
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

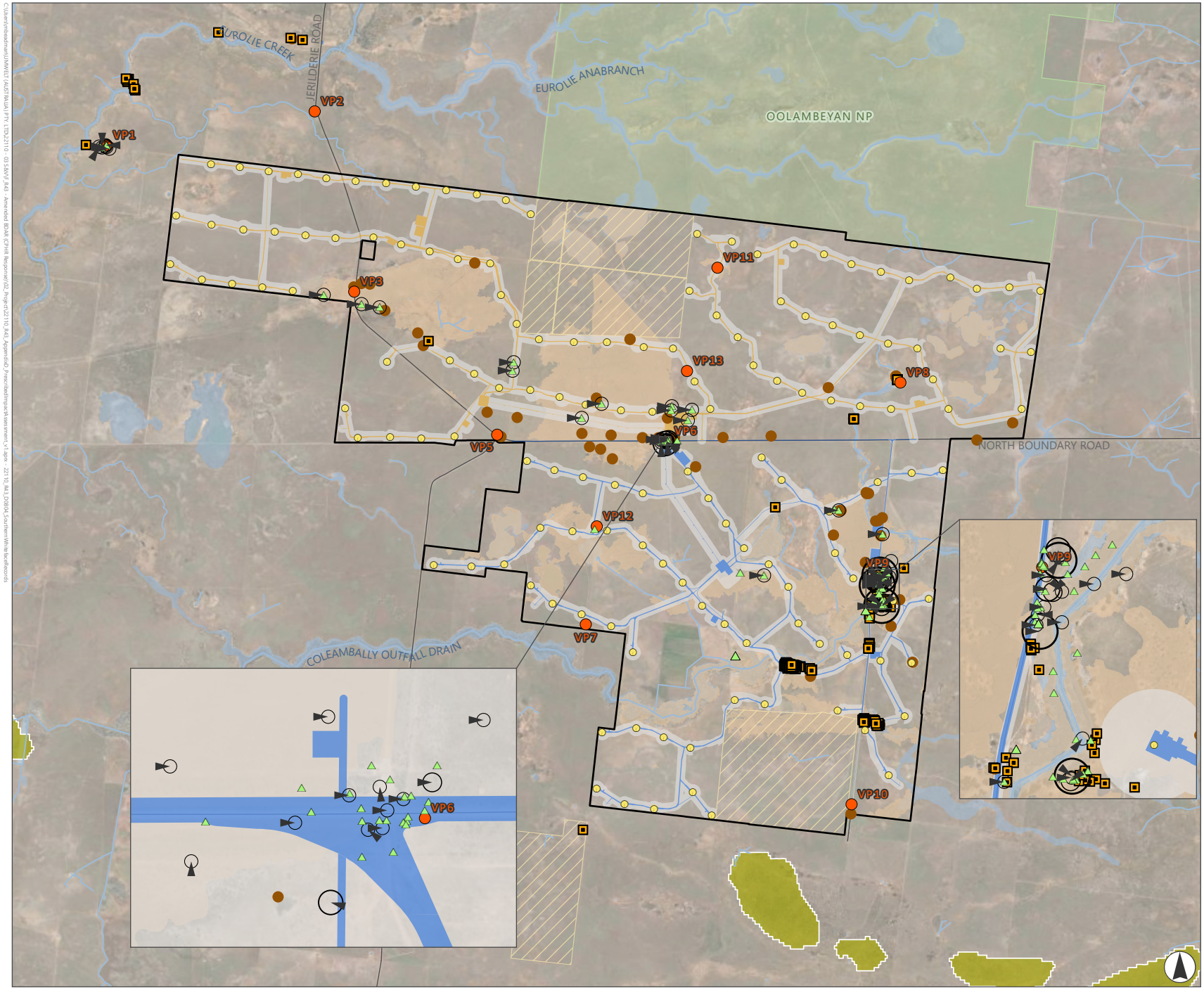


FIGURE 8.4

Location of Southern Whiteface Records in the Project Area (2022 – 2025 Surveys)

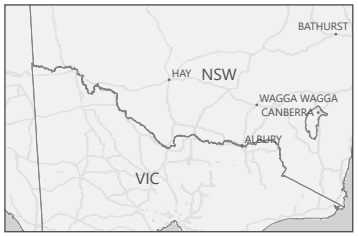
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Southern Whiteface Record
- Southern Whiteface Record (Arrow indicates direction)

Flight Height (m)

- 0 - 2
- 3 - 4
- 5 - 6
- 7 - 15

- Vantage Point Site Location
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- NPWS Reserves
- Waterbody
- Floodplain Wetland
- Road
- Hydroline



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8.2.10 Spotted Harrier (*Circus assimilis*)

8.2.10.1 Information on spotted harrier from Australian Wind Farms

One deceased spotted harrier has been recorded during monitoring from 2003 to 2018 across 15 wind farms in Victoria (Moloney et al. 2019).

8.2.10.2 Status and Flight Behaviour in the Project Area

The spotted harrier is widespread in inland New South Wales. Some birds are resident whereas others are thought to be dispersive or migratory. In the Riverina, spotted harrier may overwinter only in good seasons, more usually dispersing or migrating in autumn and returning in spring (Marchant and Higgins 1993).

Spotted harriers were recorded 37 times in the Project Area during the 2022–2024 bird surveys, including 14 times during vantage point surveys and 23 times incidentally. The location of observations of spotted harrier in the Project Area is shown in **Figure 8.5**.

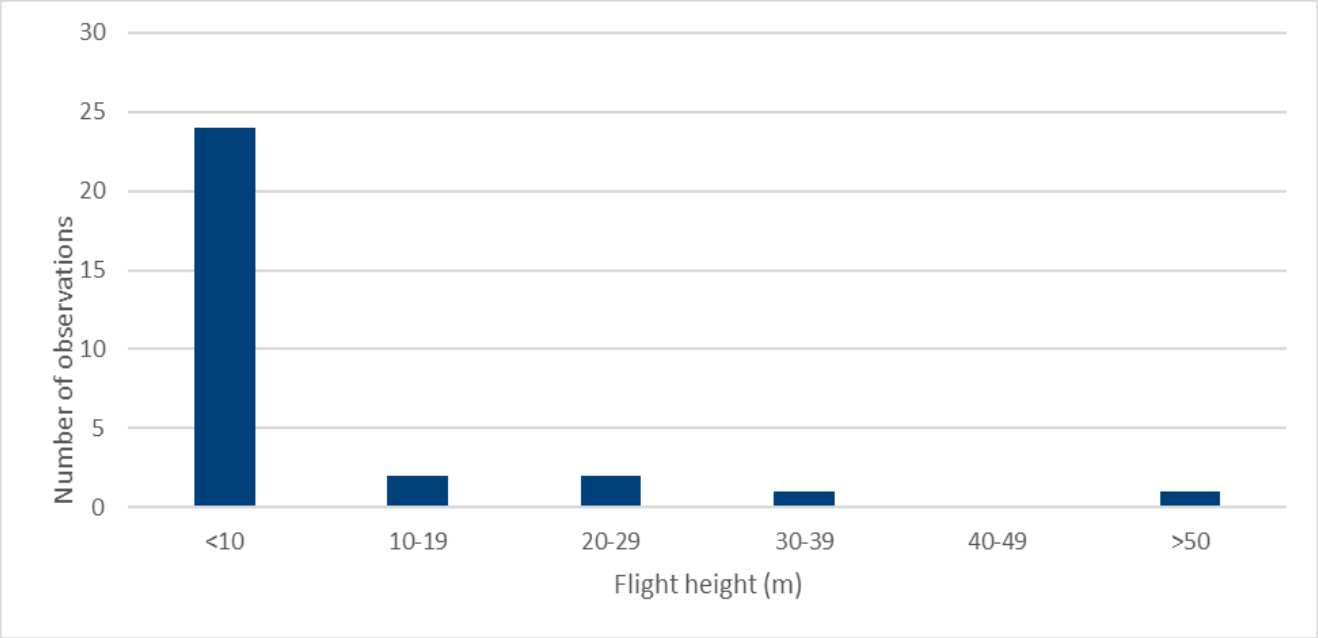
Spotted harriers were recorded at six of the regularly surveyed sites (VP1-VP10), and at one of the three infrequently surveyed sites (VP11-VP13) (**Table 8.17**). Spotted harriers were recorded during four of the eight seasonal survey events. The overall reporting rate across all vantage point surveys was 2% (11/453).

A summary of spotted harrier observations in the Project Area is presented below:

- 90% (35/37) of observations were of individuals, 5% (2/37) were of two birds.
- Spotted harrier were recorded in flight on 32 occasions and whilst perched on three occasions. Behaviour was not recorded for the remaining two observations. The height of observed birds at the moment when first detected during each observation is shown in **Graph 8.2**.
- Maximum flight height recorded for spotted harrier was 80 metres.

Table 8.17 Number of Spotted Harrier Observations at Each Survey Site

	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12	VP13
Number of obs.	1	0	0	3	2	5	1	1	0	0	0	1	0
Proportion of surveys recorded	1/35 (3%)	0/36	0/49	2/48 (4%)	2/49 (4%)	3/47 (6%)	1/37 (3%)	1/42 (2%)	0/41	0/44	0/12	1/7	0/6



Graph 8.2 Number of Observations of Spotted Harrier (At Moment of Initial Detection) in Each Height Class

8.2.10.3 Likelihood and Consequence of Impacts

The overall risk rating for spotted harrier is Moderate, based on a Moderate likelihood and Moderate consequence of collisions (**Table 8.18**). The rationale for responses to each criterion is as follows:

a. Flight data from observations within the Project Area showed that spotted harriers were mostly recorded at <10 m above ground level. Maximum flight height recorded however, was 80 m which is within RSA height of Turbine Type B. Dispersing birds or pairs searching for new territories have been documented flying between woodland patches using thermals and flying at 500 m (Higgins et al. 2006). Hence, Criterion A has been assigned as Moderate.

b. Spotted harriers were recorded on 37 occasions in the Project Area during the 2022–2024 surveys. Hence, Criterion B is assigned Moderate.

c. The spotted harrier is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the spotted harrier overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Marchant and Higgins 1993). Hence, Criterion D is assigned Moderate.

e. The total population of spotted harrier is unknown but is not considered to be <10,000 mature individuals (BirdLife International 2024). Given no specific population estimate is available for the species and the species is not considered lower than 10,000, Criterion E has been assigned Moderate.

f. Spotted harrier is listed as Vulnerable under the BC Act. It is not listed under the EPBC Act.

Should an impact trigger occur on the Project for spotted harrier a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.18**, the Residual Risk rating for the spotted harrier is considered to be reduced from Moderate to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.18 Spotted Harrier Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X			
Moderate	X	X		X	X	X
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					
Risk Rating	Moderate					
Mitigated Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Carrion removal program. • Raptor perch management. • In consultation with landowners and where feasible, modifications to agricultural land management activities, particularly back burning, slashing, ploughing, clearing…etc.. • Removal of any identified breeding nests, to be specifically offset or artificially reproduced elsewhere. • Radar consideration.					
Residual Risk Rating	Minor					

1 Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

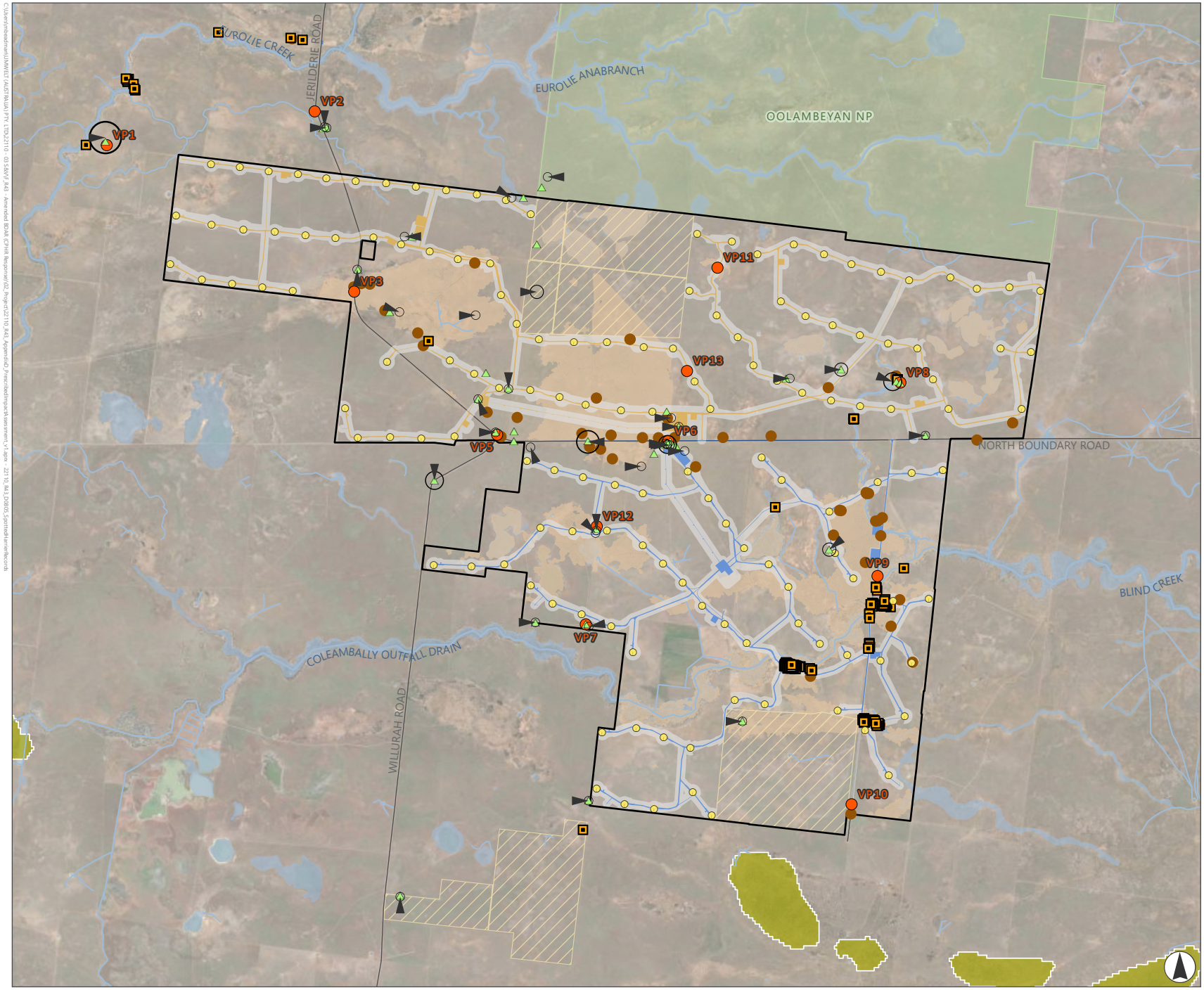


FIGURE 8.5

Location of Spotted Harrier Records in the Project Area (2022 – 2025 Surveys)

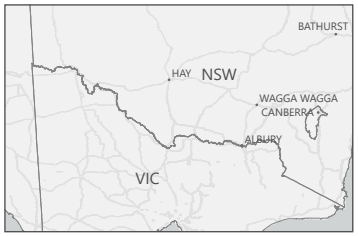
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Spotted Harrier Record
- Spotted Harrier Record (Arrow indicates direction)

Flight Height (m)

- 0 - 3
- 4 - 10
- 11 - 20
- 21 - 30
- 31 - 50

- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- NPWS Reserves
- Waterbody
- Floodplain Wetland
- Road
- Hydroline



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8.2.11 White-fronted Chat (*Epthianura albifrons*)

8.2.11.1 Information on white-fronted chat from Australian Wind Farms

There are no published records of blade strike of white-fronted chats in the available literature in Victoria (Moloney et al. 2019), south-east New South Wales (CPHR unpublished data) or in north-west Tasmania (Hull et al. 2013). This is despite having a wide distribution in southern Australia, a preference for open landscapes in which the majority of wind farms are situated and a tendency to occasionally fly above the typical minimum RSA height. Given the survey effort of post-construction monitoring to date, scavenger rates in open landscapes and the small size of this species amongst other factors it is plausible that instances of blade strike have gone undetected at Australian wind farms.

A review of literature identified that the species may actively avoid turbines, with an observation of turbine avoidance from Codrington Wind Farm in south-western Victoria. Meredith et al. (2002) reported a 100% turbine avoidance rate for the species at this location. However, given that the context of the situation in which this observation was made is unknown (i.e. the survey effort, number of observed flights, habitat type and all other relevant factors are unspecified) little can be drawn from this observation other than the conclusion that white-fronted chat do indeed avoid turbines (though the question of the rate at which they do remains unanswered).

8.2.11.2 Status and Flight Behaviour in the Project Area

The white-fronted chat is a widespread but uncommon breeding resident across the Riverina Bioregion. White-fronted chats were regularly recorded in the Project Area during the 2022–2024 bird surveys. The species was recorded on 100 occasions, including 77 times during vantage point surveys and 23 times incidentally. The location of observations of white-fronted chat in the Project Area is shown in **Figure 8.6**.

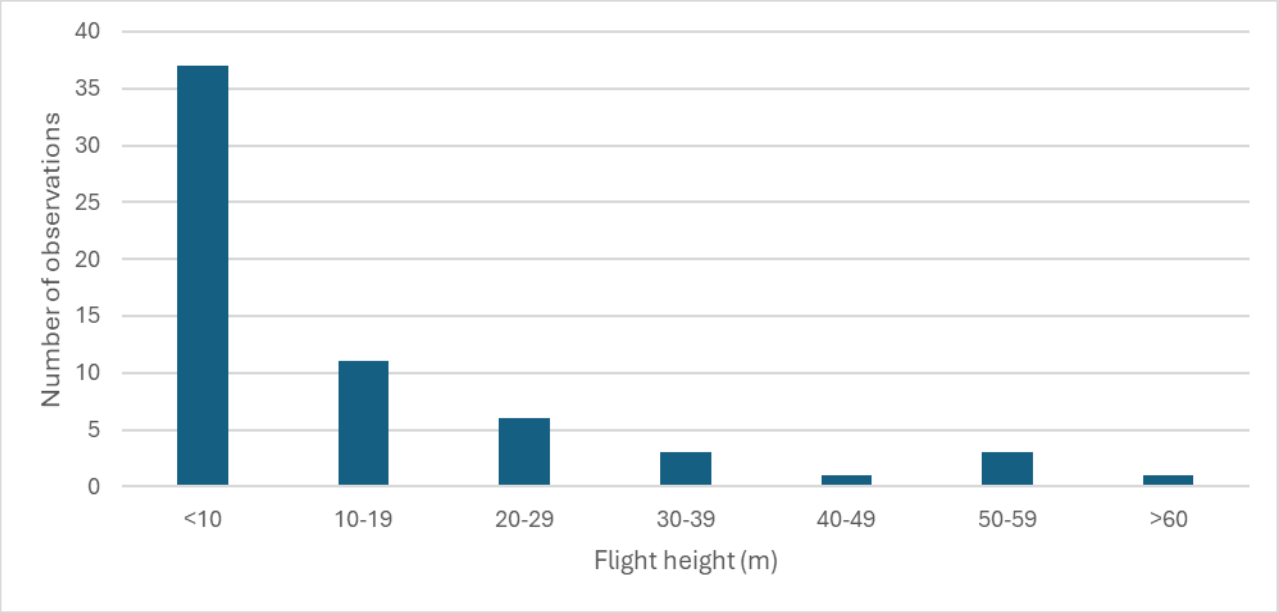
White-fronted chats were recorded at nine of the regularly surveyed sites (VP1-VP10), and at one of the three infrequently surveyed sites (VP11-VP13) (**Table 8.19**). White-fronted chats were recorded during each of the eight seasonal survey events. The overall reporting rate across all vantage point surveys was 11% (49/453).

A summary of white-fronted chat observations in the Project Area is presented below:

- 91% (82/90) of observations were of individuals or of groups less than 10. Only 9% of observations were of groups greater than 10 with the maximum flock size recorded being 32.
- White-fronted chats were recorded in flight on 59 occasions and perched on 19 occasions. Behaviour was not recorded for the remaining 12 observations.
- The height of observed birds at the moment when first detected during each observation is shown in **Graph 8.3**. Three flights out of 275, or 1% of flights occurred within the lower RSA height of turbine type B. No flight observations were recorded within the RSA height range of turbine type A.

Table 8.19 Number of White-fronted Chat Observations at Each Survey Site

	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12	VP13
Number of obs.	11	3	0	11	2	17	3	4	1	2	22	1	0
Proportion of surveys recorded	9/35 (%)	2/36 (%)	0/49	9/48 (%)	1/49 (%)	15/47 (%)	2/37 (%)	4/42 (%)	1/41 (%)	2/44 (%)	7/12 (%)	1/7 (%)	0/6



Graph 8.3 Number of Observations of White-fronted Chat (At Moment of Initial Detection) in Each Height Class

8.2.11.3 Likelihood and Consequence of Impacts

The overall risk rating for white-fronted chat is Negligible, based on a Low likelihood and Low consequence of collisions (**Table 8.20**). Note that despite a High rating being assigned for Criterion B, the overall rating for consequence is deemed to be Low. This is because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and observations from the Project Area.

a. The white-fronted chat is unlikely to fly at RSA height regularly and is thought to avoid turbines. Hence, Criterion A is assigned Low.

b. White-fronted chats were regularly recorded in the Project Area during the 2022–2024 surveys. The species was recorded on 90 occasions. Hence, Criterion B is assigned High.

c. The white-fronted chat is widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed. Hence, Criterion C is assigned Low.

d. The life-history characteristics of the white-fronted chat align with the Low rating for Criterion D.

e. The white-fronted chat population size has not been quantified, but it is not believed to approach the thresholds for Vulnerable under the population size criterion (<10,000 mature individuals with a continuing decline estimated to be >10% in ten years or three generations, or with a specified population structure) (BirdLife International 2024). Criterion E is assigned Low.

f. The white-fronted chat is listed as Vulnerable under the BC Act. It is not listed under the EPBC Act.

Table 8.20 White-fronted Chat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X		X	X	X	
Moderate						X
High		X				
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

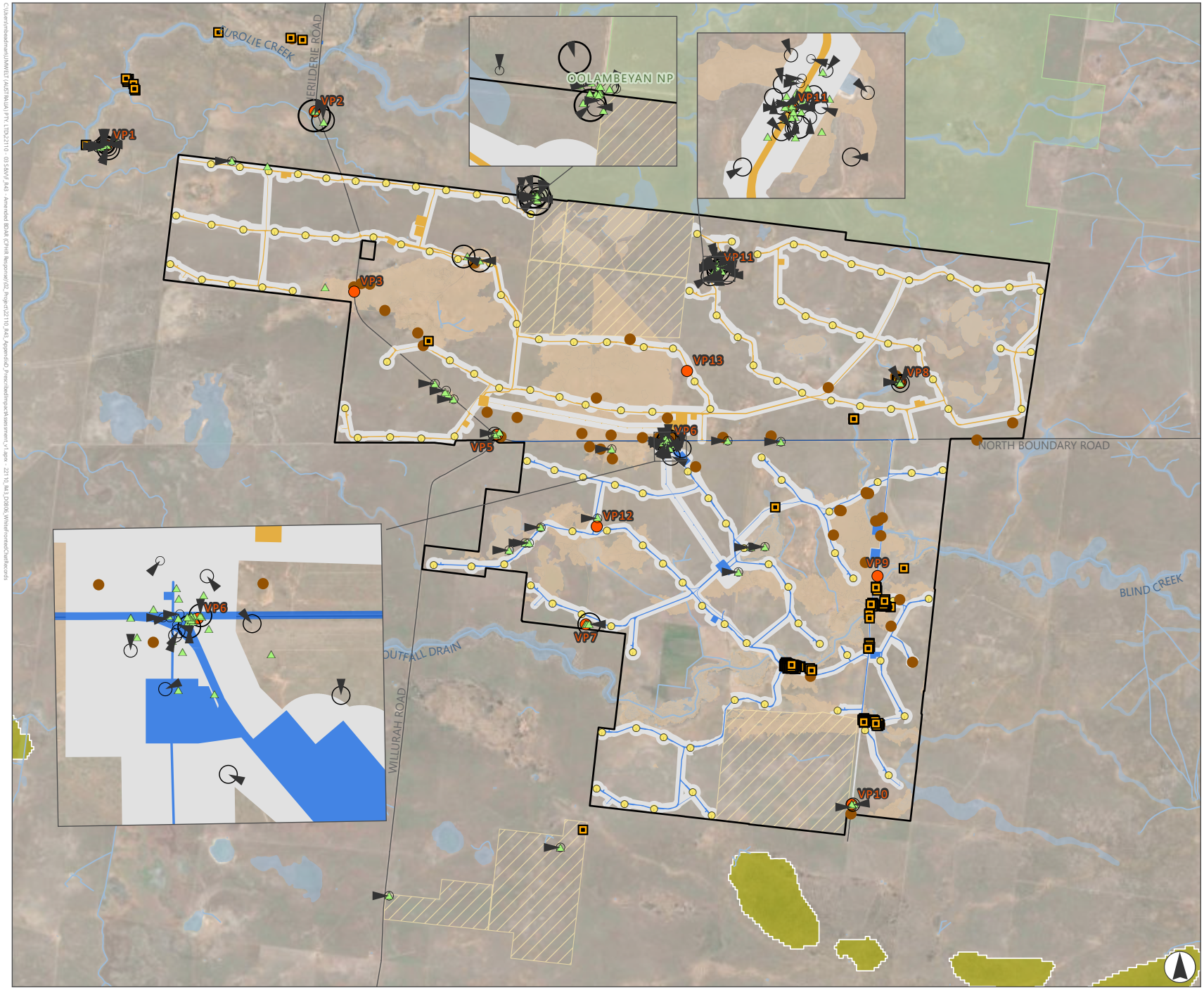


FIGURE 8.6

Location of White-fronted Chat Records in the Project Area (2022 – 2025 surveys)

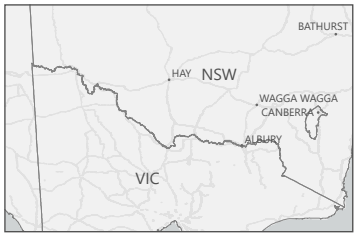
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- White-fronted Chat Record (Arrow indicates direction)
- White-fronted Chat Record

Flight Height (m)

- 0 - 2
- 3 - 6
- 7 - 15
- 16 - 30
- 31 - 60

- Stick Nests
- Hollow-bearing Tree
- Conservation Agreement Area
- Woodland and Swamp Plant Community Types
- NPWS Reserves
- Waterbody
- Floodplain Wetland
- Road
- Hydroline



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8.2.12 Threatened and Migratory Bird Species not recorded in the Project Area

The estimated relative risk of blade strike for 18 threatened and/or migratory bird species listed under the BC Act and/or the EPBC Act that were not recorded in the Project Area but may rarely or occasionally occur in the Project Area is shown in **Table 8.21**. Two species were assigned a Moderate risk rating, 10 were assigned a minor risk rating and six were assigned a negligible rating.

Table 8.21 Unrecorded Threatened and Migratory Bird Species Risk Assessment

Common Name	Scientific Name	EPBC Act Status	BC Act Status	Likelihood	Consequence	Risk Rating
Australian bustard	*Ardeotis australis*	-	Endangered	Low	Moderate	Minor
Australian painted snipe	*Rostratula australis*	Endangered	Endangered	Low	High	Moderate
brolga	*Grus rubicunda*	-	Vulnerable	Low	Low	Negligible
brown treecreeper	*Climacteris picumnus*	Vulnerable	Vulnerable	Low	Moderate	Minor
dusky woodswallow	*Artamus cyanopterus*	-	Vulnerable	Moderate	Low	Minor
freckled duck	*Stictonetta naevosa*	-	Vulnerable	Low	Moderate	Minor
gull-billed tern	*Gelochelidon nilotica*	Migratory	-	Low	Low	Negligible
Latham's snipe	*Gallinago hardwickii*	Vulnerable, Migratory	-	Low	Low	Negligible
magpie goose	*Anseranas semipalmata*	-	Vulnerable	Low	Low	Negligible
pink cockatoo	*Lophochroa leadbeateri*	Endangered	Vulnerable	Low	Moderate	Minor
Pacific swift	*Apus pacificus*	Migratory	-	Moderate	Low	Minor
painted honeyeater	*Grantiella picta*	Vulnerable	Vulnerable	Low	Moderate	Minor
pied honeyeater	*Certhionyx variegatus*	-	Vulnerable	Low	Low	Negligible
sharp-tailed sandpiper	*Calidris acuminata*	-	Vulnerable, Migratory	Low	Low	Negligible
square-tailed kite	*Lophoictinia isura*	-	Vulnerable	Low	Moderate	Minor
superb parrot	*Polytelis swainsonii*	Vulnerable	Vulnerable	Low	Moderate	Minor
white-bellied sea-eagle	*Haliaeetus leucogaster*	-	Vulnerable	Moderate	Low	Minor
white-throated needletail	*Hirundapus caudacutus*	Vulnerable, Migratory	Vulnerable	Moderate	Moderate	Moderate

8.3 Assessment of Likelihood and Consequence of Impact – Non-threatened Bird Species

The results of the blade strike risk assessment for all non-threatened bird species (total of 92) recorded in the Project Area during the 2022–2024 surveys are presented in **Table 8.22**. A total of 27 non-threatened bird species were recorded flying at RSA height on at least one occasion during the 2022–2024 surveys in the Project Area. A total of five species were assigned a moderate risk rating, 26 were assigned a minor risk rating and the remaining 61 were assigned a negligible risk rating. Due to its status in the Project Area and its known susceptibility to blade strike wedge-tailed eagle is more closely examined than the other non-threatened bird species recorded in the Project Area (**Section 8.3.1**).

Table 8.22 Non-threatened Bird Species Risk Assessment

Common Name	Scientific Name	No. of records in the Project Area	Recorded at RSA height in the Project Area (Yes/No)	Likelihood	Consequence	Risk Rating
apostlebird	*Struthidea cinerea*	1	No	Low	Low	Negligible
Australasian pipit	*Anthus novaeseelandiae*	247	No	Low	Low	Negligible
Australian hobby	*Falco longipennis*	11	**Yes**	Moderate	Low	Minor
Australian magpie	*Gymnorhina tibicen*	618	**Yes**	Moderate	Low	Minor
Australian owlet-nightjar	*Aegotheles cristatus*	4	No	Low	Low	Negligible
Australian pelican	*Pelecanus conspicillatus*	8	**Yes**	Moderate	Low	Minor
Australian raven	*Corvus coronoides*	542	**Yes**	Moderate	Low	Minor
Australian ringneck	*Barnardius zonarius*	7	No	Low	Low	Negligible
Australian white Ibis	*Threskiornis moluccus*	1	No	Moderate	Low	Minor
Australian wood duck	*Chenonetta jubata*	15	No	Low	Low	Negligible
banded lapwing	*Vanellus tricolor*	23	**Yes**	Moderate	Low	Minor
eastern barn owl	*Tyto alba*	2	No	Low	Low	Negligible
black kite	*Milvus migrans*	489	**Yes**	High	Low	Moderate
black-faced cuckoo-shrike	*Coracina novaehollandiae*	25	**Yes**	Moderate	Low	Minor
black-faced woodswallow	*Artamus cinereus*	23	**Yes**	High	Low	Moderate
black-shouldered kite	*Elanus axillaris*	343	**Yes**	High	Low	Moderate
black-tailed native-hen	*Tribonyx ventralis*	1	No	Low	Low	Negligible
blue bonnet	*Northiella haematogaster*	157	**Yes**	Low	Low	Negligible
blue-faced honeyeater	*Entomyzon cyanotis*	4	No	Low	Low	Negligible
brown falcon	*Falco berigora*	144	**Yes**	High	Low	Moderate
brown goshawk	*Accipiter fasciatus*	5	**Yes**	Moderate	Low	Minor
brown songlark	*Cincloramphus cruralis*	498	No	Low	Low	Negligible
chestnut-rumped thornbill	*Acanthiza uropygialis*	2	No	Low	Low	Negligible
cockatiel	*Nymphicus hollandicus*	12	No	Low	Low	Negligible

Common Name	Scientific Name	No. of records in the Project Area	Recorded at RSA height in the Project Area (Yes/No)	Likelihood	Consequence	Risk Rating
common bronzewing	*Phaps chalcoptera*	1	No	Low	Low	Negligible
common starling	*Sturnus vulgaris*	130	**Yes**	Moderate	Low	Minor
crested pigeon	*Ocyphaps lophotes*	213	No	Low	Low	Negligible
crimson rosella	*Platycercus elegans*	1	No	Low	Low	Negligible
double-barred finch	*Taeniopygia bichenovii*	1	No	Low	Low	Negligible
emu	*Dromaius novaehollandiae*	61	No	Low	Low	Negligible
fairy martin	*Petrochelidon ariel*	12	No	Moderate	Low	Minor
galah	*Eolophus roseicapilla*	554	**Yes**	Moderate	Low	Minor
golden whistler	*Pachycephala pectoralis*	4	No	Low	Low	Negligible
great cormorant	*Phalacrocorax carbo*	6	**Yes**	Moderate	Low	Minor
grey butcherbird	*Cracticus torquatus*	1	No	Low	Low	Negligible
grey shrike-thrush	*Colluricincla harmonica*	26	No	Low	Low	Negligible
grey teal	*Anas gracilis*	5	No	Low	Low	Negligible
ground cuckoo-shrike	*Coracina maxima*	2	No	Low	Low	Negligible
Horsfield's bronze-cuckoo	*Chalcites basalis*	13	No	Low	Low	Negligible
Horsfield's bushlark	*Mirafra javanica*	110	No	Low	Low	Negligible
house sparrow	*Passer domesticus*	44	No	Low	Low	Negligible
laughing kookaburra	*Dacelo novaeguineae*	3	No	Low	Low	Negligible
little black cormorant	*Phalacrocorax sulcirostris*	4	**Yes**	High	Low	Moderate
little button-quail	*Turnix velox*	3	No	Low	Low	Negligible
little crow	*Corvus bennetti*	7	No	Low	Low	Negligible
little pied cormorant	*Microcarbo melanoleucos*	12	**Yes**	Moderate	Low	Minor
little raven	*Corvus mellori*	245	**Yes**	Moderate	Low	Minor
magpie-lark	*Grallina cyanoleuca*	147	**Yes**	Low	Low	Negligible
masked lapwing	*Vanellus miles*	5	No	Low	Low	Negligible

Common Name	Scientific Name	No. of records in the Project Area	Recorded at RSA height in the Project Area (Yes/No)	Likelihood	Consequence	Risk Rating
masked woodswallow	*Artamus personatus*	3	**Yes**	Moderate	Low	Minor
mistletoebird	*Dicaeum hirundinaceum*	1	No	Low	Low	Negligible
nankeen kestrel	*Falco cenchroides*	868	**Yes**	High	Low	Moderate
nankeen night-heron	*Nycticorax caledonicus*	1	No	Low	Low	Negligible
noisy miner	*Manorina melanocephala*	123	**Yes**	Low	Low	Negligible
Pacific black duck	*Anas superciliosa*	18	**Yes**	Low	Low	Negligible
peaceful dove	*Geopelia placida*	8	No	Low	Low	Negligible
pied butcherbird	*Cracticus nigrogularis*	100	No	Low	Low	Negligible
pied cormorant	*Phalacrocorax varius*	1	**Yes**	Moderate	Low	Minor
rainbow bee-eater	*Merops ornatus*	9	No	Moderate	Low	Minor
red-backed kingfisher	*Todiramphus pyrrhopygius*	1	No	Low	Low	Negligible
red-browed finch	*Neochmia temporalis*	1	No	Low	Low	Negligible
red-rumped parrot	*Psephotus haematonotus*	125	**Yes**	Low	Low	Negligible
royal spoonbill	*Platalea regia*	3	**Yes**	High	Low	Moderate
rufous songlark	*Cincloramphus mathewsi*	9	No	Low	Low	Negligible
rufous whistler	*Pachycephala rufiventris*	11	No	Low	Low	Negligible
sacred kingfisher	*Todiramphus sanctus*	8	No	Low	Low	Negligible
singing honeyeater	*Gavicalis virescens*	63	No	Low	Low	Negligible
southern boobook	*Ninox boobook*	1	No	Low	Low	Negligible
spotted pardalote	*Pardalotus punctatus*	1	No	Low	Low	Negligible
straw-necked ibis	*Threskiornis spinicollis*	22	**Yes**	High	Low	Moderate
striated pardalote	*Pardalotus striatus*	33	No	Low	Low	Negligible
striped honeyeater	*Plectorhyncha lanceolata*	4	No	Low	Low	Negligible
stubble quail	*Coturnix pectoralis*	61	No	Low	Low	Negligible
sulphur-crested cockatoo	*Cacatua galerita*	2	No	Low	Low	Negligible

Common Name	Scientific Name	No. of records in the Project Area	Recorded at RSA height in the Project Area (Yes/No)	Likelihood	Consequence	Risk Rating
superb fairy-wren	*Malurus cyaneus*	70	No	Low	Low	Negligible
tawny frogmouth	*Podargus strigoides*	1	No	Low	Low	Negligible
tree martin	*Petrochelidon nigricans*	131	**Yes**	High	Low	Moderate
wedge-tailed eagle	*Aquila audax*	668	**Yes**	High	Low	Moderate
welcome swallow	*Hirundo neoxena*	63	**Yes**	Moderate	Low	Minor
western gerygone	*Gerygone fusca*	4	No	Low	Low	Negligible
whistling kite	*Haliastur sphenurus*	22	**Yes**	Moderate	Low	Minor
white-browed woodswallow	*Artamus superciliosus*	1	**Yes**	Moderate	Low	Minor
white-faced heron	*Egretta novaehollandiae*	21	**Yes**	Low	Low	Negligible
white-necked heron	*Ardea pacifica*	17	**Yes**	Low	Low	Negligible
white-plumed honeyeater	*Ptilotula penicillata*	52	No	Low	Low	Negligible
white-winged chough	*Corcorax melanorhamphos*	9	No	Low	Low	Negligible
white-winged fairy-wren	*Malurus leucopterus*	284	No	Low	Low	Negligible
willie wagtail	*Rhipidura leucophrys*	171	**Yes**	Low	Low	Negligible
yellow-billed spoonbill	*Platalea flavipes*	4	Yes	Moderate	Low	Minor
yellow-rumped thornbill	*Acanthiza chrysorrhoa*	8	No	Low	Low	Negligible
yellow-throated miner	*Manorina flavigula*	49	No	Low	Low	Negligible
zebra finch	*Taeniopygia guttata*	120	No	Low	Low	Negligible

8.3.1 Wedge-tailed Eagle

8.3.1.1 Information on Wedge-tailed Eagle from Australian Wind Farms

Wedge-tailed eagle are commonly reported during mortality monitoring events at wind farms in Australia. Moloney *et al.* (2019) report wedge-tailed eagle as the second-most frequently recorded bird species found deceased during monitoring from 2003 to 2018 across 15 wind farms in Victoria, with 58 carcasses detected and equating to 10% of all birds found. Using this data, Moloney *et al.* (2019) calculated mortality estimates of 0.06 (95% CI: 0.02–0.41) and 0.1 (95% CI: 0–0.2) individuals per turbine per year at two Victorian wind farms.

At two wind farms in north-western Tasmania, a total of 18 wedge-tailed eagle carcasses were recorded during monitoring conducted for three and six years at Bluff Point Wind Farm and Studland Bay Wind Farm respectively (Hull *et al.* 2013). This particular monitoring program modelled a mortality estimate of 1.5 and 1.1 collisions per annum at Bluff Point (37 turbines) and Studland Bay (25 turbines). A 95% turbine avoidance rate closely approximated the observed mean annual mortality rate of 1.6 and 1.1 individuals per annum at each wind farm respectively (Smales *et al.* 2013).

Wedge-tailed eagle are known to have collided with wind turbines in south-east NSW, however the total number of fatalities detected in this region is not publicly available (CPHR unpublished data). Six wedge-tailed eagle carcasses were recorded under turbines at Gullen Range Wind Farm during monthly monitoring of 30–32 turbines (out of a total of 73 turbines) conducted from January–June 2015 (BLA 2016).

8.3.1.2 Status and Flight Behaviour in the Project Area

The wedge-tailed eagle is a common breeding resident in the Riverina Bioregion. Wedge-tailed eagle were regularly recorded on in the Project Area during the 2022–2024 surveys. The species was recorded on 668 occasions, including 623 times during vantage point surveys and 45 times incidentally. The location of observations of wedge-tailed eagle in the Project Area is shown in **Figure 8.7**.

Wedge-tailed eagle were recorded at all 10 of the regularly surveyed sites (VP1-VP10), and each of the three infrequently surveyed sites (VP11-VP13) (**Table 8.23**). Wedge-tailed eagle were recorded during each of the eight seasonal survey events. The overall reporting rate across all vantage point surveys was 62% (279/453).

One nest site was recorded in the Project Area however as nest sites were not specifically monitored during the 2022–2024 bird survey program factors such as breeding timing during 2022–2024, breeding success rates and use of different nest sites in the Project Area is unknown. A summary of wedge-tailed eagle observations in the Project Area is presented below:

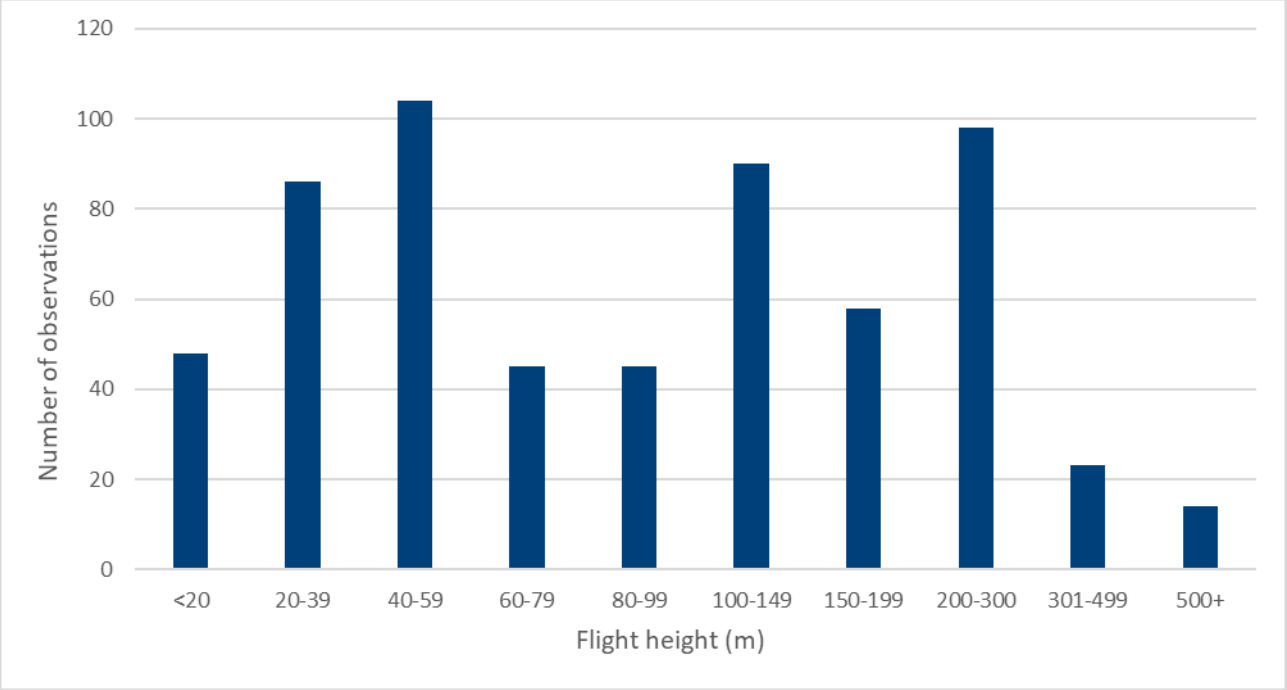
- 66% (441/668) of observations were of individuals, 27% (179/668) of observations were of pairs, 3% (23/668) of observations were of three birds, 2% (14/668) of observations were of four bird, 5/668 observations were of five birds, 5/668 observations were of six birds and one observation was of nine birds.

- Wedge-tailed eagle were recorded in flight on 611 occasions and whilst perched on 49 occasions. Behaviour was not recorded for the remaining eight observations. The height of observed birds at the moment when first detected during each observation is shown in **Graph 8.4**. Of the 611 flight observations:

- 40% (246/611) comprised observation of birds between 100–300 m at the moment of detection. 6% (37/613) comprised observation of birds above 300 m at the moment of detection
- 55% (334/611) comprised observation of birds between 100–300 m at any point during the observation.
- Of the total individual bird flights recorded where height was measured, 60% (547/910) fell within the RSA height of Turbine Type A, and 73% (660/910) fell within the RSA height of Turbine Type B.

Table 8.23 Number of Wedge-tailed Eagle Observations at Each Survey Site

Data	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12	VP13
Number of obs.	41	29	53	64	44	45	70	63	35	119	40	4	0
Proportion of surveys recorded	24/35 (69%)	14/36 (39%)	27/49 (55%)	31/48 (65%)	28/49 (57%)	25/47 (53%)	26/37 (70%)	31/42 (74%)	18/41 (44%)	37/44 (84%)	11/12 (92%)	2/7 (29%)	5/6 (83%)



Graph 8.4 Number of Observations of Wedge-tailed Eagle (At Moment of Initial Detection) in Each Height Class

8.3.1.3 Likelihood and Consequence of Impacts

The overall risk rating for wedge-tailed eagle is Moderate, based on a High likelihood and Low consequence of collisions (**Table 8.24**). The rationale for responses to each criterion is as follows:

a. A high proportion of wedge-tailed eagle flight activity is at RSA height.

b. Wedge-tailed eagle are a common resident in the Project Area.

c. Wedge-tailed eagle are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.

d. The life-history characteristics of the wedge-tailed eagle overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D, however overall, they average out between the two and hence Criterion D is assigned Moderate (Marchant and Higgins 1993).

e. The total population of wedge-tailed eagle is described as very large by Birdlife International (2023b) and given this species' very large distribution (c. 10.6 million km^2) the total population is likely to exceed 20,000 individuals.

f. The subspecies of wedge-tailed eagle that occurs in the Project Area is not listed as threatened under the EPBC Act or the BC Act.

The wedge-tailed eagle's risk rating of Moderate reflects the low consequence that a potentially high frequency of blade strike in the Project Area is likely to have on this species' total population.

Should an impact trigger occur on the Project for wedge-tailed eagle a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.24**, the Residual Risk rating for the wedge-tailed eagle is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.24 Wedge-tailed Eagle Risk Assessment

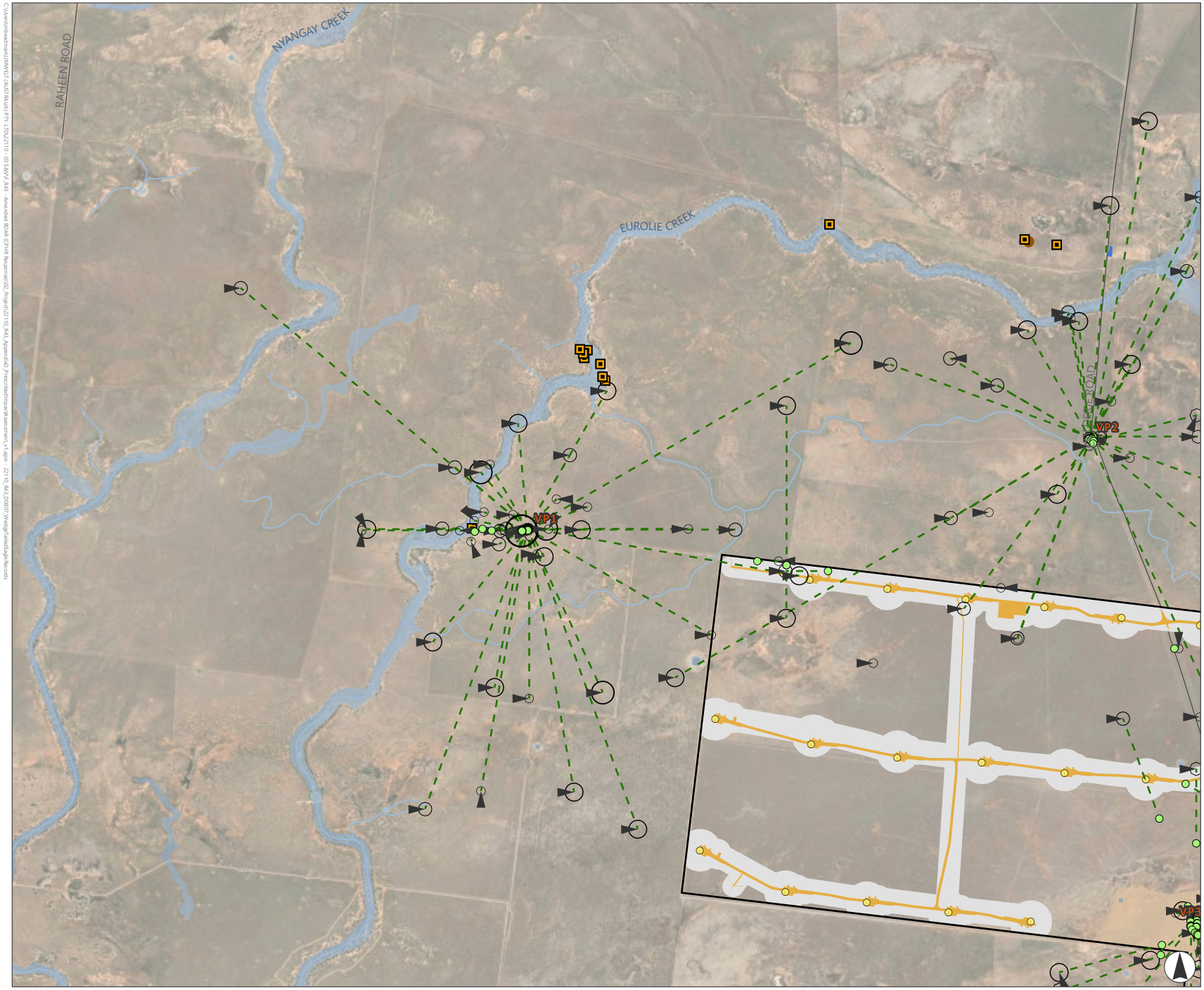
	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X		X	X
Moderate				X		
High	X	X				
Unmitigated Risk Rating						
Likelihood	High					
Consequence	Low					
Risk Rating	Moderate					
Mitigated Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist and CPHR. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR.					

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Carrion removal program. • Raptor perch management. • In consultation with landowners and where feasible, modifications to agricultural land management activities, particularly back burning, slashing, ploughing, clearing…etc.. • Removal of any identified breeding nests, to be specifically offset or artificially reproduced elsewhere. • Radar consideration.					
Residual Risk Rating	Minor					

[1] *Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.*

FIGURE 8.7A

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Wedge-tailed Eagle Record (Arrow indicates direction)

Flight Height (m)

- 0 - 40
- 41 - 130
- 131 - 300
- 301 - 700
- 701 - 1500

- Observer Location
- Observer Direction and Distance
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Waterbody
- Road
- Hydroline

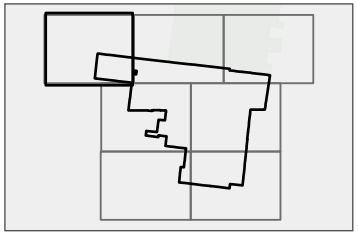


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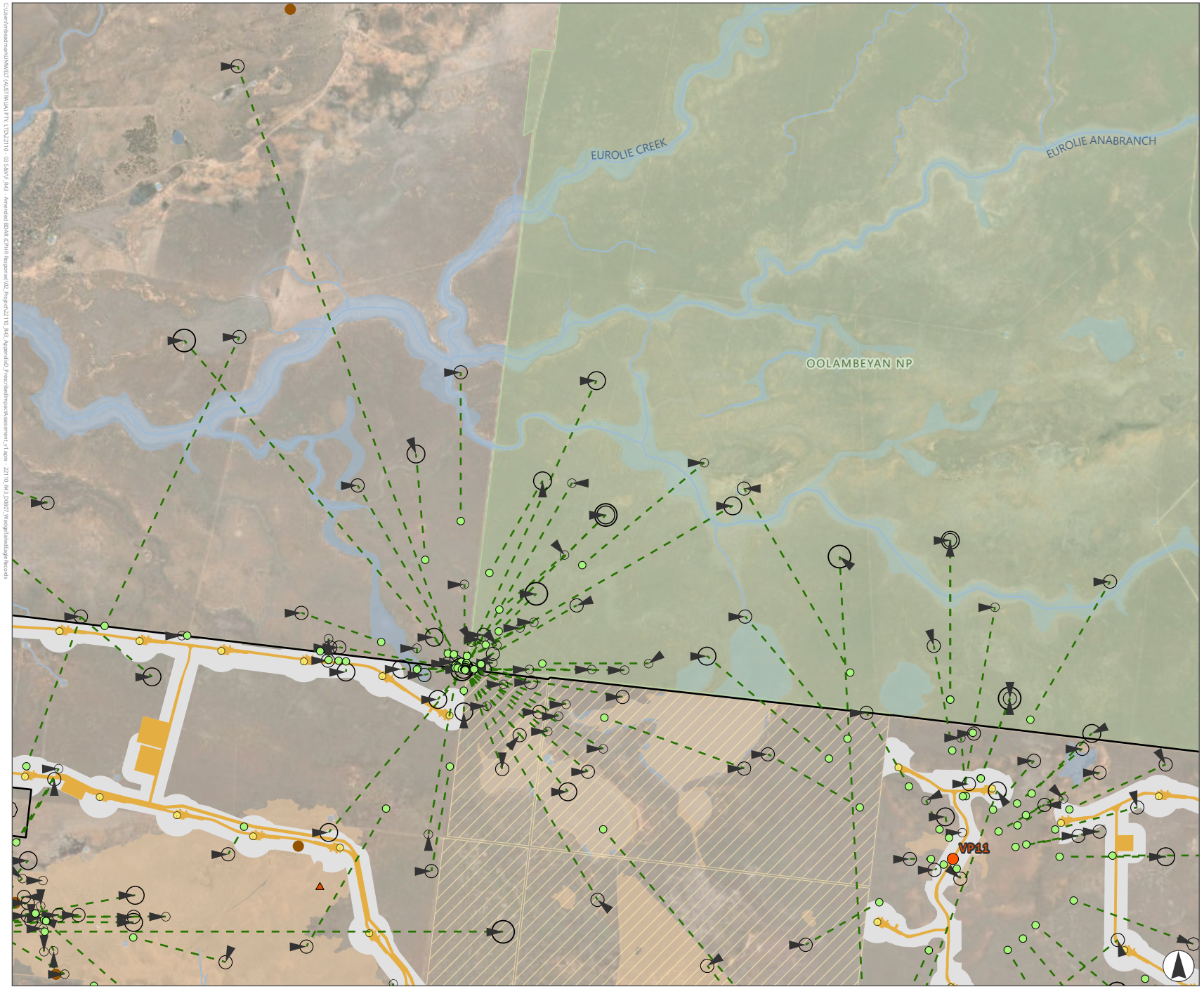
FIGURE 8.7B

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)



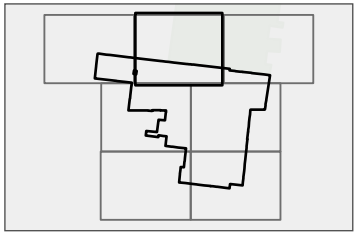
Legend

- Project Boundary
- Subject Land
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Wedge-tailed Eagle Record
- Wedge-tailed Eagle Record (Arrow indicates direction)

Flight Height (m)

- 0 - 40
- 41 - 130
- 131 - 300
- 301 - 700

- Observer Location
- Observer Direction and Distance
- Stick Nests
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- NPWS Reserves
- Waterbody
- Hydroline



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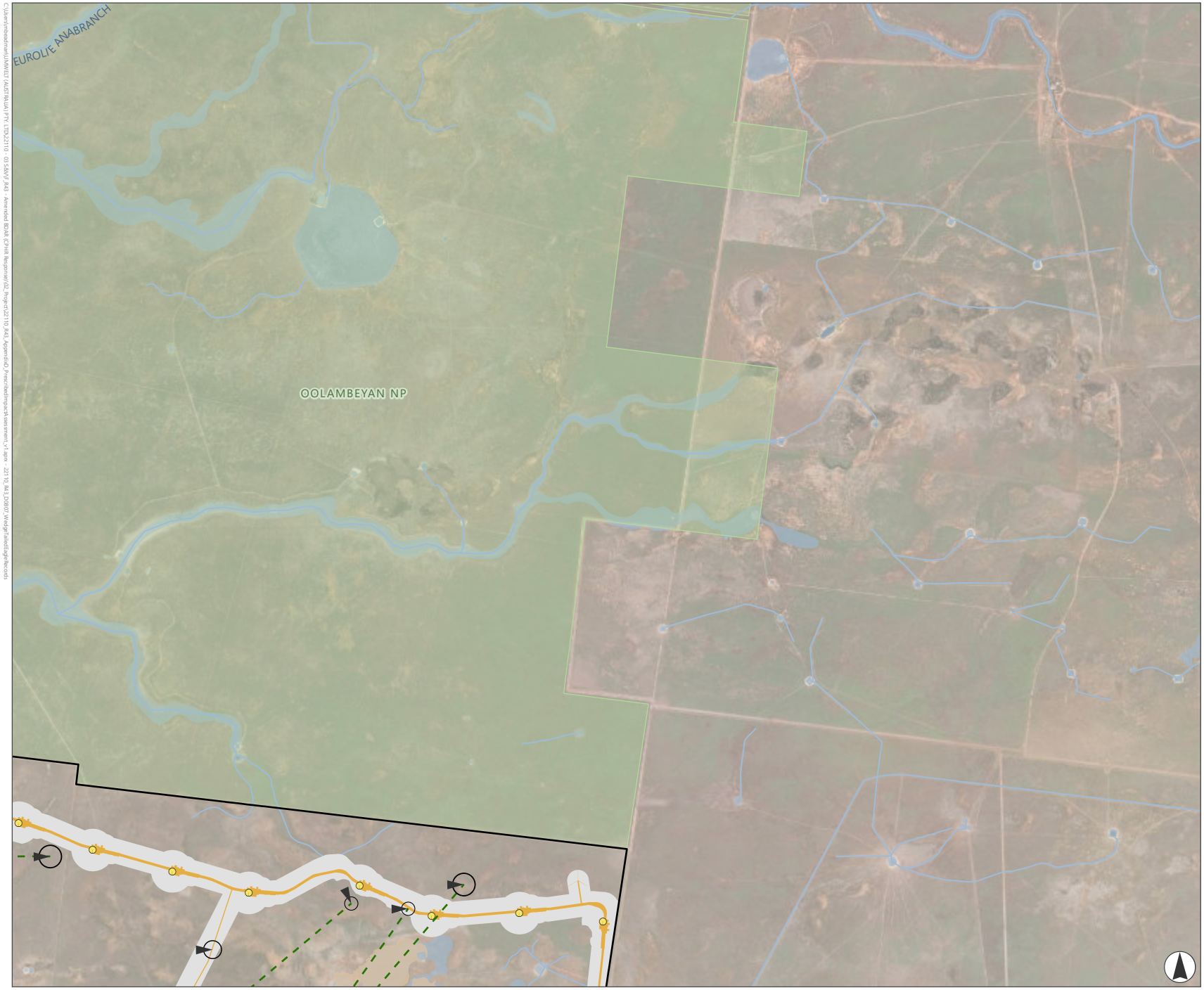

FIGURE 8.7C

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)

Legend

- Project Boundary
- Subject Land
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Wedge-tailed Eagle Record (Arrow indicates direction)

Flight Height (m)

- 41 - 130
- 131 - 300
- 301 - 700

- Observer Direction and Distance
- Woodland and Swamp Plant Community Types
- NPWS Reserves
- Waterbody
- Hydroline

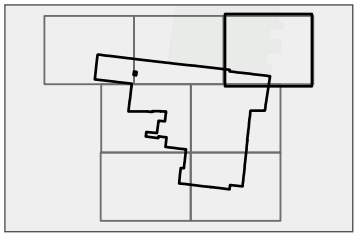

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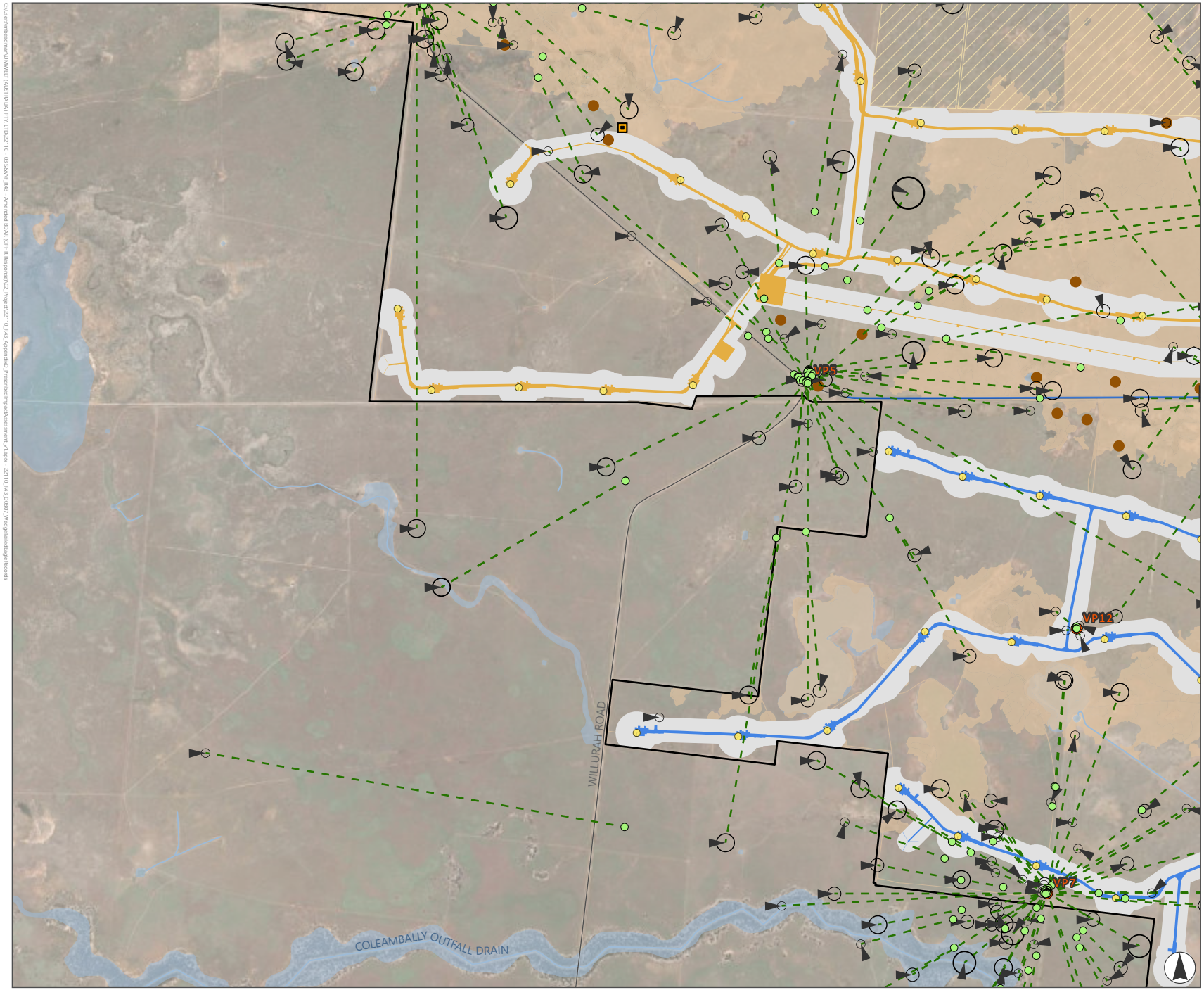
FIGURE 8.7D

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Wedge-tailed Eagle Record (Arrow indicates direction)

Flight Height (m)

- 0 - 40
- 41 - 130
- 131 - 300
- 301 - 700
- 701 - 1500

- Observer Location
- Observer Direction and Distance
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- Waterbody
- Road
- Hydroline

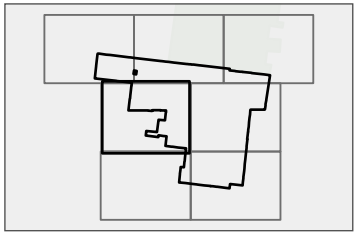


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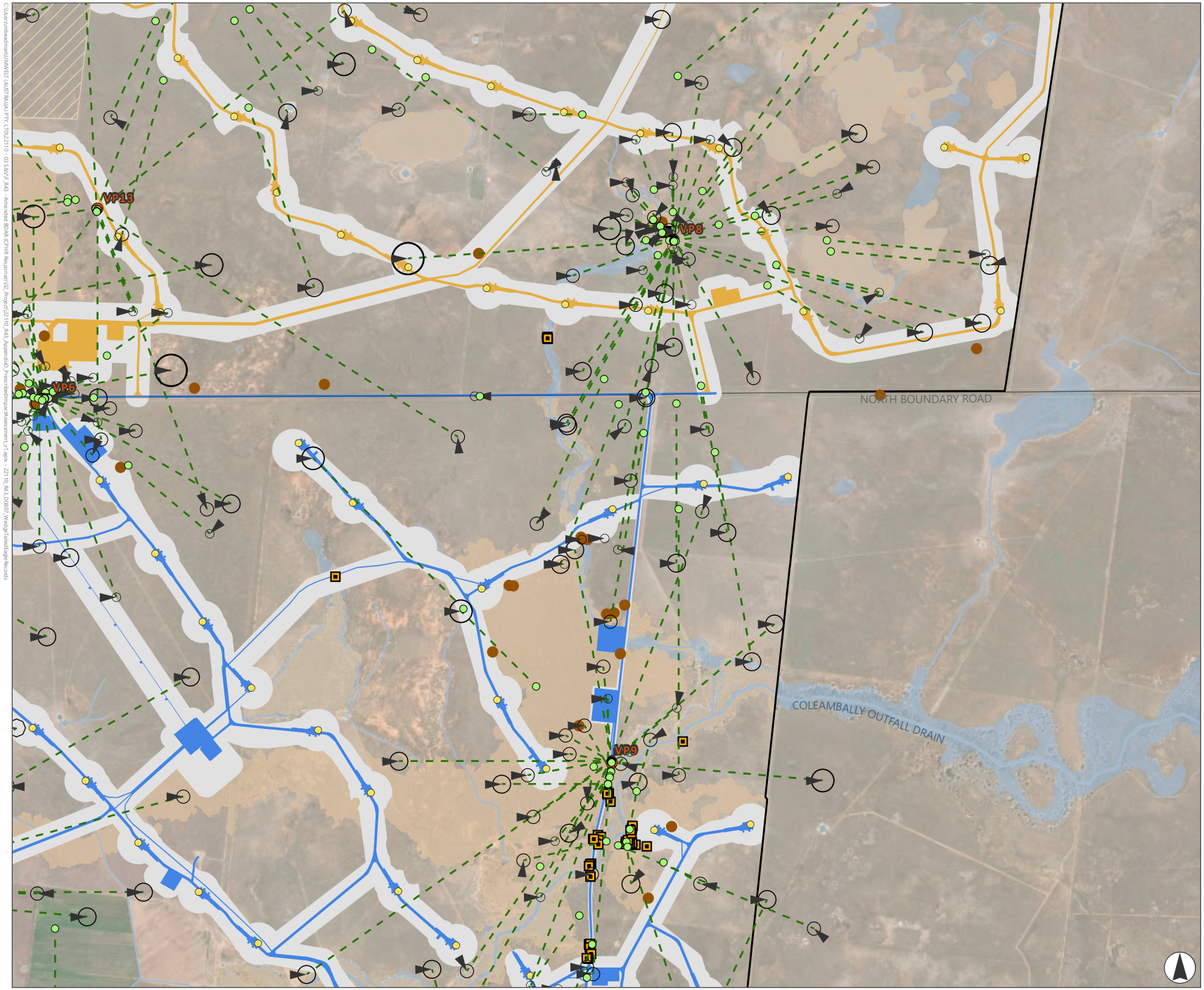
FIGURE 8.7E

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)



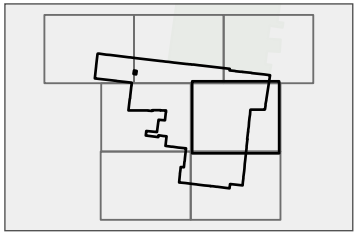
Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Vantage Point Site Location
- Wedge-tailed Eagle Record (Arrow indicates direction)

Flight Height (m)

- 0 - 40
- 41 - 130
- 131 - 300
- 301 - 700
- 701 - 1500

- Observer Location
- Observer Direction and Distance
- Stick Nests
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- Waterbody
- Road
- Hydroline



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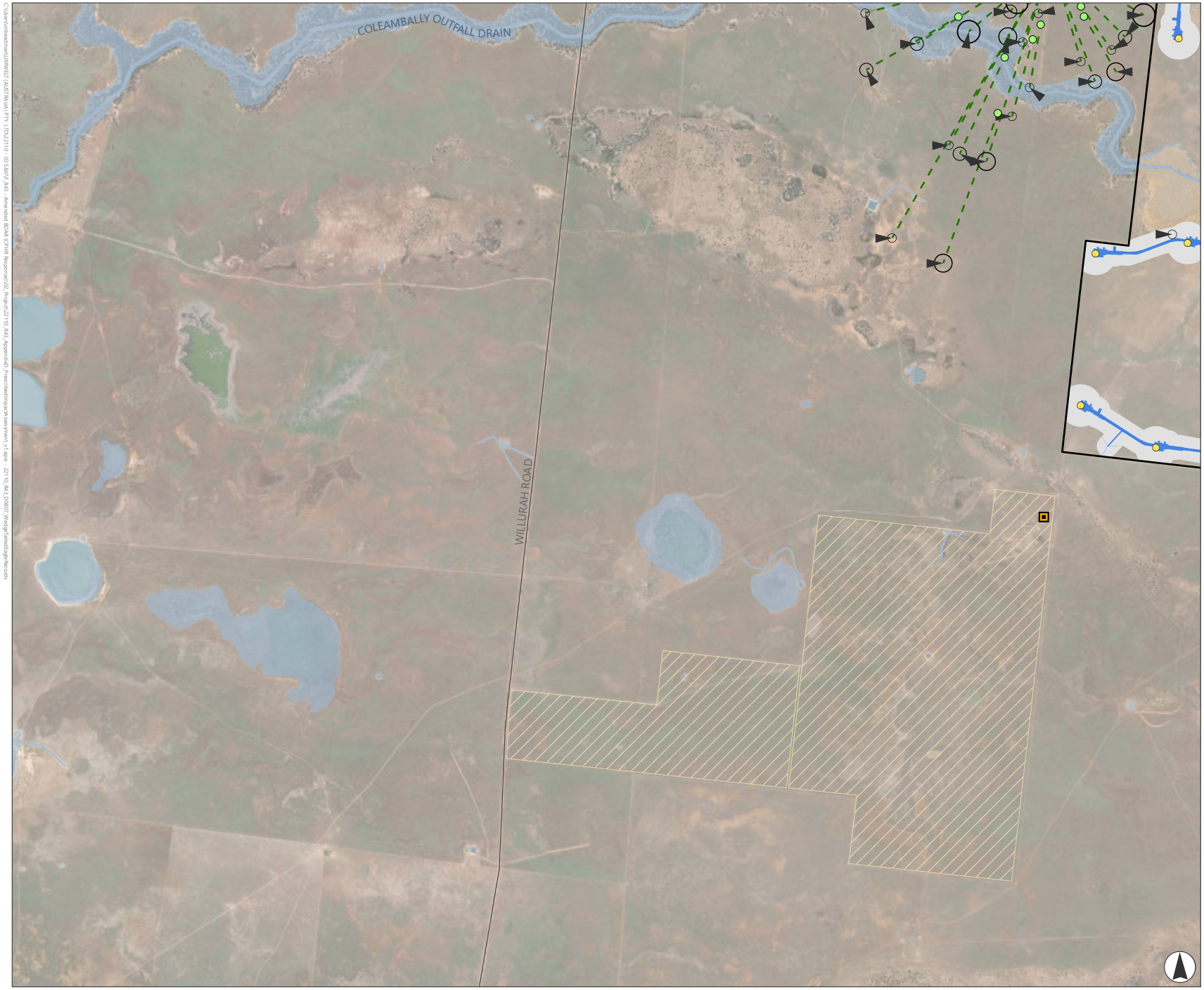

FIGURE 8.7F

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Wedge-tailed Eagle Record (Arrow indicates direction)

Flight Height (m)

- 0 - 40
- 41 - 130
- 131 - 300
- 301 - 700

- Observer Location
- Observer Direction and Distance
- Hollow-bearing Tree
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- Waterbody
- Road
- Hydroline

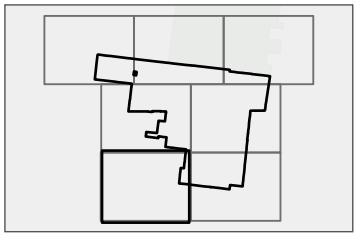

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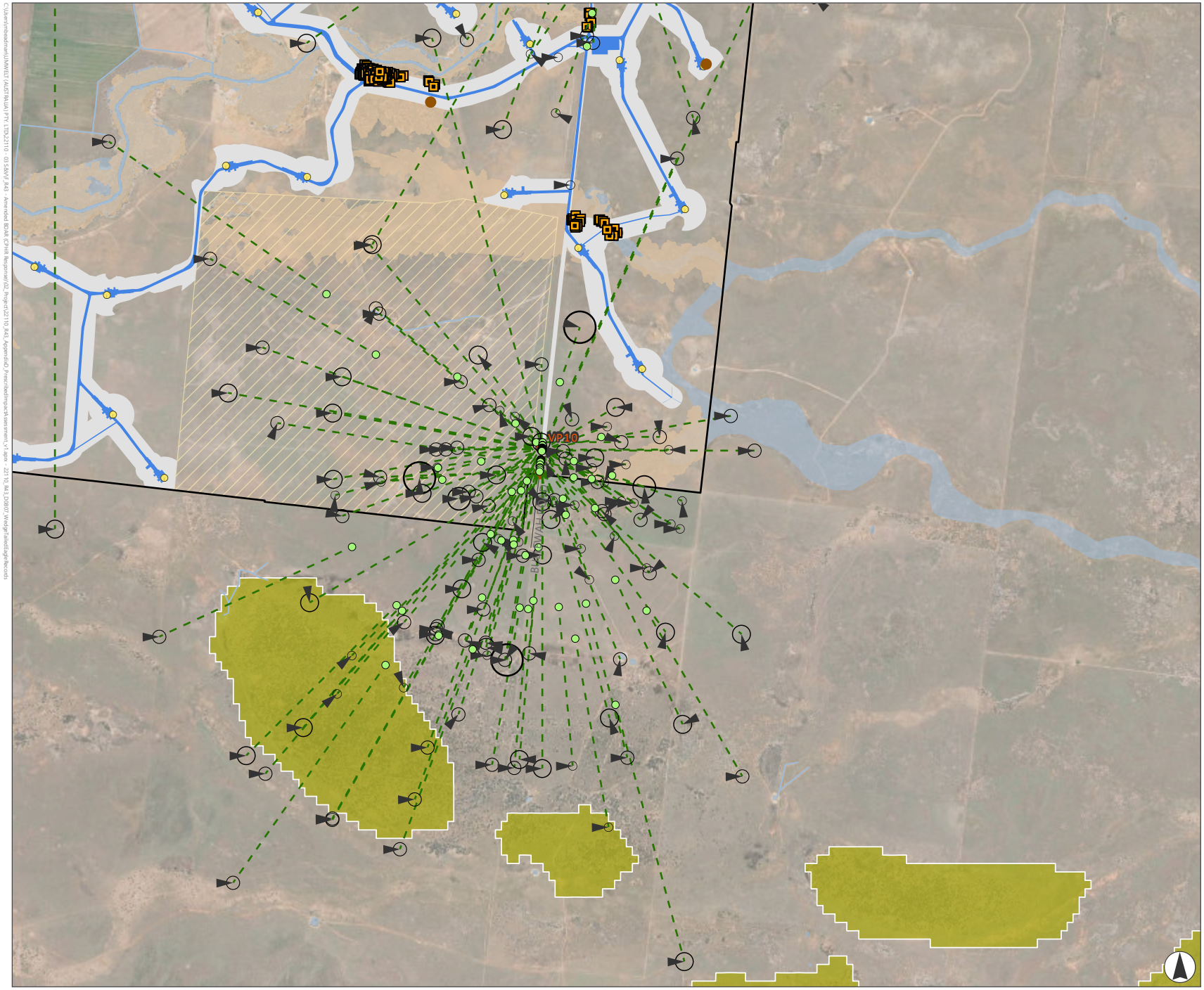
Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

FIGURE 8.7G

Location of Wedge-tailed Eagle Records in the Project Area (2022 - 2025 Surveys)



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8.4 Assessment of Likelihood and Consequence – Threatened Bat Species

8.4.1 Yellow-bellied Sheathtail-bat

8.4.1.1 Information on Yellow-bellied Sheathtail-bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across six operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding only four yellow-bellied sheathtail-bat carcasses out of 229 total carcasses of 11 bat species. However, four of the five wind farms examined had a minimum turbine height of 30 m (the remaining turbine was 74 m minimum and no yellow-bellied sheathtail-bats were recorded). Moloney et al. (2019) examined 11 wind farms in Victoria and found no yellow-bellied sheathtail-bats within 446 total bat carcasses. This suggests that the yellow-bellied sheathtail-bat occasionally flies at (lower) turbine heights and represents a moderate overall collision risk.

8.4.1.2 Status and Flight Behaviour in the Project Area

The yellow-bellied sheathtail-bat has not been definitively recorded on the study area. A call possibly belonging to this species was recorded on one night in November 2023 and three nights in February 2024. On two other occasions a single call belonging to either the white-striped freetail-bat or the yellow-bellied sheathtail-bat was recorded (May and September 2022). Many calls definitely attributed to the white-striped freetail-bat were recorded in most of the six surveys conducted in 2022 and 2023 across various seasons. The yellow-bellied sheathtail-bat was not recorded by the detectors on Met Mast 1 or 2. However, may occur Project Area and based on the mortality data discussed above the yellow-bellied sheathtail-bat is likely to be at risk of turbine strike or barotrauma.

Umwelt have reviewed existing records of yellow-bellied sheathtail-bat from the NSW BioNet Atlas (DPE 2022). The species is widely recorded across much of eastern and northern Australia (ALA 2024a). However, there are no species records in the vicinity of Hay and the Project Area.

8.4.1.3 Likelihood and Consequence of Impacts

The overall risk rating for yellow-bellied sheathtail-bat is Moderate, based on a Moderate likelihood and Moderate consequence of collisions (**Table 8.25**). The rationale for responses to each criterion is as follows:

- Yellow-bellied sheathtail-bat has not been definitively recorded on the Project Area and there is a dearth of local records on the NSW BioNet Atlas.
- Yellow-bellied sheathtail-bat have potential to fly at RSA height of turbine type B regularly, and turbine type A occasionally.
- Yellow-bellied sheathtail-bat are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The life-history characteristics of yellow-bellied sheathtail-bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D.

- Very little is known about the ecology of yellow-bellied sheathtail-bat though given its very large distribution (Churchill 2009) its population is likely to exceed 5,000 individuals and may possibly be over 20,000. Given the migratory nature of individuals that occur in south-eastern Australia coupled with the lack of any population estimates Criterion E is conservatively assigned Moderate.
- The yellow-bellied sheathtail-bat is listed as vulnerable in NSW under the BC Act.
- Should an impact trigger occur on the Project for yellow-bellied sheathtail-bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.25**, the Residual Risk rating for the yellow-bellied sheathtail-bat is considered to be reduced from Moderate to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.25 Yellow-bellied Sheathtail-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low						
Moderate		X	X	X	X	X
High	X					
Unmitigated Risk Rating						
Likelihood	High					
Consequence	Moderate					
Risk Rating	High					
Mitigated Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, and CPHR. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Moderate					

[1] *Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.*

8.4.2 Corben's Long-eared Bat

8.4.2.1 Information on Corben's Long-eared Bat from Australian Wind Farms

There are no published records of blade strike of Corben's long-eared bats in the available literature in Victoria (Moloney et al. 2019), south-east NSW (CPHR unpublished data) or NSW more broadly (Jacobs 2022). The majority of wind farms monitored to date in Victoria are located outside of this species' distribution. There are published records of blade strike of the closely related lesser long-eared bat (six strikes) and Gould's long-eared bat (one strike) in Victoria (Moloney et al. 2019) and five strikes of the lesser long-eared bat in NSW (Jacobs 2022). A mortality model for the lesser long-eared bat generated a mortality rate estimate of 0.1 individuals per turbine per year (95% CI 0–0.5) for one particular wind farm (Moloney et al. 2019). Thus, it is possible that Corben's long-eared bat would be similarly vulnerable to turbine strike.

8.4.2.2 Status and Flight Behaviour in the Project Area

Corben's long-eared bat was recorded on the Project Area as part of a species complex consisting of large-footed myotis/Corben's long-eared bat/lesser long-eared bat/Gould's long-eared bat on 4,996 occasions in all six survey periods. The number of passes per survey ranged from 2 (July 2022) to 4,219 (January 2023). Subsequent targeted surveys for the large-footed myotis in March 2024 failed to detect this species, suggesting that the species complex records are most likely to represent one or more *Nyctophilus* species. A *Nyctophilus* sp. was recorded on both Met Masts on one occasion each suggesting it occasionally flies at turbine height on the Project Area. Given the dearth of Corben's long-eared bat records on the Hay Plains it is unlikely that this species is present and at risk of turbine strike or barotrauma. However, targeted surveys were not conducted, and the species requires capture to allow for positive identification to species level, thus the species is conservatively assumed to be present.

Umwelt have reviewed existing records of Corben's long-eared bat from the NSW BioNet Atlas (DPE 2024). The species occurs inland of the Great Dividing Range from southern Queensland, through NSW and northern Victoria to the far east of South Australia (ALA 2024b). No species records occur directly or directly adjacent to the Project (DPE 2024). Indeed, the species may be absent from the Hay Plains (OEH 2024).

8.4.2.3 Likelihood and Consequence of Impacts

The overall risk rating for Corben's long-eared bat is Low, based on a Low likelihood and Moderate consequence of collisions **Table 8.26**. The rationale for responses to each criterion is as follows:

- Corben's long-eared bat may be absent from the Hay Plains (OEH 2024) and there are no records of the species within 30 km of the Project Area.
- Based on available data on related species, Corben's long-eared bat may occasionally fly at RSA height.
- Corben's long-eared bat have a wide but sparse distribution and are highly concentrated in suitable habitat (Law et al. 2016).
- The life-history characteristics of the Corben's long-eared bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Churchill 2009).

- The population of Corben's long-eared bats is not fully quantified but is likely to be between 5,000 and 20,000 individuals (Pennay et al. 2011).
- Corben's long-eared bat are listed as vulnerable under both the EPBC Act and BC Act.

Should an impact trigger occur on the Project for Corben's long-eared bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.26**, the Residual Risk rating for the Corben's long-eared bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.26 Corben's Long-eared Bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X				
Moderate	X		X	X	X	X
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					
Risk Rating	Moderate					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.4.3 Inland Forest Bat

8.4.3.1 Information on the Inland Forest Bat from Australian Wind Farms

There are no published records of blade strike of the inland forest bat in the available literature in Victoria (Moloney et al. 2019) or NSW (Jacobs 2022). The majority of wind farms monitored to date are located outside of this species' distribution. There are published records of blade strike of the related southern forest bat (21 strikes), large forest bat (20 strikes), little forest bat (15 strikes) and an unidentified vesper bat (nine strikes) in NSW (Jacobs 2022). In Victoria, turbine strike has been recorded for southern forest bat (two strikes), large forest bat (16 strikes) and little forest bat (nine strikes) (Moloney et al. 2019).

8.4.3.2 Status and Flight Behaviour in the Project Area

The inland forest bat was not recorded on the Project Area, either as a likely species or a species complex.

Umwelt have reviewed existing records of the inland forest bat from the NSW BioNet Atlas (DPE 2024). The species occurs inland of the Great Dividing Range from central Queensland, through NSW, north-east Victoria to South Australia and southern Northern Territory, with an outlying population in western Australia (ALA 2024b). It typically occurs where the annual rainfall is less than 400 mm (OEH 2024). No species records occur directly or directly adjacent to the Project (DPE 2024).

8.4.3.3 Likelihood and Consequence of Impacts

The overall risk rating for the inland forest bat is Low, based on a Low likelihood and Moderate consequence of collisions **Table 8.27**. The rationale for responses to each criterion is as follows:

- The inland forest bat may be absent from the Hay Plains (OEH 2024) and there are no records of the species within 30 km of the Project Area.
- Based on available data on related species, the inland forest bat may occasionally fly at RSA height.
- The inland forest bat has a wide but sparse distribution and are highly concentrated in suitable habitat.
- The life-history characteristics of the inland forest bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Churchill 2009).
- The population of the inland forest bat is not fully quantified but is likely to be between 5,000 and 20,000 individuals (Pennay et al. 2011).
- The inland forest bat is listed as vulnerable under the BC Act.

Should an impact trigger occur on the Project for inland forest bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.27**, the Residual Risk rating for the inland forest bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.27 Inland Forest Bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X				
Moderate	X		X	X	X	X
High						
Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					
Risk Rating	Moderate					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.4.4 Little Pied Bat

8.4.4.1 Information on the Little Pied Bat from Australian Wind Farms

There are no published records of blade strike of the little pied bat in the available literature in Victoria (Moloney et al. 2019) or NSW (Jacobs 2022). The majority of wind farms monitored to date are located outside of this species' distribution. There are published records of blade strike of the related Gould's wattled bat (59 strikes) and chocolate wattled bat (nine strikes) in NSW (Jacobs 2022). In Victoria, turbine strike has been recorded for Gould's wattled bat (49 strikes) and the chocolate wattled bat (five strikes) (Moloney et al. 2019). It is possible that the little pied bat would also be at risk of turbine strike.

8.4.4.2 Status and Flight Behaviour in the Project Area

The little pied bat was not recorded on the Project Area, either as a likely species or a species complex.

Umwelt have reviewed existing records of the little pied bat from the NSW BioNet Atlas (DPE 2024). The species occurs in inland NSW and Queensland (ALA 2024b). No species records occur directly or directly adjacent to the Project (DPE 2024).

8.4.4.3 Likelihood and Consequence of Impacts

The overall risk rating for the little pied bat is Low, based on a Low likelihood and Moderate consequence of collisions **Table 8.28**. The rationale for responses to each criterion is as follows:

- little pied bat may be absent from the Hay Plains (OEH 2024) and there are no records of the species within 30 km of the Project Area.
- Based on available data on related species, the little pied bat may occasionally fly at RSA height.
- The little pied bat has a wide but sparse distribution.
- The life-history characteristics of the little pied bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Churchill 2009).
- The population of the little pied bat is not fully quantified but is likely to be between 5,000 and 20,000 individuals (Pennay et al. 2011).
- The little pied bat is listed as vulnerable under the BC Act.

Table 8.28 Little Pied Bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X	X				
Moderate			X	X	X	X
High						
Risk Rating						
Likelihood	Low					
Consequence	Moderate					
Risk Rating	Minor					

8.5 Assessment of Likelihood and Consequence – Non-threatened Bat Species

An assessment of microbat species recorded on site is contained within the subsections below. The locations of each bat species recorded is detailed on **Figure 8.8**.

8.5.1 Inland Freetail-bat

8.5.1.1 Information on Inland Freetail-bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding only one inland freetail-bat carcass out of 229 total carcasses of 11 bat species.

The wind farm (Silverton) has a minimum turbine height of 30 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found no inland freetail-bats within 446 total bat carcasses. However, the inland freetail-bat only occurs in Victoria in the far north-west of the State and it is unlikely to occur in the locations of any of the wind farms examined. This suggests that the inland freetail-bat occasionally flies at (lower) turbine heights but represents a low overall collision risk.

8.5.1.2 Status and Flight Behaviour in the Project Area

The inland freetail-bat was not definitively recorded by ground-based detectors on the Project Area. A complex of Gould's wattle-bat/inland freetail-bat/Ride's freetail-bat/inland broad-nosed bat was reported from four surveys periods from ground-based detectors with a total of 95 records.

A second, similar complex of Gould's wattle-bat/inland freetail-bat/ inland broad-nosed bat was reported from three survey periods, totalling nine records. However, but it was picked up by the detectors on both Met Masts (191 definite detections), demonstrating that it flies at turbine height on the Project Area.

Umwelt have reviewed existing records of inland freetail-bat from the NSW BioNet Atlas (DPE 2022). The species is widely recorded in NSW west of the Great Dividing Range (ALA 2024c). However, there are no species records in the vicinity of the Project Area. The nearest record is about 37 km from the Project Area, south-west of Coleambally.

8.5.1.3 Likelihood and Consequence of Impacts

The overall risk rating for the inland freetail-bat is Moderate, based on a Moderate likelihood and Low/moderate consequence of collisions (**Table 8.29**). The rationale for responses to each criterion is as follows:

- The inland freetail-bat has not been definitively recorded on the Project Area and there is a dearth of local records on the NSW BioNet Atlas.
- Inland freetail-bats are likely to regularly fly below RSA height and may occasionally fly at the lower RSA height of Turbine Type B (60 m).
- Inland freetail-bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The life-history characteristics of the inland freetail-bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D.
- Very little is known about the ecology of inland freetail-bat though given its very large distribution (Churchill 2009) its population is likely to exceed 5,000 individuals and may possibly be over 20,000.
- The inland freetail bat is not listed under the BC Act or the EPBC Act.

Should an impact trigger occur on the Project for inland forest bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.27**, the Residual Risk rating for the inland forest bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.29 Inland Freetail-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X			X
Moderate	X	X		X	X	
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					
Risk Rating	Moderate					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.2 Southern freetail-bat

8.5.2.1 Information on Southern Freetail-bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding 17 southern freetail-bat carcasses out of 229 total carcasses of 11 bat species. It was recorded at only one wind farm (Bodangora; 102 total bat carcasses), which has a minimum turbine height of 20 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found nine southern freetail-bats within 446 total bat carcasses. This suggests that the southern freetail-bat occasionally flies at (lower) turbine heights but represents a low-moderate overall collision risk.

8.5.2.2 Status and Flight Behaviour in the Project Area

The southern freetail-bat was recorded on the Project Area on 680 occasions in all six survey periods. Of these, 532 passes were documented in May 2022. The southern freetail-bat was also detected on both Met Masts (totalling of 192 detections) demonstrating that it flies at turbine height on the Project Area.

Umwelt have reviewed existing records of southern freetail-bat from the NSW BioNet Atlas (DPE 2024). The species is widely recorded in NSW west of the Great Dividing Range (ALA 2024d). However, there are no species records in the vicinity of the Project Area. The nearest record is about 33.9 km north of the Project Area.

8.5.2.3 Likelihood and Consequence of Impacts

The overall risk rating for the southern freetail-bat is Moderate, based on a Moderate likelihood and Low/moderate consequence of collisions (**Table 8.30**). The rationale for responses to each criterion is as follows:

- The southern freetail-bat has been definitively recorded on the Project Area on multiple occasions.
- Southern freetail-bats are likely to regularly fly below RSA height and occasionally fly within the lower RSA height of Turbine Type B (60 m).
- Southern freetail-bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The life-history characteristics of the southern freetail-bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D.
- Very little is known about the ecology of southern freetail-bat though given its very large distribution (Churchill 2009) its population is likely to exceed 5,000 individuals and may possibly be over 20,000.
- The southern freetail bat is not listed under the BC Act or the EPBC Act.

Should an impact trigger occur on the Project for southern freetail- bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.30**, the Residual Risk rating for the southern freetail-bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.30 Southern Freetail-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X			X
Moderate	X	X		X	X	
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					

Risk Rating	Moderate
Residual Risk Rating	
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.
Residual Risk Rating	Minor

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.3 Ride's freetail-bat

8.5.3.1 Information on Ride's Freetail-bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora) but did not report Ride's freetail-bat out of 229 total carcasses of 11 bat species. Four of the five wind farms had minimum turbine heights of 20–30 m, with the remaining one 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and also reported no Ride's freetail-bats within 446 total bat carcasses. This suggests that the Ride's freetail-bat usually flies below turbine heights even when they are not particularly high. Thus, Ride's freetail-bat is considered to have a low overall collision risk.

8.5.3.2 Status and Flight Behaviour in the Project Area

Ride's freetail-bat was definitively recorded on the study area nine times. A number of other possible identifications were within species complexes. Complexes of Gould's wattle-bat/inland freetail-bat/Ride's freetail-bat/inland broad-nosed bat (2,955 detection), Gould's wattle-bat/southern freetail-bat/Ride's freetail-bat/inland broad-nosed bat (6,849 records) and Ride's freetail-bat/southern freetail-bat (419 passes) were reported from all six surveys periods. Many definitive identifications of Gould's wattle-bat (926) and the southern freetail-bat (743) were made across all survey periods. Seven calls attributed to Ride's freetail-bat were recorded across both Met Masts. Ride's freetail-bat or the southern freetail-bat were recorded from both Met Masts (21 records). It is possible that Ride's freetail-bat flies at turbine height on the Project Area.

Umwelt have reviewed existing records of Ride's freetail-bat from the NSW BioNet Atlas (DPE 2022). The species is widely recorded in eastern NSW with records on the south-west plains more scattered (ALA 2024e). However, there are no species records in the vicinity of the Project Area.

8.5.3.3 Likelihood and Consequence of Impacts

The overall risk rating for the Ride's freetail-bat is Low, based on a Low/moderate likelihood and Low/moderate consequence of collisions (**Table 8.31**). The rationale for responses to each criterion is as follows:

- Ride's freetail-bat has not been definitively recorded on the Project Area and there is a dearth of local records on the NSW BioNet Atlas.
- Ride's freetail-bats are likely to regularly fly below RSA height and occasionally fly within the lower RSA height of Turbine Type B (60 m).
- Ride's freetail-bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The life-history characteristics of Ride's freetail-bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D.
- Very little is known about the ecology of Ride's freetail-bat though given its very large distribution (Churchill 2009) its population is likely to exceed 5,000 individuals and may possibly be over 20,000.
- Ride's freetail bat is not listed under the BC Act or the EPBC Act.

Should an impact trigger occur on the Project for Ride's freetail-bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.31**, the Residual Risk rating for Ride's freetail-bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.31 Ride's Freetail-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X	X			X
Moderate	X			X	X	
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Moderate					
Risk Rating	Moderate					

Residual Risk Rating	
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.
Residual Risk Rating	Minor

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.4 Chocolate Wattled Bat

8.5.4.1 Information on Chocolate Wattled Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding nine chocolate wattle-bat carcasses at three sites out of 229 total carcasses of 11 bat species across all sites. This included one record at Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found five chocolate wattle-bats within 446 total bat carcasses. This suggests that the chocolate wattle-bat may fly at turbine heights exceeding 74 m. The minimum turbine height at Bullawah Wind Farm would be 60 m on Turbine Type B.

8.5.4.2 Status and Flight Behaviour in the Project Area

The chocolate wattle-bat was recorded on the Project Area on 19 occasions in five survey periods. Of these, nine passes were documented in August 2023. The chocolate wattle-bat was recorded on seven occasions across both Met Masts, demonstrating that it flies at turbine height on the Project Area.

Umwelt have reviewed existing records of chocolate wattle-bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely in NSW, although records are relatively sparse in the north-west third of the State (ALA 2024f). The nearest record is about 12.5 km to the north of the Project Area in Oolambeyan National Park.

8.5.4.3 Likelihood and Consequence of Impacts

The overall risk rating for chocolate wattle-bat is Moderate, based on a Moderate likelihood and Low consequence of collisions (**Table 8.32**). The rationale for responses to each criterion is as follows:

- The chocolate wattle-bat has been definitively recorded on the Project Area on 16 occasions.
- Chocolate wattle-bats are likely to regularly fly below RSA height and occasionally fly at RSA height of Turbine Type B (60 m).
- Chocolate wattle-bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The life-history characteristics of the chocolate wattle-bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D.
- The population of the chocolate wattle-bat is likely to be well over 20,000 individuals.
- The chocolate wattle-bat is not listed under the BC Act or the EPBC Act.
- Should an impact trigger occur on the Project for chocolate wattled bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.32**, the Residual Risk rating for the chocolate wattled bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.32 Chocolate Wattle-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X	X		X	X
Moderate	X			X		
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Low					
Risk Rating	Minor					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days.					

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
	• Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.5 Gould's Wattled Bat

8.5.5.1 Information on Gould's Wattled Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding 59 Gould's wattle-bat carcasses at four sites out of 229 total carcasses of 11 bat species across all sites. All four turbines had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found 49 Gould's wattle-bats within 446 total bat carcasses. This suggests that Gould's wattle-bat is likely to fly at heights exceeding the minimum turbine height at those locations. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.5.2 Status and Flight Behaviour in the Project Area

Gould's wattle-bat was recorded on the Project Area on 1,264 occasions in all six survey periods. The number of passes per survey ranged from 11 (May 2022) to 770 (January 2023). Gould's wattle-bat was also detected a total of 179 times across both detectors, demonstrating that it flies at turbine height on the Project Area.

Umwelt have reviewed existing records of Gould's wattle-bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely across most of Australia (ALA 2024g). The nearest record is about 12.5 km to the north of the Project Area in Oolambeyan National Park.

8.5.5.3 Likelihood and Consequence of Impacts

The overall risk rating Gould's wattle-bat is Moderate, based on a High likelihood and Low consequence of collisions (**Table 8.33**). The rationale for responses to each criterion is as follows:

- Gould's wattle-bat has been definitively recorded on the Project Area on 117 occasions.
- Gould's wattle-bats are likely to regularly fly below RSA height and occasionally fly at RSA height of Turbine Type B (60 m).
- Gould's wattle-bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- Gould's wattle-bat is a common and widespread species that would have high demographic resilience.

- The population of the Gould's wattle-bat extends to all of Australia and would, therefore, be very large.
- Gould's wattle-bat is not listed under the BC Act or the EPBC Act.
- Should an impact trigger occur on the Project for Gould's wattled bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.33** the Residual Risk rating for the Gould's wattled bat is considered to be reduced from Moderate to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.33 Gould's Wattle-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X	X	X	X
Moderate		X				
High	X					
Unmitigated Risk Rating						
Likelihood	High					
Consequence	Low					
Risk Rating	Moderate					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.6 Little forest bat

8.5.6.1 Information on Little Forest Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding 15 little forest bat carcasses at two sites out of 229 total carcasses of 11 bat species across all sites. These turbines had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found nine little forest bats within 446 total bat carcasses. This suggests that the little forest bat may fly at heights exceeding the minimum turbine height at least occasionally. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.6.2 Status and Flight Behaviour in the Project Area

The little forest bat was recorded on the Project Area on 2,400 occasions across all six survey periods. The number of passes per survey ranged from 12 to 744 (January 2023). The little forest bat was also detected a total of 13 times across both Met Masts, demonstrating that it flies at turbine height on the Project Area.

Umwelt have reviewed existing records of little forest bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely from central Queensland through most of NSW and Victoria to inside the South Australian border (ALA 2024h). The nearest record is about 11.8 km to the north of the Project Area in Oolambeyan National Park.

8.5.6.3 Likelihood and Consequence of Impacts

The overall risk rating for little forest bat is Moderate, based on a Moderate likelihood and Low consequence of collisions (**Table 8.34**). The rationale for responses to each criterion is as follows:

- The little forest bat has been definitively recorded on the Project Area on 1,656 occasions.
- Little forest bats are likely to regularly fly below RSA height and occasionally fly at RSA height of Turbine Type B (60 m).
- Little forest bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The little forest bat is a common and widespread species that would have high demographic resilience.
- The population of the little forest bat extends to a large swath of south-eastern Australia and would, therefore, be very large and exceed 20,000 individuals.
- The little forest bat is not listed under the BC Act or the EPBC Act.

Table 8.34 Little Forest Bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X	X	X	X	X
Moderate	X					
High						

Risk Rating	
Likelihood	Moderate
Consequence	Low
Risk Rating	Minor

8.5.7 Lesser Long-eared Bat

8.5.7.1 Information on Lesser Long-eared Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding five lesser long-eared bat carcasses at two sites out of 229 total carcasses of 11 bat species across all sites. These turbines had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found six lesser long-eared bats within 446 total bat carcasses. This suggests that the lesser long-eared bat may fly at heights exceeding the minimum turbine height at least occasionally. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.7.2 Status and Flight Behaviour in the Project Area

The lesser long-eared bat was recorded on the Project Area as part of a species complex consisting of large-footed myotis/Corben's long-eared bat/lesser long-eared bat/Gould's long-eared bat on 4,443 occasions in all six survey periods. The number of passes per survey ranged from 2 (July 2022) to 744 (January 2023). Subsequent targeted surveys for the large-footed myotis in March 2024 failed to detect this species, suggesting that the species complex records are most likely to represent one or more *Nyctophilus* species. A *Nyctophilus* sp. was recorded on each Met Mast on one occasion each, suggesting it occasionally flies at turbine height on the Project Area.

Umwelt have reviewed existing records of lesser long-eared bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely across all of Australia and there are multiple records in southern inland NSW (ALA 2024i). The nearest record is about 11.8 km to the north of the Project Area in Oolambeyan National Park.

8.5.7.3 Likelihood and Consequence of Impacts

The overall risk rating for lesser long-eared bat is Moderate, based on a Moderate likelihood and Low consequence of collisions (**Table 8.35**). The rationale for responses to each criterion is as follows:

- The lesser long-eared bat has not been definitively recorded on the Project Area, but it is a common and widespread species with multiple records within 30 km and there are 777 onsite records of a species complex that includes this species.
- Lesser long-eared bats are likely to regularly fly below RSA height and may occasionally fly at RSA height of Turbine Type B (60 m).
- Lesser long-eared bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.

- The lesser long-eared bat is a common and widespread species that would have high demographic resilience.
- The population of the lesser long-eared bat covers the entire continent and would, therefore, be very large and exceed 20,000 individuals.
- The lesser long-eared bat is not listed under the BC Act or the EPBC Act.

Table 8.35 Lesser Long-eared Bats Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low		X	X	X	X	X
Moderate	X					
High						
Risk Rating						
Likelihood	Moderate					
Consequence	Low					
Risk Rating	Minor					

8.5.8 Large forest bat

8.5.8.1 Information on Large Forest Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding 20 large forest bat carcasses at two sites out of 229 total carcasses of 11 bat species across all sites. These turbines had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found 16 large forest bats within 446 total bat carcasses. This suggests that the large forest bat may fly at heights exceeding the minimum turbine height at least occasionally. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.8.2 Status and Flight Behaviour in the Project Area

The large forest bat was not definitively recorded on the Project Area. The large forest bat was only described from two species complexes: little broad-nosed bat/large forest bat (247 passes over four surveys) and large forest bat/little forest bat (275 passes over four surveys). Both the little broad-nosed bat (2,610 passes) and little forest bat (2,400 passes) were recorded on the Project Area on multiple occasions. The large forest bat was not recorded on either Met Mast, suggesting that it is unlikely to fly at turbine height on the Project Area.

Umwelt have reviewed existing records of large forest bat from the NSW BioNet Atlas (DPE 2024). The species occurs from south-east Queensland through the eastern half of NSW, most of Victoria and west to Adelaide (ALA 2024j). The nearest record is about 50 km to the south of the Project Area near Coleambally.

8.5.8.3 Likelihood and Consequence of Impacts

The overall risk rating for large forest bat is Low, based on a Low likelihood and Low consequence of collisions (**Table 8.36**). The rationale for responses to each criterion is as follows:

- The large forest bat has not been definitively recorded on the Project Area.
- Large forest bats are likely to regularly fly below RSA height and occasionally fly at RSA height of Turbine Type B (60 m).
- Large forest bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The large forest bat is a common and widespread species that would have high demographic resilience.
- The population of the large forest bat extends to a large swath of south-eastern Australia and would, therefore, be very large and exceed 20,000 individuals.
- The large forest bat is not listed under the BC Act or the EPBC Act.

Table 8.36 Large Forest bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X	X	X	X	X	X
Moderate						
High						
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

8.5.9 Southern Forest Bat

8.5.9.1 Information on Southern Forest Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding 21 southern forest bat carcasses at two sites out of 229 total carcasses of 11 bat species across all sites. These turbines had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found two southern forest bats within 446 total bat carcasses. This suggests that the little forest bat may fly at heights exceeding the minimum turbine height at least occasionally. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.9.2 Status and Flight Behaviour in the Project Area

The southern forest bat was not definitively recorded on the Project Area. The southern forest bat was only described from three species complexes: chocolate wattle-bat/ southern forest bat (1,108 passes over four surveys), little forest bat/southern forest bat (17 passes on one survey) and chocolate wattle-bat/little forest bat/southern forest bat (11,205 passes over five surveys). Both the little forest bat (2,400 passes) and chocolate wattle-bat (19 passes over five surveys) were recorded on the Project Area on multiple occasions. The southern forest bat was not recorded by either detector on either Met Mast, suggesting that it is unlikely to fly at turbine height on the Project Area.

Umwelt have reviewed existing records of southern forest bat from the NSW BioNet Atlas (DPE 2024). The species occurs across southern Australia from Western Australia, through the eastern half of NSW to south-east Queensland (ALA 2024k). The nearest record is about 41 km to the north of the Project Area near Hay.

8.5.9.3 Likelihood and Consequence of Impacts

The overall risk rating for southern forest bat is Low, based on a Low likelihood and Low consequence of collisions (**Table 8.37**). The rationale for responses to each criterion is as follows:

- The southern forest bat has not been definitively recorded on the Project Area.
- Southern forest bats are likely to regularly fly below RSA height and occasionally fly at RSA height of Turbine Type B (60 m).
- Southern forest bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The southern forest bat is a common and widespread species that would have high demographic resilience.
- The population of the southern forest bat extends to a large swath of southern Australia and would, therefore, be very large and exceed 20,000 individuals.
- The southern forest bat is not listed under the BC Act or the EPBC Act.

Table 8.37 Southern Forest Bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low	X	X	X	X	X	X
Moderate						
High						
Risk Rating						
Likelihood	Low					
Consequence	Low					
Risk Rating	Negligible					

8.5.10 White-striped Freetail-bat

8.5.10.1 Information on White-striped Freetail-bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding 69 white-striped freetail-bat carcasses at four of the five sites out of 229 total carcasses of 11 bat species across all sites. These four wind farms had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found 296 white-striped freetail-bats within 446 total bat carcasses. White-striped freetail-bats have been frequently reported to be killed in moderate numbers as a result of blade strike or barotrauma through Bird and Bat Adaptive Management Plans (BBAMPs) for wind farms in the south-east NSW (CPHR unpublished data). The white-striped freetail-bat may fly at heights exceeding the minimum turbine height, but greater clearance (e.g. 74 m) may reduce this exposure. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.10.2 Status and Flight Behaviour in the Project Area

A total of 660 white-striped freetail-bat calls were recorded on the Project Area in five survey periods, ranging from four passes in September 2022 to 320 passes in January 2024. The white-striped freetail-bat was also detected a total of 227 times on both Met Masts, demonstrating that it flies at turbine height on the Project Area.

Umwelt have reviewed existing records of white-striped freetail-bat from the NSW BioNet Atlas (DPE 2024). The species occurs from south-east Queensland through the eastern half of NSW, most of Victoria and west to Adelaide (ALA 2024l). The nearest record is about 12.5 km from the Project Area.

8.5.10.3 Likelihood and Consequence of Impacts

The overall risk rating for White-striped freetail-bat is High, based on a High likelihood and Moderate consequence of collisions (**Table 8.38**). The rationale for responses to each criterion is as follows:

- The white-striped freetail-bat has been definitively recorded on the Project Area on 340 occasions.
- White-striped freetail-bat are likely to regularly fly below RSA height and within RSA height given their instances of being struck by wind turbines as well as the results of our at height bat utilisation surveys.
- White-striped freetail-bats are widespread and have greater flexibility in the range of suitable habitat availability (including roosting in hollows of trees) of which the habitat is also relatively widespread (Richards 1995, Hoye 2002, Churchill 2009).
- The life-history characteristics of white-striped freetail-bat overlap with certain aspects of both the descriptions for a Low and High rating for Criterion D (Churchill 2009).
- The ALA (2023c) indicates over 17,000 records of this species have been reported across Australia. While this does not give reliable population estimate it does suggest this species is a common species found across the continent with 10,000 of those records in NSW.
- The white-striped freetail-bat is not a threatened species but it is known to be susceptible to wind turbine strikes.

Should an impact trigger occur on the Project for white-striped freetail-bat, a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. Such actions will be required to occur as part of the implementation of the BBAMP for the Project (to be prepared and finalised following approval). As a result of the post trigger responses presented below in **Table 8.38**, the Residual Risk rating for the white-striped freetail-bat is considered to be reduced from High to Moderate. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.38 White-striped Freetail-bat Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low					X	X
Moderate			X	X		
High	X	X				
Unmitigated Risk Rating						
Likelihood	High					
Consequence	Moderate					
Risk Rating	High					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Moderate					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.11 Gould's Long-eared Bat

8.5.11.1 Information on Gould's Long-eared Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora). No Gould's long-eared bats were found, but the five carcasses of the related lesser long-eared bat were recorded at two sites out of 229 total carcasses of 11 bat species across all sites. These turbines had a minimum height of 20–30 m. There were no records from Sapphire Wind Farm, which has a minimum turbine height of 74 m. Moloney et al. (2019) examined 11 wind farms in Victoria and found one Gould's long-eared bat within 446 total bat carcasses. Six lesser long-eared bat carcasses were also found. This suggests that the Gould's long-eared bat may occasionally fly at heights exceeding the minimum turbine height at least occasionally. The minimum turbine height at Bullawah Wind Farm would be 60 m.

8.5.11.2 Status and Flight Behaviour in the Project Area

The Gould's long-eared bat was potentially recorded on the Project Area as part of a species complex consisting of large-footed myotis/Corben's long-eared bat/lesser long-eared bat/Gould's long-eared bat on 4,778 occasions in all six survey periods. Subsequent targeted surveys for the large-footed myotis in March 2024 failed to detect this species, suggesting that the species complex records are most likely to represent one or more *Nyctophilus* species. A *Nyctophilus* sp. was recorded on each Met Mast on one occasion each, suggesting it occasionally flies at turbine height on the Project Area.

Umwelt have reviewed existing records of Gould's long-eared bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely and there are multiple records in southern inland NSW (ALA 2024i). However, there are no species records in the vicinity of the Project Area. The nearest record is about 32.9 km away from the Project Area.

8.5.11.3 Likelihood and Consequence of Impacts

The overall risk rating for Gould's long-eared bat is Moderate, based on a Moderate likelihood and Low consequence of collisions (**Table 8.37**). The rationale for responses to each criterion is as follows:

- The Gould's long-eared bat has not been definitively recorded on the Project Area, but it is a common and widespread species with records within 35 km and there are 4,778 onsite records of a species complex that includes this species.
- Gould's long-eared bats are likely to regularly fly below RSA height and may occasionally fly at RSA height (60 m).
- Gould's long-eared bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The Gould's long-eared bat is a common and widespread species that would have high demographic resilience.
- The population of the Gould's long-eared bat covers most of Victoria, the eastern half of NSW and much of Queensland, although most records are clustered in the south-east corner of that State, therefore, it is likely to be very large and exceed 20,000 individuals.
- The Gould's long-eared bat is not listed under the BC Act or the EPBC Act.

Should an impact trigger occur on the Project for Gould's long-eared bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species.

As a result of the post trigger responses presented below in **Table 8.27**, the Residual Risk rating for the Gould's long-eared bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.39 Gould's Long-eared Bats Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X	X	X	X
Moderate	X	X				
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Low					
Risk Rating	Minor					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

1. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

8.5.12 Inland Broad-nosed Bat

8.5.12.1 Information on Inland Broad-nosed Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding no Inland broad-nosed bat carcasses Moloney et al. (2019) examined 11 wind farms in Victoria and also found no Inland broad-nosed bats within 446 total bat carcasses. The broad distribution range of the inland broad-nosed bat suggests that it would occur in areas occupied by commissioned wind farms. Similarly, there are no turbine strikes from other related and widely distributed broad-nosed bat species. This suggests that the inland broad-nosed bat is at a low risk of turbine strike.

8.5.12.2 Status and Flight Behaviour in the Project Area

The Inland broad-nosed bat was recorded on the Project Area on 10 occasions and 23 probable recordings in two survey periods. Of these, nine passes were documented in January 2023. It was also recorded as part of four different species complexes, which collectively returned 69,317 passes. Other members of these complexes were frequently detected with definite and probably confidence. The Inland broad-nosed bat was recorded on one occasion across both Met Masts, demonstrating that it occasionally flies at turbine height on the Project Area.

Umwelt have reviewed existing records of Inland broad-nosed bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely across Australia (ALA 2024f). The nearest record is about 12.4 km away from the Project Area.

8.5.12.3 Likelihood and Consequence of Impacts

The overall risk rating for Inland broad-nosed bat is Moderate, based on a Moderate likelihood and Low consequence of collisions (**Table 8.38**). The rationale for responses to each criterion is as follows:

- The Inland broad-nosed bat has been definitively recorded on the Project Area on 10 occasions.
- Inland broad-nosed bats are likely to regularly fly below RSA height and occasionally fly at RSA height (60 m).
- Inland broad-nosed bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The inland broad-nosed bat is a common and widespread species that would have high demographic resilience.
- The population of the Inland broad-nosed bat is likely to be well over 20,000 individuals.
- The Inland broad-nosed bat is not listed under the BC Act or the EPBC Act.

Should an impact trigger occur on the Project for inland broad-nosed bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.40**, the Residual Risk rating for the inland broad-nosed bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

Table 8.38 Inland Broad-nosed Bats Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X	X	X	X
Moderate	X	X				
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Low					
Risk Rating	Minor					
Residual Risk Rating						
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.					
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.					
Residual Risk Rating	Minor					

8.5.13 Little Broad-nosed Bat

8.5.13.1 Information on Little Broad-nosed Bat from Australian Wind Farms

Jacobs (2022) reviewed bat mortality data across five operational wind farms in NSW (Silverton, Gullen Range, White Rock, Sapphire, Bodangora), finding no little broad-nosed bat carcasses Moloney et al. (2019) examined 11 wind farms in Victoria and also found no little broad-nosed bats within 446 total bat carcasses. The broad distribution range of the little broad-nosed bat suggests that it would occur in areas occupied by commissioned wind farms. Similarly, there are no turbine strikes from other related and widely distributed broad-nosed bat species. This suggests that the little broad-nosed bat is at a low risk of turbine strike.

8.5.13.2 Status and Flight Behaviour in the Project Area

The Little broad-nosed bat was recorded on the Project Area on 1,781 occasions and 1,272 probable recordings in all six survey periods. Of these, 1,382 passes were documented in January 2023. There was a further 660 passes of a species complex of the inland freetail bat and the little broad-nosed bat. The Little broad-nosed bat was recorded on two occasions across both Met Masts, demonstrating that it occasionally flies at turbine height on the Project Area.

Umwelt have reviewed existing records of Little broad-nosed bat from the NSW BioNet Atlas (DPE 2024). The species occurs widely from the Murray River, NSW, to far North Queensland and diagonally across the continent to the northern half of Western Australia (ALA 2024f). The nearest record is about 33.9 km away from the Project Area.

8.5.13.3 Likelihood and Consequence of Impacts

The overall risk rating for Little broad-nosed bat is Low, based on a Low likelihood and Low consequence of collisions (**Table 8.40**). The rationale for responses to each criterion is as follows:

- The Little broad-nosed bat has been definitively recorded on the Project Area on 1,781 occasions.
- Little broad-nosed bats are likely to regularly fly below RSA height and occasionally fly at RSA height (60 m).
- Little broad-nosed bats are widely distributed within areas of suitable habitat across its range and the habitat itself is relatively widely dispersed.
- The inland broad-nosed bat is a common and widespread species that would have high demographic resilience.
- The population of the Little broad-nosed bat is likely to be well over 20,000 individuals.
- The Little broad-nosed bat is not listed under the BC Act or the EPBC Act.

Should an impact trigger occur on the Project for little broad-nosed bat a range of additional monitoring surveys would be implemented as well as potential implementation of species-specific mitigation measures to manage the risk of turbine strike on the species. As a result of the post trigger responses presented below in **Table 8.40**, the Residual Risk rating for the little broad-nosed bat is considered to be reduced to Minor. Full detail of the impact trigger thresholds, post trigger responses and mitigation measures will be prepared and finalised in the BBAMP through consultation with CPHR and/or Commonwealth DCCEEW.

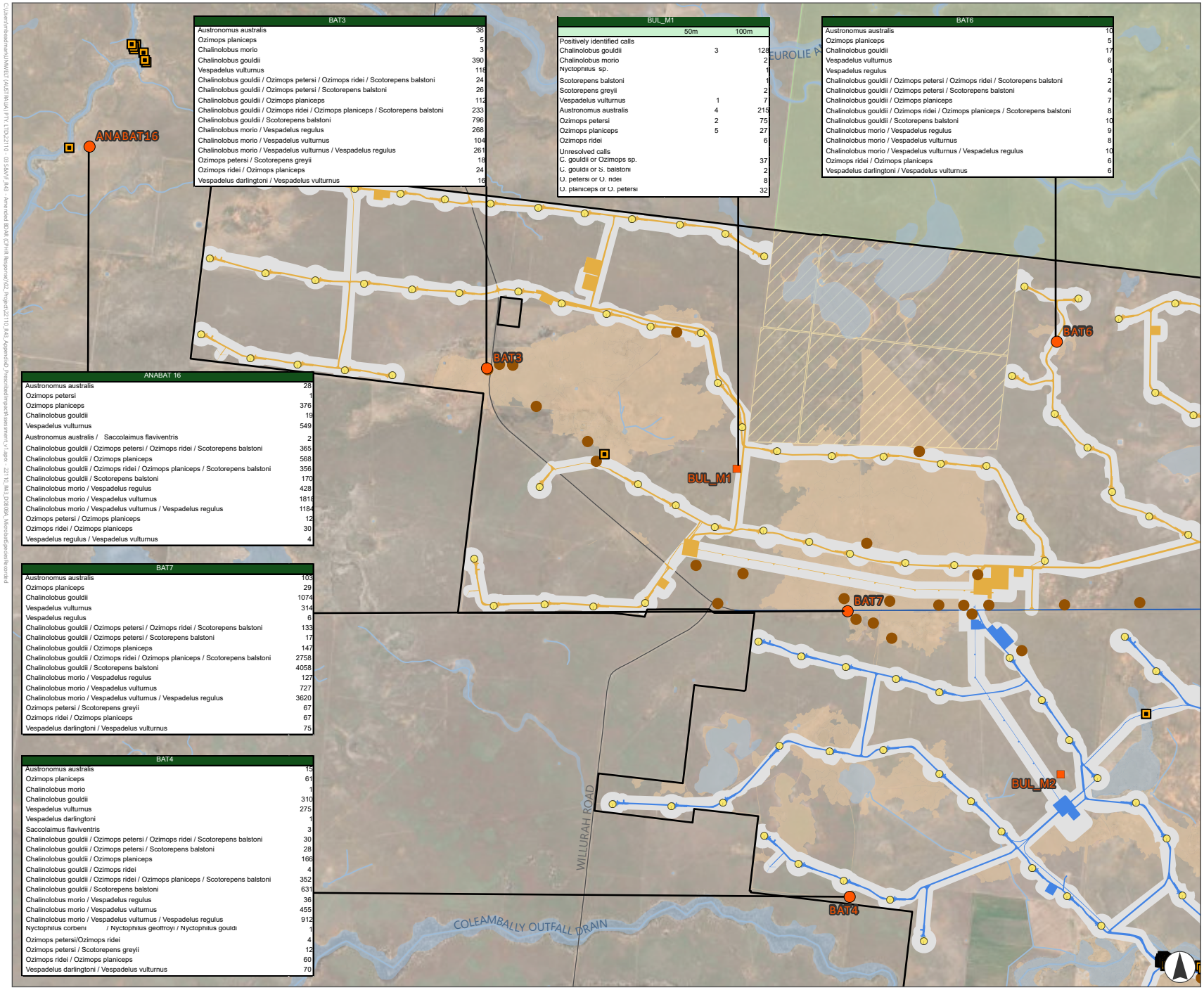
Table 8.40 Little Broad-nosed Bats Risk Assessment

	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F
Low			X	X	X	X
Moderate	X	X				
High						
Unmitigated Risk Rating						
Likelihood	Moderate					
Consequence	Low					
Risk Rating	Minor					

Residual Risk Rating	
Post Trigger Measures[1]	• Additional carcass monitoring to fortnightly (from monthly) for an initial period of six weeks. In the event that additional carcasses of the particular species are recorded, monitoring is to continue until a time that is agreed upon between the Proponent, engaged ecologist, CPHR and/or Commonwealth DCCEEW. • Implement targeted monitoring within five working days of trigger confirmation (i.e. species identification) at the trigger wind turbine and any other wind turbines where impacts are recorded, along with other wind turbines where the target species has been recorded but not necessarily impacted. Targeted monitoring methodology and timing should be specific to the triggered species; however, monitoring should continue for a minimum of three consecutive days. • Impact investigation and subsequent consultation with CPHR and/or Commonwealth DCCEEW.
Mitigation Measures[1]	Implementation of BBAMP, approved in consultation with CPHR. Measures specific to this species include: • Lighting and deterrents. • Wind turbine curtailment. • Acoustic deterrents.
Residual Risk Rating	Minor

FIGURE 8.8A

Location of Microbat Species Recorded within the Project Area



BAT3	
Austronomus australis	38
Ozimops planiceps	5
Chalinolobus morio	3
Chalinolobus gouldii	390
Vespadelus vulturnus	118
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	24
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	26
Chalinolobus gouldii / Ozimops planiceps	112
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	233
Chalinolobus gouldii / Scotorepens balstoni	796
Chalinolobus morio / Vespadelus regulus	268
Chalinolobus morio / Vespadelus vulturnus	104
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	261
Ozimops petersi / Scotorepens greyii	18
Ozimops ridei / Ozimops planiceps	24
Vespadelus darlingtoni / Vespadelus vulturnus	16

BUL_M1	50m	100m
Positively identified calls		
Chalinolobus gouldii	3	128
Chalinolobus morio		2
Nyctophilus sp.		1
Scotorepens balstoni		1
Scotorepens greyii		2
Vespadelus vulturnus	1	7
Austronomus australis	4	215
Ozimops petersi	2	75
Ozimops planiceps	5	27
Ozimops ridei		6
Unresolved calls		
C. gouldii or Ozimops sp.		37
C. gouldii or S. balstoni		2
O. petersi or O. ridei		8
O. planiceps or O. petersi		32

BAT6	
Austronomus australis	10
Ozimops planiceps	5
Chalinolobus gouldii	17
Vespadelus vulturnus	6
Vespadelus regulus	1
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	2
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	4
Chalinolobus gouldii / Ozimops planiceps	7
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	8
Chalinolobus gouldii / Scotorepens balstoni	10
Chalinolobus morio / Vespadelus regulus	9
Chalinolobus morio / Vespadelus vulturnus	8
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	10
Ozimops ridei / Ozimops planiceps	6
Vespadelus darlingtoni / Vespadelus vulturnus	6

ANABAT 16	
Austronomus australis	28
Ozimops petersi	1
Ozimops planiceps	376
Chalinolobus gouldii	19
Vespadelus vulturnus	549
Austronomus australis / Saccolaimus flaviventris	2
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	365
Chalinolobus gouldii / Ozimops planiceps	568
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	356
Chalinolobus gouldii / Scotorepens balstoni	170
Chalinolobus morio / Vespadelus regulus	428
Chalinolobus morio / Vespadelus vulturnus	1818
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	1184
Ozimops petersi / Ozimops planiceps	12
Ozimops ridei / Ozimops planiceps	30
Vespadelus regulus / Vespadelus vulturnus	4

BAT7	
Austronomus australis	103
Ozimops planiceps	29
Chalinolobus gouldii	1074
Vespadelus vulturnus	314
Vespadelus regulus	6
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	133
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	17
Chalinolobus gouldii / Ozimops planiceps	147
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	2758
Chalinolobus gouldii / Scotorepens balstoni	4058
Chalinolobus morio / Vespadelus regulus	127
Chalinolobus morio / Vespadelus vulturnus	727
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	3620
Ozimops petersi / Scotorepens greyii	67
Ozimops ridei / Ozimops planiceps	67
Vespadelus darlingtoni / Vespadelus vulturnus	75

BAT4	
Austronomus australis	15
Ozimops planiceps	61
Chalinolobus morio	1
Chalinolobus gouldii	310
Vespadelus vulturnus	275
Vespadelus darlingtoni	1
Saccolaimus flaviventris	3
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	30
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	28
Chalinolobus gouldii / Ozimops planiceps	166
Chalinolobus gouldii / Ozimops ridei	4
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	352
Chalinolobus gouldii / Scotorepens balstoni	631
Chalinolobus morio / Vespadelus regulus	36
Chalinolobus morio / Vespadelus vulturnus	455
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	912
Nyctophilus corbeni / Nyctophilus geoffroyi / Nyctophilus gouldi	1
Ozimops petersi/Ozimops ridei	4
Ozimops petersi / Scotorepens greyii	12
Ozimops ridei / Ozimops planiceps	60
Vespadelus darlingtoni / Vespadelus vulturnus	70

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Bat Survey Location
- Met Mast Location
- Hollow-bearing Tree
- Stick Nests
- Conservation Agreement Area
- Woodland and Swamp Plant Community Types
- NPWS Reserves
- Waterbody
- Road
- Hydroline

Note: Species in **bold** are threatened

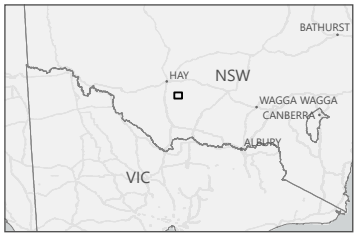


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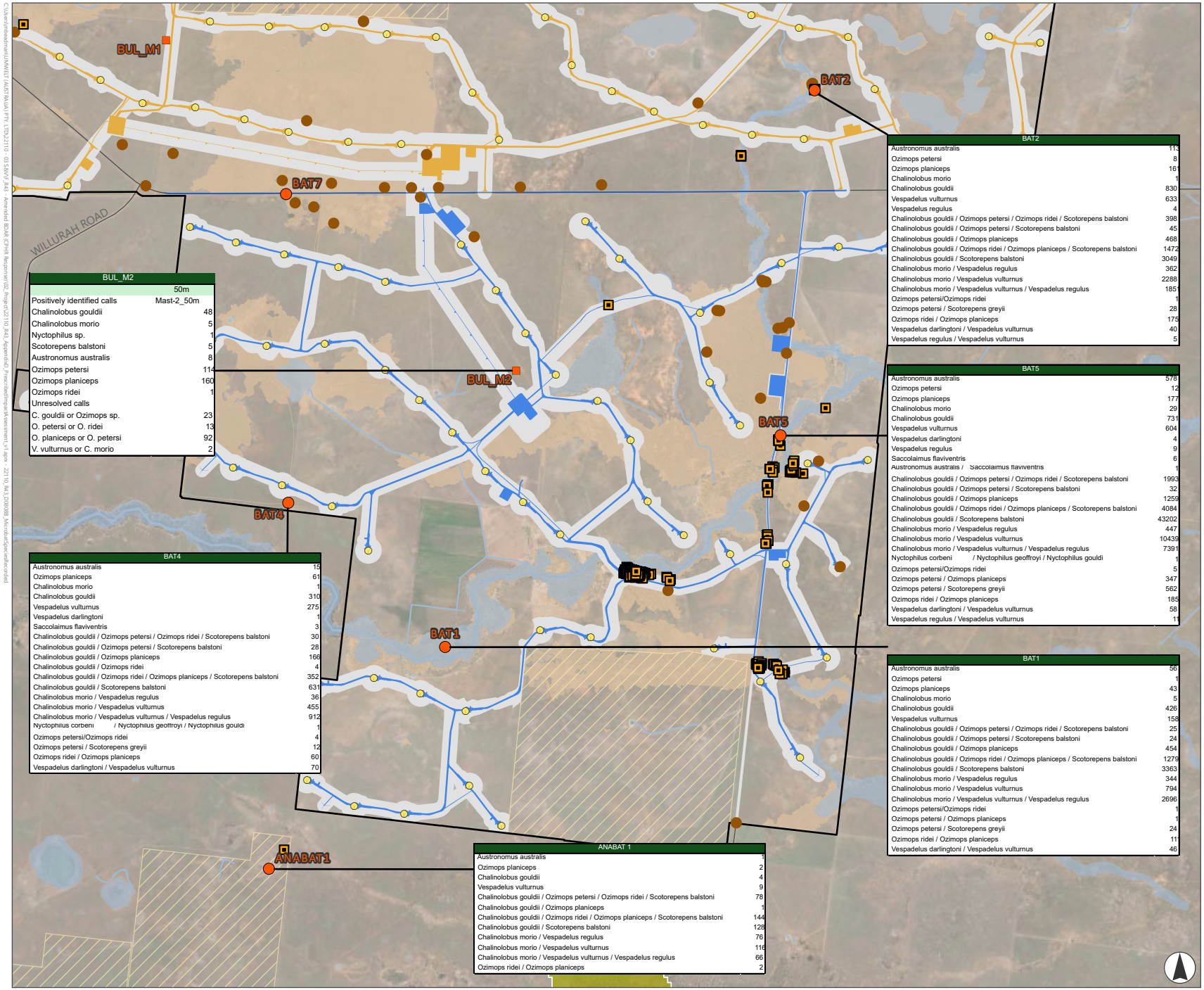
Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

FIGURE 8.8B

Location of Microbat Species Recorded within the Project Area



BUL_M2	50m
Positively identified calls	Mast-2_50m
Chalinolobus gouldii	48
Chalinolobus morio	5
Nyctophilus sp.	1
Scotorepens balstoni	5
Austronomus australis	8
Ozimops petersi	114
Ozimops planiceps	160
Ozimops ridei	1
Unresolved calls	
C. gouldii or Ozimops sp.	23
O. petersi or O. ridei	13
O. planiceps or O. petersi	92
V. vulturnus or C. morio	2

BAT2	
Austronomus australis	113
Ozimops petersi	8
Ozimops planiceps	161
Chalinolobus morio	1
Chalinolobus gouldii	830
Vespadelus vulturnus	633
Vespadelus regulus	4
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	398
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	45
Chalinolobus gouldii / Ozimops planiceps	468
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	1472
Chalinolobus gouldii / Scotorepens balstoni	3049
Chalinolobus morio / Vespadelus regulus	362
Chalinolobus morio / Vespadelus vulturnus	2288
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	185
Ozimops petersi/Ozimops ridei	1
Ozimops petersi / Scotorepens greyii	28
Ozimops ridei / Ozimops planiceps	175
Vespadelus darlingtoni / Vespadelus vulturnus	40
Vespadelus regulus / Vespadelus vulturnus	5

BAT5	
Austronomus australis	578
Ozimops petersi	12
Ozimops planiceps	177
Chalinolobus morio	29
Chalinolobus gouldii	731
Vespadelus vulturnus	604
Vespadelus darlingtoni	4
Vespadelus regulus	9
Saccolaimus flaviventris	6
Austronomus australis / Saccolaimus flaviventris	1
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	1993
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	32
Chalinolobus gouldii / Ozimops planiceps	1259
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	4084
Chalinolobus gouldii / Scotorepens balstoni	43202
Chalinolobus morio / Vespadelus regulus	447
Chalinolobus morio / Vespadelus vulturnus	10439
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	7391
Nyctophilus corbeni / Nyctophilus geoffroyi / Nyctophilus gouldi	1
Ozimops petersi/Ozimops ridei	5
Ozimops petersi / Ozimops planiceps	347
Ozimops petersi / Scotorepens greyii	562
Ozimops ridei / Ozimops planiceps	185
Vespadelus darlingtoni / Vespadelus vulturnus	58
Vespadelus regulus / Vespadelus vulturnus	11

BAT4	
Austronomus australis	15
Ozimops planiceps	61
Chalinolobus morio	1
Chalinolobus gouldii	310
Vespadelus vulturnus	275
Vespadelus darlingtoni	1
Saccolaimus flaviventris	3
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	30
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	28
Chalinolobus gouldii / Ozimops planiceps	166
Chalinolobus gouldii / Ozimops ridei	4
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	352
Chalinolobus gouldii / Scotorepens balstoni	631
Chalinolobus morio / Vespadelus regulus	36
Chalinolobus morio / Vespadelus vulturnus	455
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	912
Nyctophilus corbeni / Nyctophilus geoffroyi / Nyctophilus gouldi	1
Ozimops petersi/Ozimops ridei	4
Ozimops petersi / Scotorepens greyii	12
Ozimops ridei / Ozimops planiceps	60
Vespadelus darlingtoni / Vespadelus vulturnus	70

BAT1	
Austronomus australis	56
Ozimops petersi	1
Ozimops planiceps	43
Chalinolobus morio	5
Chalinolobus gouldii	426
Vespadelus vulturnus	158
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	25
Chalinolobus gouldii / Ozimops petersi / Scotorepens balstoni	24
Chalinolobus gouldii / Ozimops planiceps	454
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	1279
Chalinolobus gouldii / Scotorepens balstoni	3363
Chalinolobus morio / Vespadelus regulus	344
Chalinolobus morio / Vespadelus vulturnus	794
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	2696
Ozimops petersi/Ozimops ridei	1
Ozimops petersi / Ozimops planiceps	1
Ozimops petersi / Scotorepens greyii	24
Ozimops ridei / Ozimops planiceps	11
Vespadelus darlingtoni / Vespadelus vulturnus	46

ANABAT 1	
Austronomus australis	1
Ozimops planiceps	2
Chalinolobus gouldii	4
Vespadelus vulturnus	9
Chalinolobus gouldii / Ozimops petersi / Ozimops ridei / Scotorepens balstoni	78
Chalinolobus gouldii / Ozimops planiceps	1
Chalinolobus gouldii / Ozimops ridei / Ozimops planiceps / Scotorepens balstoni	144
Chalinolobus gouldii / Scotorepens balstoni	128
Chalinolobus morio / Vespadelus regulus	76
Chalinolobus morio / Vespadelus vulturnus	116
Chalinolobus morio / Vespadelus vulturnus / Vespadelus regulus	66
Ozimops ridei / Ozimops planiceps	2

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Bat Survey Location
- Woodland and Swamp Plant Community Types
- Conservation Agreement Area
- Floodplain Wetland
- Waterbody
- Road
- Hydroline

Note: Species in **bold** are threatened

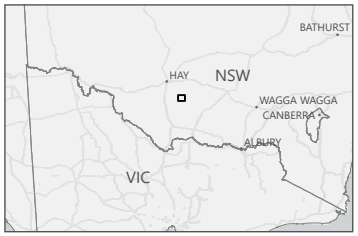


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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

9.0 Impact Avoidance Behaviour

Criterion a (vi) predict the impact of avoidance behaviour for migratory species relative to migration distances, and the availability of suitable habitat for breeding, feeding and resting over the migration route

Avoidance behaviour is considered to be a behavioural change by a particular species whereby either specific habitat, a locality or a wider region is avoided. The potential influence that indirect impacts associated with such avoidance behaviour may have on migratory or partly migratory species is difficult to predict given the lack of relevant information available in Australia. Assessment against such criterion will be only possible through the preparation (i.e., completion of baseline monitoring) and subsequent implementation (i.e., ongoing monitoring) of the Bird and Bat Adaptative Management Plan (BBAMP) for the Project.

Turbines spaced closely together have the potential to increase the inherent risk associated with barrier effects and changes in flight behaviour. Where turbine spacing is too close (for example, <200 m between RSA edges), it can impact flight behaviours (Tulp et al. 1999, Percival 2001). Turbine spacing within the Project Area is typically a minimum of approximately 900 metres apart, meaning RSA separation is typically at minimum 700 metres apart.

While the turbine layout occurs in an east-west alignment, the spacing between turbines is considered sufficient to allow for meso-scale avoidance of turbine (i.e. avoidance between individual turbines). Larger, high-flying species may avoid the wind farm entirely, while smaller and more manoeuvrable species may also avoid individual turbine blades. Overall, the barrier effect generated by the project is considered limited, as breeding habitat for migratory species within the site is generally absent, foraging and resting habitat will be largely retained, and the large spacing of turbines would allow for thoroughfare through the project area. **Figure 12.1** below provides an indicative map of migratory species routes within Australia and shows that the Project Area forms only a small part of the suitable habitat for these species.

10.0 Justification of Likelihood and Nature of Impact Predictions

Criterion b: Justify predictions with reference to data, collision risk modelling (if available), relevant literature or other published sources including any publications by the Department

Refer to **Section 8.0**.

11.0 Disturbance Zones

Criterion c: Map the disturbance zone around wind turbines, and the significant landscape and habitat features within that zone, for species likely to be affected, e.g., hollow bearing trees and important habitat for migratory species.

11.1 Turbine Disturbance Zones

As per Section 8.3.5(c) of the BAM (DPIE 2021a), the disturbance zones around the up to 143 proposed WTGs have been identified in **Figure 11.1A-D** to **Figure 11.2A-D**. A 200 m buffer (i.e. 200 m radius) for each proposed wind turbine has been applied as the disturbance zone, which encompasses the 100 m rotor radius considered for the Project. Each disturbance area is approximately 125,664 m^2 or 12.6 ha per turbine. Across the entire Project (i.e. 143 WTGs), these disturbance zones represent a total area of approximately 17,969,952 m^2 or 1,797 ha. It is noted that this demonstration of the disturbance zones of the Project for the Type A (larger) WTG scenario that is described in **Section 1.1**. This is the maximum proposed disturbance zone for turbine related impacts.

11.2 Turbine Risk Assessment

The WTGs risk assessment has been developed based on known risk factors of the Project Area. It also includes additional criteria that would be implemented during operation in the Bird and Bat Adaptive Management Plan (BBAMP) based on actual recorded impacts. As such, these additional criteria cannot be utilised as this preliminary stage as only baseline data is available. Updates to these criteria can be made during operational management of the Project (with justification) based on any other relevant risks that are observed during operation. The results of operational monitoring can subsequently be used to change risk ratings.

The potential risk of impact to threatened species associated with turbine placement, barriers to movement and potential collision with turbine blades, has been assessed on a per turbine basis. Factors considered when assessing the risk associated with the turbines prior to any operational mitigation measures and strategies being implemented include:

- Bird utilisation surveys results – proportion of total flights.
- Bird utilisation survey results – proportion of flights within the Rotor Swept Area.
- Distance to wetlands.
- Distance to hydrological features (creeks, streams and dams).
- Distance to stick nests.
- Distance to hollow-bearing trees.
- Distance to forest, woodland and swamp vegetation.

- Bird utilisation survey results – proportion of flights by ‘at risk’ species, and presence of incidental records of ‘at risk’ species.
- Bat utilisation survey results - proportion of flights by ‘at risk’ species.

Following preparation of the risk-based assessment of the Project, an assessment to differentiate the assessed risk of turbine strike for each proposed wind turbine has been undertaken. The parameters and rating system used to assign risk ratings are presented in **Table 11.1** below. Further discussion of the assessment and limitations in the assessment of these parameters is also provided in **Section 11.2.1**.

Table 11.1 Turbine Risk Rating Parameters and Rating System

Bird Utilisation – Number of Records	Score	Bird Utilisation – RSA	Score	Distance to wetlands	Score	Distance to hydrology	Score	Distance to stick nest	Score	Distance to HBT	Score	Distance to vegetation	Score	Bird Risk Rating	Score	Bat Risk Rating	Score
Low (0–6.9% of total flights)	1	>80% below RSA	1	Far (>1,000 m)	1	Far (>1,000 m)	1	Far (>1,000 m)	1	Far (>1,000 m)	1	Far (>1,000 m)	1	Majority Negligible	1	Majority Negligible	1
Moderate (7–8.9% of total flights)	2	>80% above (>) RSA	1.5	Near (<1,000 m)	2	Near (<1,000 m)	2	Near (<1,000 m)	2	Near (<1,000 m)	2	Near (<1,000 m)	2	Majority Negligible and Minor	1.5	Majority Negligible and Minor	1.5
High (8.9–10.01% of total flights)	3	>15% of flights within (<->) RSA	2	Close (<500 m)	3	Close (<500 m)	3	Close (<500 m)	3	Close (<500 m)	3	Close (<500 m)	3	Majority Minor	2	Majority Minor	2
Very High (>10.01% of total flights	4	>20% of flights within (-) RSA	3	Very Close (<200 m)	4	Very Close (<200 m)	4	Very Close (<200 m)	4	Very Close (<200 m)	4	Very Close (<200 m)	4	Majority Minor and Moderate	2.5	Majority Minor and Moderate	2.5
-	-	>25% of flights within (-) RSA	4	-	-	-	-	-	-	-	-	-	-	Majority Moderate	3	Majority Moderate	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	Majority High	4	Majority Moderate and High	3.5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Majority High	4

11.2.1 Turbine Risk Assessment Methodology

The following methodology was utilised to assess the relative risk of turbines within the Subject Land. A detailed table summarising the outcomes of the methodology below is provided in **Appendix 2**.

Bird Utilisation – Number of Records

Each proposed turbine location was assigned a bird survey vantage point (VP) based on the nearest linear VP to the turbine. This allowed for the identification of localised variations in bird activity, relative to the habitats available in proximity to the turbines rather than generalised activity levels across PCTs (which may have homogenised data across large areas, missing the nuances of habitat availability and bird activity across the Subject Land). The proportions of total flights detected across all surveys were compared between these points, and a relative score was given based on the proportion in comparison to total flights. A score between 1 and 4 was given for the following proportions of flights:

- Low (0–6.9% of total flights) – 1.
- Moderate (7–8.9% of total flights) – 2.
- High (8.9–10.01% of total flights) – 3.
- Very High (>10.01% of total flights) – 4.

Scores ranged from 1–4 for VPs.

A limitation to this score is that the proportions assume equal survey effort across all sites, which did not occur.

Bird Utilisation – Turbine Type A

Raw data were analysed to determine the total number of flights detected at each VP below, within and above the Rotor Swept Area (RSA) of Turbine Type A, having a lower RSA of 100 m and an upper RSA of 300 m. Data were assessed to determine whether any component of the flight fell within the RSA (e.g. flight commenced at 50 m, but reached a maximum height of 200 m), and only flights which were wholly below or above RSA were categorised as such. The proportion of flights at each VP were then categorised into below, within and above RSA, and a score given based on the proportions of flights within those heights. The following metrics were then used to determine a risk weighting of the VPs:

- >85% below RSA – 1
- >85% above (>) RSA – 1.5
- >15% of flights within (<->) RSA – 2
- >20% of flights within (-) RSA – 3
- >25% of flights within (-) RSA – 4.

Each proposed turbine location was then assigned a VP based on the nearest linear VP to the turbine. Scores ranged from 1–2 for VPs, and these scores were assigned to each turbine.

A limitation to this score is that the proportions assume equal survey effort across all sites, which did not occur.

Bird Utilisation – Turbine Type B

Raw data were analysed to determine the total number of flights detected at each VP below, within and above the Rotor Swept Area (RSA) of Turbine Type B, having a lower RSA of 60 m and an upper RSA of 240 m. Data were assessed to determine whether any component of the flight fell within the RSA (e.g. flight commenced at 50 m, but reached a maximum height of 200 m), and only flights which were wholly below or above RSA were categorised as such. The proportion of flights at each VP were then categorised in to below, within and above RSA, and a score given based on the proportions of flights within those heights. The following metrics were then used to determine a risk weighting of the VPs:

- >85% below RSA – 1
- >85% above (>) RSA – 1.5
- >15% of flights within (<->) RSA – 2
- >20% of flights within (-) RSA – 3
- >25% of flights within (-) RSA – 4.

Each proposed turbine location was then assigned a VP based on the nearest linear VP to the turbine. Scores ranged from 1–4 for VPs, and these scores were assigned to each turbine. This indicates that Turbine Type B represents a greater risk of bird strike than Turbine Type A.

A limitation to this score is that the proportions assume equal survey effort across all sites, which did not occur.

Distance to Wetlands

Distance to habitat features was used as a metric to assess risk that turbines may present to species utilising those features. This included distance to mapped wetlands, with scores determined based on the distance to these features. Distance to features and their associated scores are defined below:

- Far (>1,000 m) – 1.
- Near (<1,000 m) – 2.
- Close (<500 m) – 3.
- Very Close (<200 m) – 4.

Each turbine was buffered at these distances and any intersects with features identified, and scores assigned per turbine. All turbines scored 1 (wetlands >1000 m) for this metric.

Limitations to this metric are that waterbodies may or may not contain water at any given point in time (e.g. in drought years, or when irrigation channels are not in use) and therefore may represent a higher risk than actually present at any given time.

Distance to Hydrology

Distance to habitat features was used as a metric to assess risk that turbines may present to species utilising those features. This included distance to mapped hydrological features, including dams, creeks and drainage channels. Scores were determined based on the distance to these features. Distance to features and their associated scores are defined below:

- Far (>1,000 m) – 1.
- Near (<1,000 m) – 2.
- Close (<500 m) – 3.
- Very Close (<200 m) – 4.

Each turbine was buffered at these distances and any intersects with features identified, and scores assigned per turbine. Scores ranged from 1–4 for this metric, indicating that some turbines were in very close proximity to hydrological features.

Limitations to this metric are that waterbodies may or may not contain water at any given point in time (e.g. in drought years, or when irrigation channels are not in use) and therefore may represent a higher risk than actually present at any given time.

Distance to Stick Nest

Distance to habitat features was used as a metric to assess risk that turbines may present to species utilising those features. This included distance to mapped stick nests, which may be utilised by larger species such as raptors as a breeding resource. Scores were determined based on the distance to these features. Distance to features and their associated scores are defined below:

- Far (>1,000 m) – 1.
- Near (<1,000 m) – 2.
- Close (<500 m) – 3.
- Very Close (<200 m) – 4.

Each turbine was buffered at these distances and any intersects with features identified, and scores assigned per turbine. Scores ranged from 1–4 for this metric, with the majority being ranked 1, however these scores indicate that some turbines were in very close proximity to mapped stick nests.

Limitations to this metric are that stick nest presence may fluctuate based on environmental conditions (such as destruction in high winds), may or may not contain species during different times of the year, and may not have been mapped in their entirety across the project site.

Distance to HBT

Distance to habitat features was used as a metric to assess risk that turbines may present to species utilising those features. This included distance to mapped Hollow-bearing Trees (HBTs), which may be utilised by a range of bird and bat species. Scores were determined based on the distance to these features. Distance to features and their associated scores are defined below:

- Far (>1,000 m) – 1.
- Near (<1,000 m) – 2.
- Close (<500 m) – 3.
- Very Close (<200 m) – 4.

Each turbine was buffered at these distances and any intersects with features identified, and scores assigned per turbine. Scores ranged from 1–4 for this metric, with the majority being ranked 1, however these scores indicate that some turbines were in very close proximity to mapped HBTs.

Limitations to this metric are that hollows may or may not contain species during different times of the year, and may not have been mapped in their entirety across the project site.

Distance to Vegetation

Distance to habitat features was used as a metric to assess risk that turbines may present to species utilising those features. This included distance to mapped woodland, forest and swamp vegetation, which may be utilised by a range of bird and bat species for foraging, perching and nesting. Scores were determined based on the distance to these features. Distance to features and their associated scores are defined below:

- Far (>1,000 m) – 1.
- Near (<1,000 m) – 2.
- Close (<500 m) – 3.
- Very Close (<200 m) – 4.

Each turbine was buffered at these distances and any intersects with features identified, and scores assigned per turbine. Scores ranged from 1–4 for this metric, with a large proportion being ranked 4, indicating that a high number of turbines occur in proximity to these habitat types.

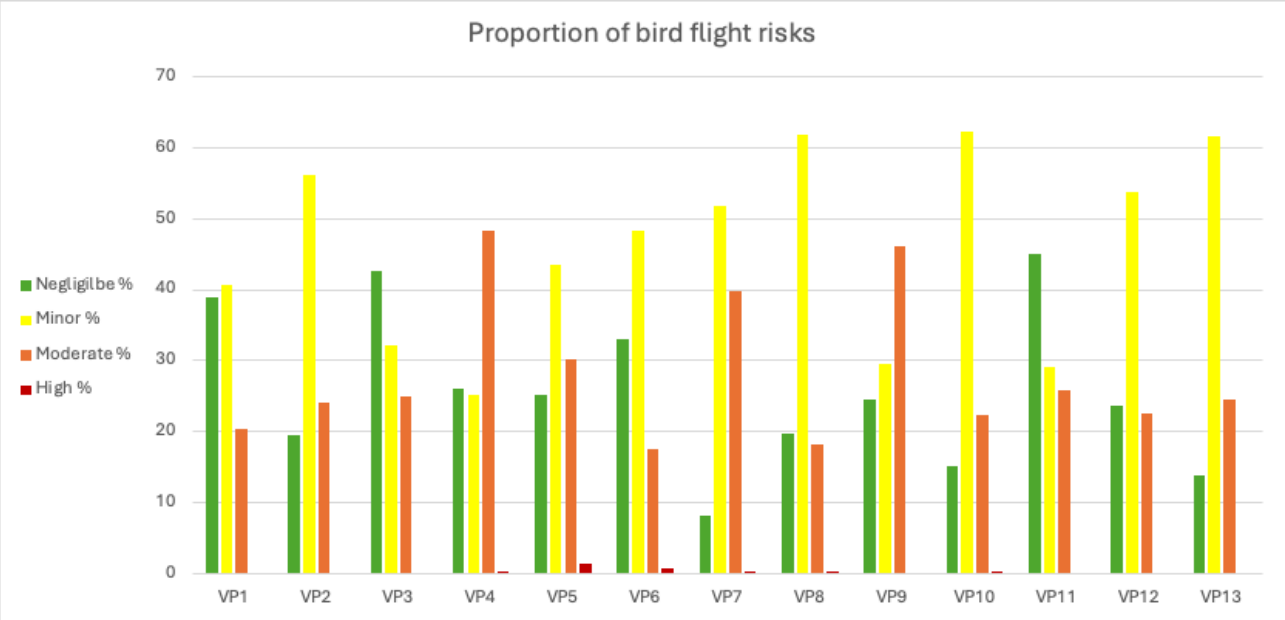
Limitations to this metric are that many bird species also utilise non-woody and non-swamp vegetation (such as chenopod shrubland) for foraging and perching, and artificial structures (such as transmission lines and poles) for perching and nesting, which are not captured within this metric.

Bird Risk Rating

Bird risk rating was assessed using data from the Prescribed Impact Assessment appendix to the BDAR, whereby birds considered at risk of turbine strike were given a rating of the severity of risk to the species (Negligible, Minor, Moderate, High) based on understanding of the species utilisation of the Project Area, flight behaviour, records within the bird utilisation surveys, and status of the species across its range. Each species was assigned a risk rating, then an analysis undertaken of the bird survey data at each VP. Scores were assigned based on the total number of flights observed at each VP per species as a proportion of total flights, and are defined below:

- Majority Negligible – 1.
- Majority Negligible and Minor – 1.5.
- Majority Minor – 2.
- Majority Minor and Moderate – 2.5.
- Majority Moderate – 3.
- Majority High – 4.

Each proposed turbine location was then assigned a VP based on the nearest linear VP to the turbine. Scores ranged from 1–4 for VPs, and these scores were assigned to each turbine. **Graph 11.1** below shows the spread of species flights based on their risk ratings per VP. VP4, VP5, VP7, VP9 had a high proportion of moderate risk species.



Graph 11.1 Bird Flight Risk Proportions

An additional score was assigned to this metric to account for the presence of incidental species records which did not fall into the bird utilisation surveys. Incidental records were mapped, and a linear distance calculated to the nearest turbine. The record was then assigned to that turbine. Where species were moderate or high risk, these added an additional 0.5 or 1 to the score, respectively, with species being cumulative (e.g. VP scored 1.5 for having majority negligible and minor, but then had an additional 3 moderate risk incidental species assigned to it, and 1 high risk incidental species added to it, totalling 4). This methodology was used as a way of accounting for the presence of incidental records, which are typically captured outside of bird utilisation surveys.

Limitations to this metric proportions of flights assume equal survey effort across all sites, which did not occur. Additionally, incidental records are collected in an unstructured fashion, and so may skew data to make particular locations seem higher or lower risk than others.

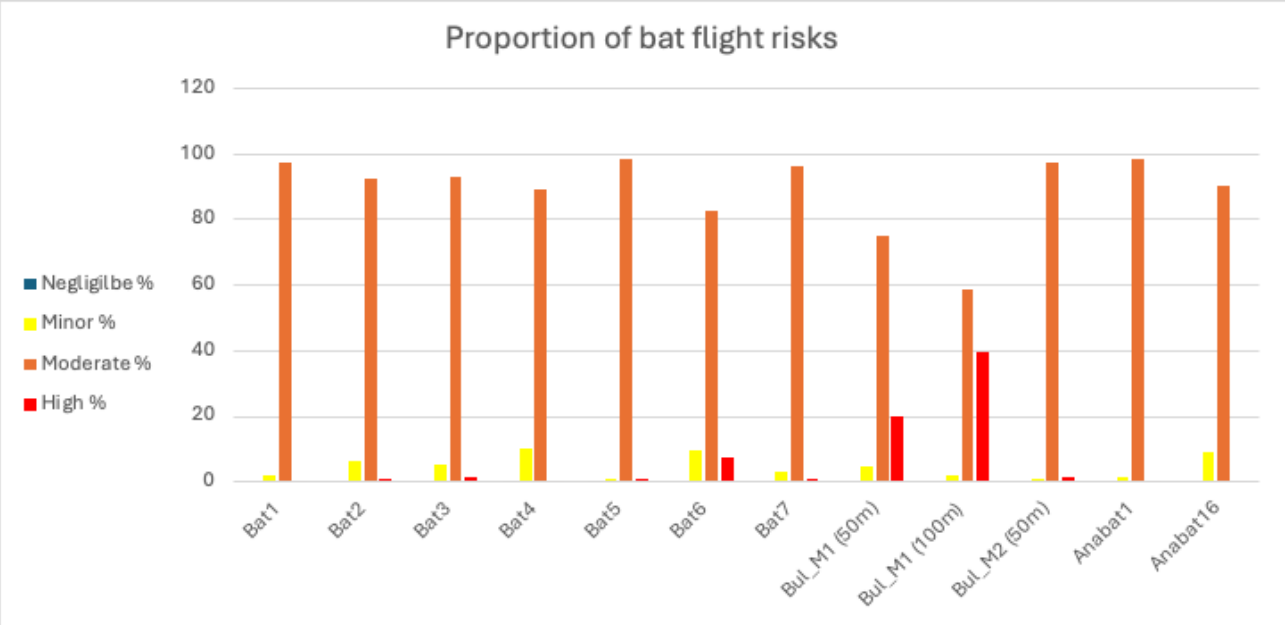
Bat Risk Rating

Bat risk rating was assessed using data from the Prescribed Impact Assessment appendix to the BDAR, whereby bats considered at risk of turbine strike were given a rating of the severity of risk to the species (Negligible, Minor, Moderate, High) based on understanding of the species utilisation of the Project Area, flight behaviour, records within the ultrasonic call detection surveys, and status of the species across its range. Each species was assigned a risk rating, then an analysis undertaken of the bat data at each detector location.

Scores were assigned based on the total number of passes observed at each detector location per species as a proportion of total flights, and are defined below:

- Majority Negligible – 1.
- Majority Negligible and Minor – 1.5.
- Majority Minor – 2.
- Majority Minor and Moderate – 2.5.
- Majority Moderate – 3.
- Majority Moderate and High – 3.5.
- Majority High – 4.

Each proposed turbine location was then assigned a detector location based on the nearest linear detector to the turbine. Scores were predominantly 3 with some being 3.5, as large volumes of the calls contained species complexes that had a range of risk categories (e.g. *Chalinolobus gouldii*/*Ozimops petersi*/*Ozimops ridei*/*Scotorepens balstoni* = Moderate/ Moderate/ Moderate/ Minor) and therefore the highest risk category was taken to represent those calls (Moderate in this example). **Graph 11.2** below shows the proportions of total calls by species risk. Of note is that the two detectors at height on Met Mast 1 (Bul_M1 50 m and Bul_M1 100 m) contained a much higher proportion of high-risk species calls (driven by *Austronomus australis*). This may indicate that ground-based detection is not the most reliable methodology for the detection of species flying with RSA height and at a higher risk of strike.



Graph 11.2 Bat Flight Risk Proportions

Limitations to this metric are that this may not represent the full data set, as all results were not available at time of reporting. Additionally, these data assume equal survey effort across sites to allow comparison, which has not occurred. Furthermore, only three of the sites included detection at or near RSA height, therefore there may be a volume of flights which were not detected but fell within the RSA area.

Turbine Risk Assessment

The methodology for the assignment of turbine risk was to compare scores across the site, rather than to score against the total possible value of the parameters detailed in **Table 11.1**. The purpose of this was to assess risk across the site, in comparison to collected data, rather than to compare to a purely numerical matrix. This methodology was undertaken by taking the total score per turbine, and comparing it to the maximum and minimum scores gained across the site. These were then divided into four units - Low, Moderate, High and Very High. A summary of findings is provided below in **Table 11.2** below, and displayed spatially in **Figure 11.3A** to **Figure 11.4D.**

Drivers of high and very high turbine risk ratings is provided in **Table 11.3** below. These higher risk turbines are typically driven by being close to survey locations which have a high proportion of total flights, having high numbers of flights within the RSA, being in close proximity to hydrology, vegetation, stick nests and HBTs, and having high bird and bat risk ratings. All values where Turbine Type A is a lower risk and Turbine Type B is a higher risk are being driven by the number of flights within the RSA, Turbine Type B being lower than Type A, and thus more birds flying at this height.

The assessments of risk are comparable only to the values collected within the Subject Land, and are not directly comparable with ratings given to any other wind farm project. While the values may show "Very High" risk, no standardised or legislated methodology exists for the assignment of risk ratings, and therefore the WTGs may have a much lower actual risk in comparison with other projects which give WTGs the same rating. The implementation of a monitoring program and adaptive mitigation measures will be directed through a BBAMP, measures included within which are detailed in **Section 13.0** below.

Table 11.2 Turbine Risk Assessment Summary

Risk Rating	Score	Turbine Type A (100–300 m)		Turbine Type B (60–240 m)	
		Count	Proportion	Count	Proportion
Low	12–15.9	32	22%	27	19%
Moderate	16–19.9	66	46%	54	38%
High	20–23.9	35	24%	44	31%
Very High	24–27.9	10	7%	18	13%
Total	-	143	100%	143	100%
Minimum recorded	12				
Max recorded	27.5				
Range	15.5				
Splits	3.9				

Table 11.3 Drivers of High and Very High Turbine Risk Ratings

WTG	Turbine Risk RSA Type A (100–300 m)	Turbine Risk RSA Type B (60–240 m)	Drivers RSA A Turbine Type A (100–300 m)	Drivers RSA B Turbine Type B (60–240 m)
27	High	High	Distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
28	High	High	Distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
30	Moderate	High	-	Flights within RSA
31	Moderate	High	-	Flights within RSA
32	Moderate	High	-	Flights within RSA
~~37~~	~~High~~	~~High~~	~~Proportion of flights, distance to vegetation, bird risk rating, bat risk rating~~	~~Proportion of flights, distance to vegetation, bird risk rating, bat risk rating~~
~~38~~	~~Very High~~	~~Very High~~	~~Proportion of flights, distance to stick nest, distance to HBT, distance to vegetation, bird risk rating, bat risk rating~~	~~Proportion of flights, distance to stick nest, distance to HBT, distance to vegetation, bird risk rating, bat risk rating~~
39	High	Very High	Proportion of flights, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
40	Moderate	High	-	Flights within RSA
41	High	Very High	Proportion of flights, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
42	High	Very High	Proportion of flights, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
43	High	Very High	Proportion of flights, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
44	Very High	Very High	Distance to hydrology, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Distance to hydrology, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating

WTG	Turbine Risk RSA Type A (100–300 m)	Turbine Risk RSA Type B (60–240 m)	Drivers RSA A Turbine Type A (100–300 m)	Drivers RSA B Turbine Type B (60–240 m)
45	High	High	Distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
50	Moderate	High	-	Flights within RSA
51	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to vegetation, bird risk rating, bat risk rating
52	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to vegetation, bird risk rating, bat risk rating
53	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to vegetation, bird risk rating, bat risk rating
70	High	High	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to HBT, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to HBT, bird risk rating, bat risk rating
71	High	High	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to HBT, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to HBT, bird risk rating, bat risk rating
80	High	High	Proportion of flights, flights within RSA, distance to hydrology, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, bird risk rating, bat risk rating
81	Very High	Very High	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to HBT, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to HBT, bird risk rating, bat risk rating
85	High	High	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nest, distance to vegetation, bird risk rating, bat risk rating
86	Moderate	High	-	Flights within RSA
87	Moderate	High	-	Flights within RSA
91	Moderate	High	-	Flights within RSA

WTG	Turbine Risk RSA Type A (100–300 m)	Turbine Risk RSA Type B (60–240 m)	Drivers RSA A Turbine Type A (100–300 m)	Drivers RSA B Turbine Type B (60–240 m)
92	Moderate	High	-	Flights within RSA
93	High	High	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
94	Moderate	High	-	Flights within RSA
96	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
101	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
102	High	Very High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
103	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
104	High	Very High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
105	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
106	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to HBT, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to HBT, distance to vegetation, bird risk rating, bat risk rating
107	High	High	Proportion of flights, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
108	Moderate	High	-	Flights within RSA
109	Moderate	High	-	Flights within RSA

WTG	Turbine Risk RSA Type A (100–300 m)	Turbine Risk RSA Type B (60–240 m)	Drivers RSA A Turbine Type A (100–300 m)	Drivers RSA B Turbine Type B (60–240 m)
110	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
111	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
112	High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
113	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to HBTs, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to HBTs, distance to vegetation, bird risk rating, bat risk rating
114	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to vegetation, bird risk rating, bat risk rating
115	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
118	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to vegetation, bird risk rating, bat risk rating
119	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bat risk rating
120	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bat risk rating
121	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
122	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating

WTG	Turbine Risk RSA Type A (100–300 m)	Turbine Risk RSA Type B (60–240 m)	Drivers RSA A Turbine Type A (100–300 m)	Drivers RSA B Turbine Type B (60–240 m)
123	High	High	Proportion of flights, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
124	Moderate	High	-	Flights within RSA
125	Moderate	High	-	Flights within RSA
126	Moderate	High	-	Flights within RSA
129	Moderate	High	-	Flights within RSA
130	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
131	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to vegetation, bird risk rating, bat risk rating
132	Very High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bat risk rating
133	High	Very High	Proportion of flights, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, distance to stick nests, distance to vegetation, bird risk rating, bat risk rating
134	High	High	Proportion of flights, distance to hydrology, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to hydrology, bird risk rating, bat risk rating
135	Moderate	Moderate	-	
136	High	High	Proportion of flights, distance to vegetation, bird risk rating, bat risk rating	Proportion of flights, flights within RSA, distance to vegetation, bird risk rating, bat risk rating
137	Moderate	High	-	Flights within RSA

Note: WTG 37 and 38 have been removed from the Amended Project.

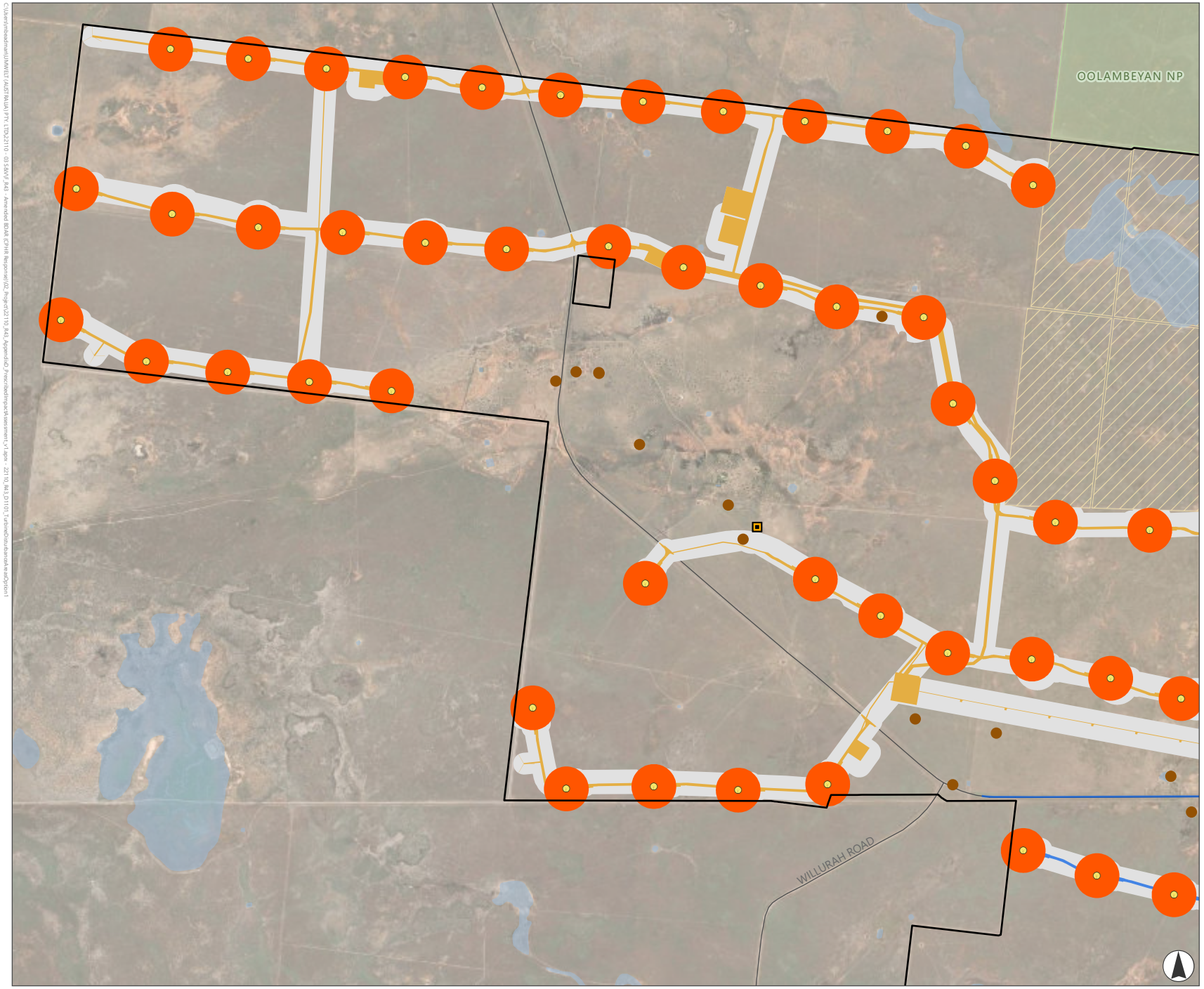


FIGURE 11.1A

Turbine Disturbance Areas - Option 1

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (200 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

0 975 1,950

Meters

Scale 1:50,000 at A4

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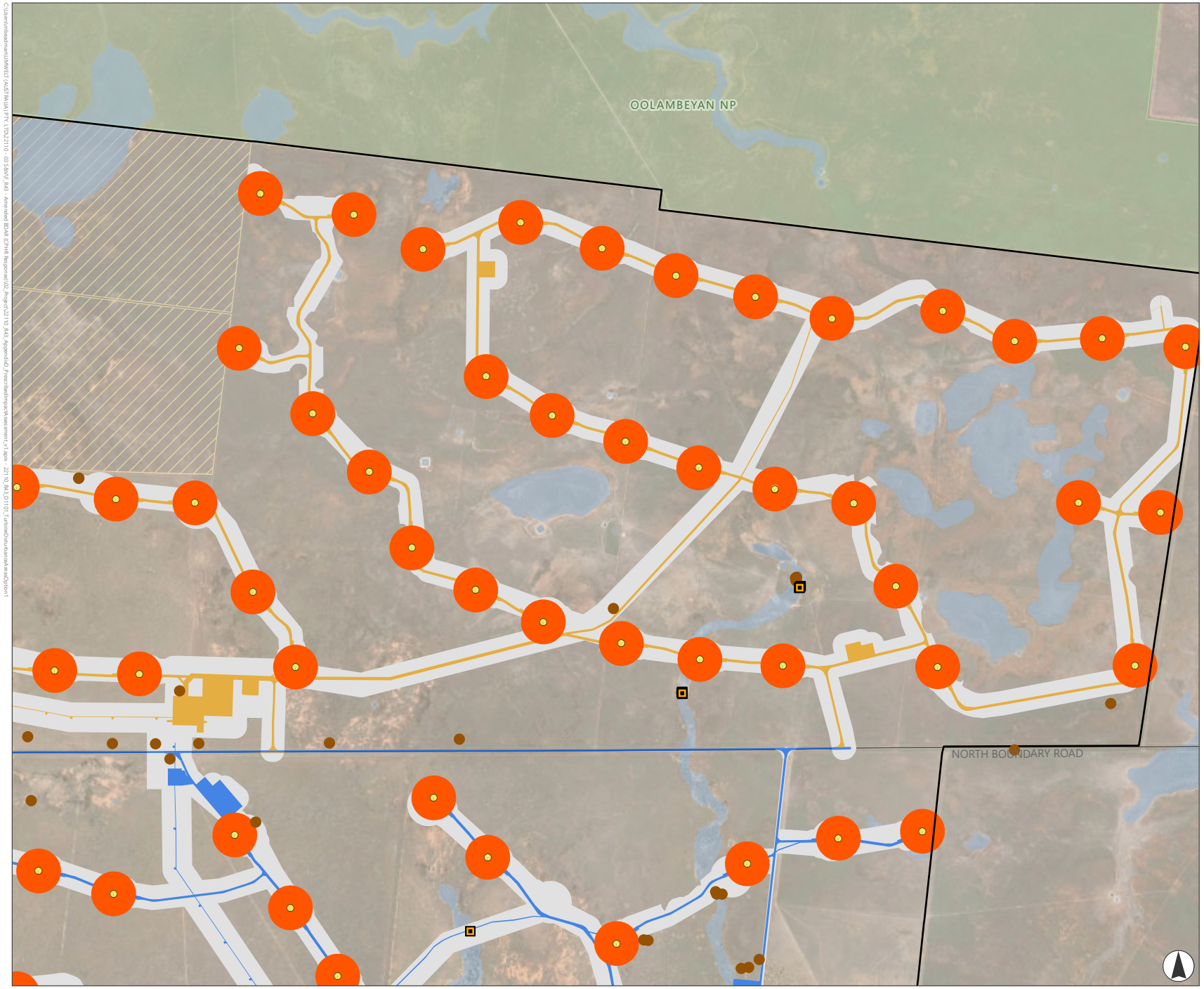

FIGURE 11.1B

Turbine Disturbance Areas - Option 1

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (200 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

0 975 1,950

Meters

Scale 1:50,000 at A4

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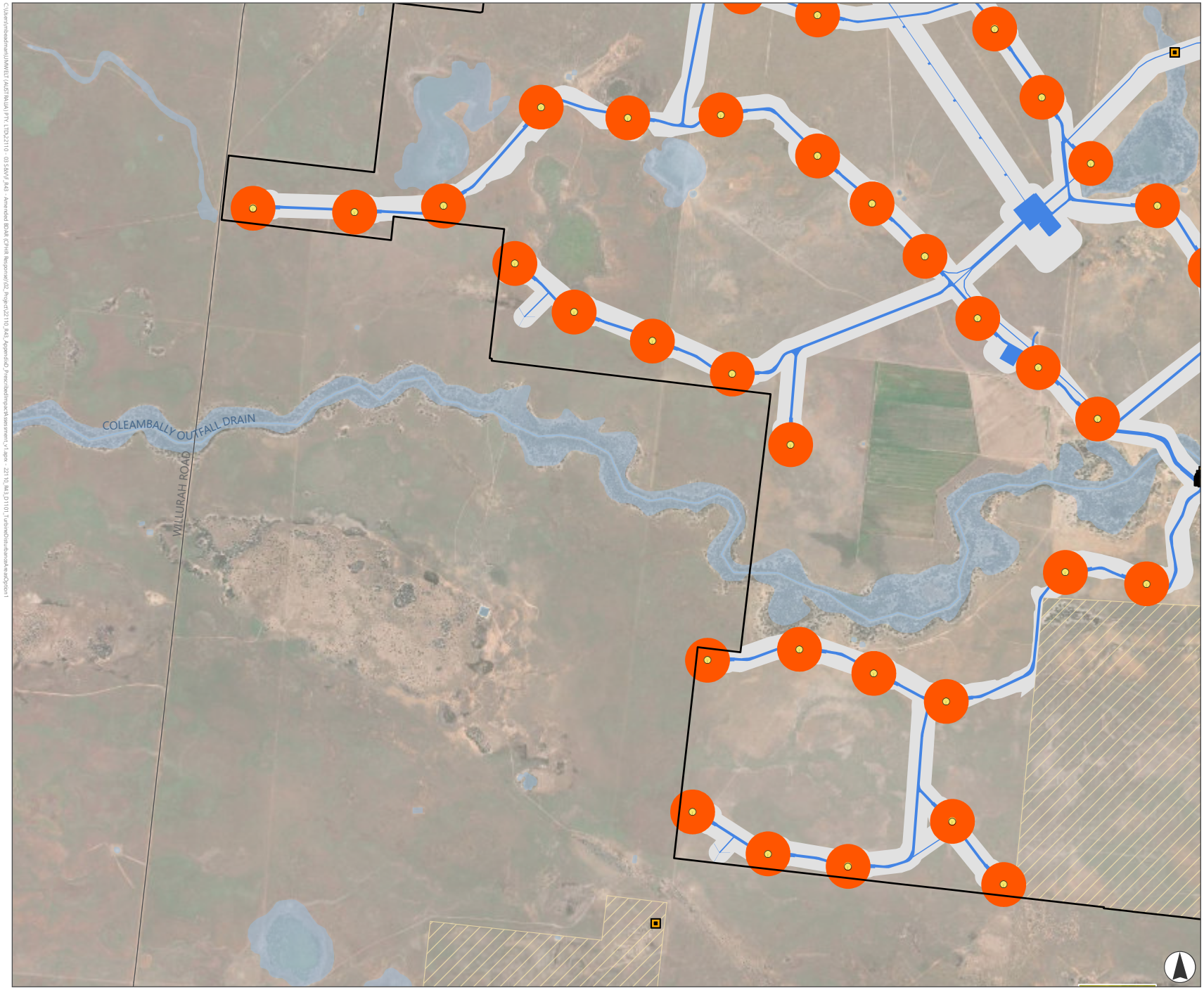

FIGURE 11.1C

Turbine Disturbance Areas - Option 1

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (200 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Road
- Hydroline

0 975 1,950

Meters

Scale 1:50,000 at A4

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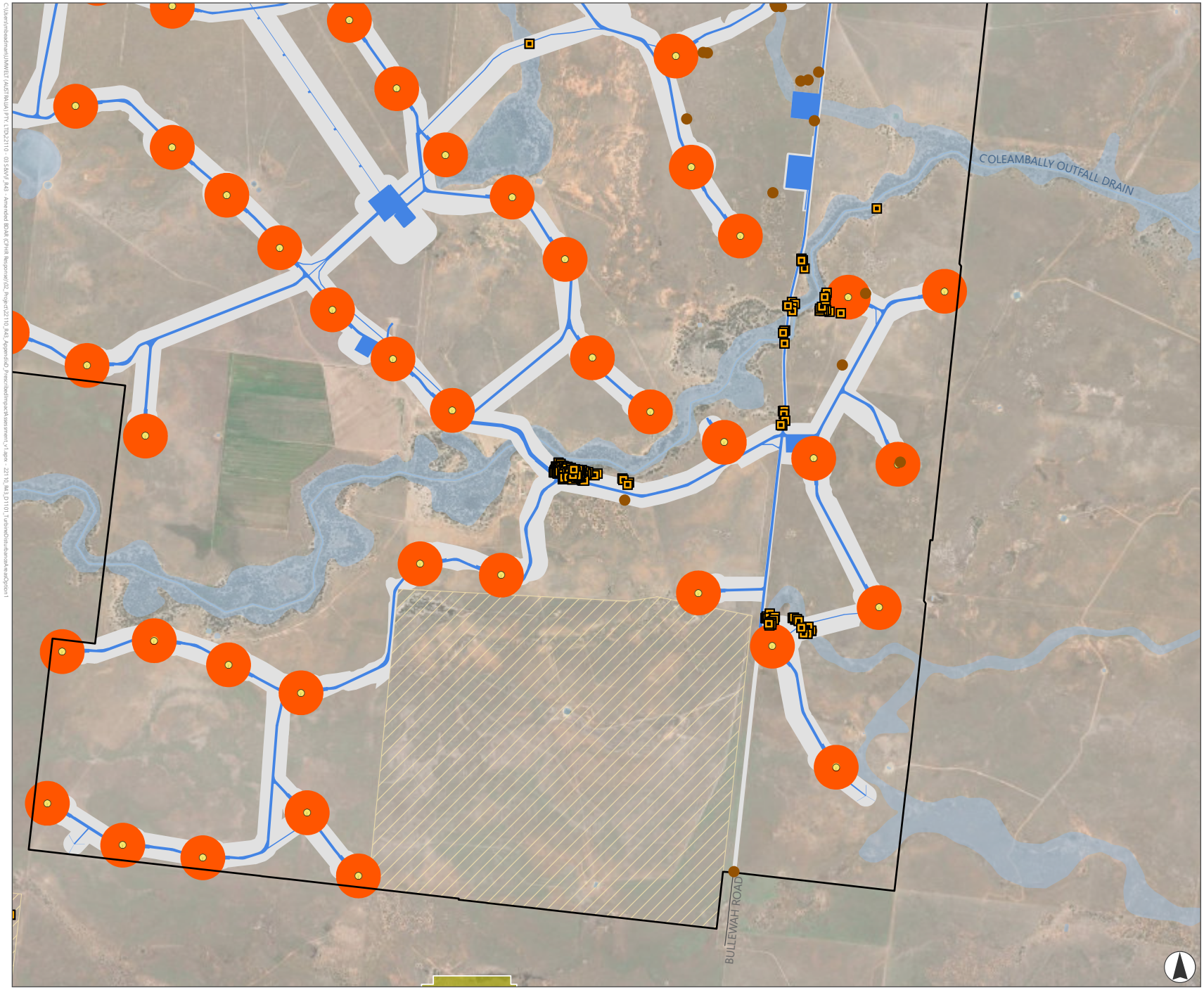
FIGURE 11.1D

Turbine Disturbance Areas - Option 1



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (200 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Stick Nests
- Road
- Hydroline

0 975 1,950

Meters

Scale 1:50,000 at A4

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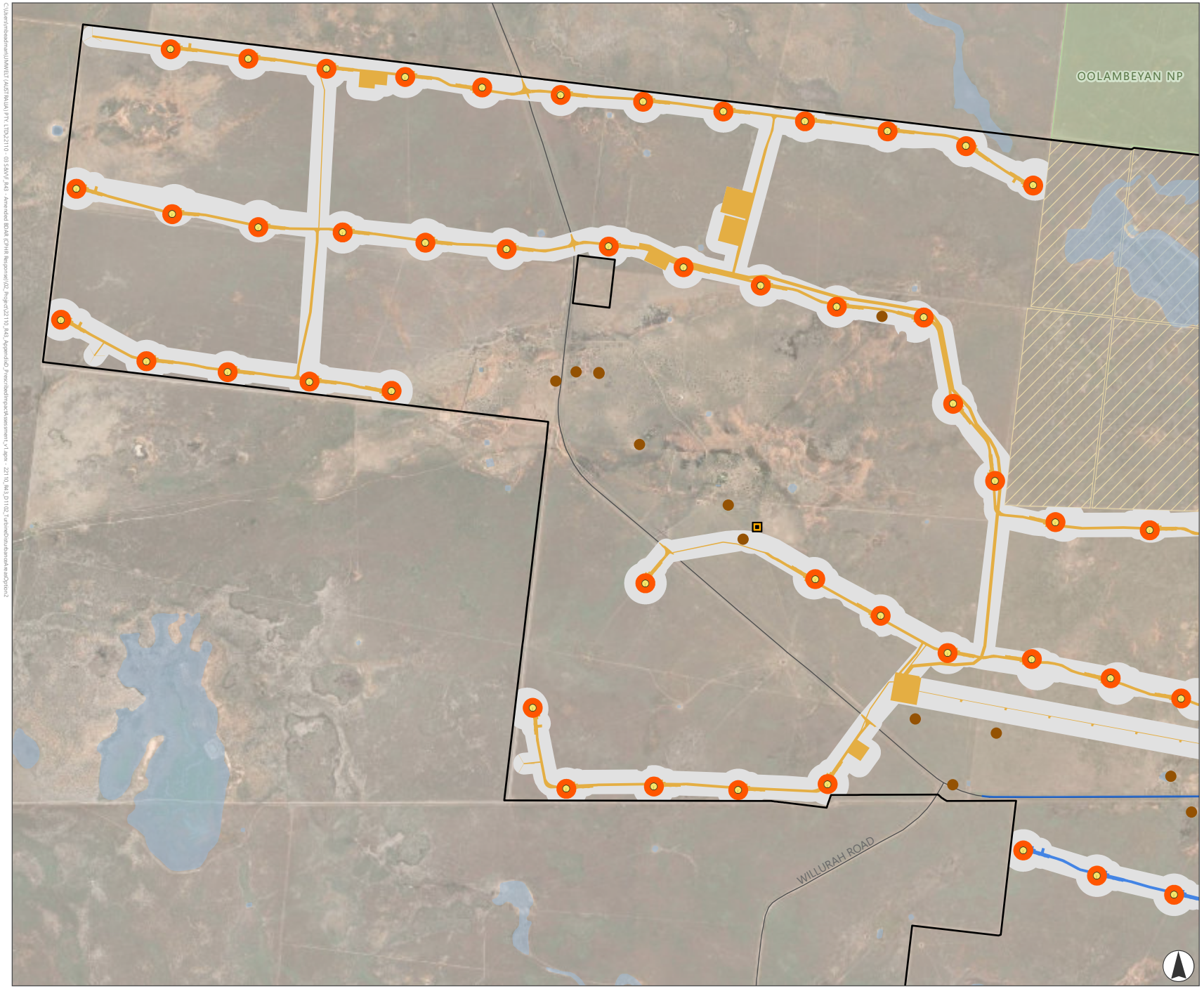

FIGURE 11.2A

Turbine Disturbance Areas - Option 2

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (83 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

0 975 1,950

Meters

Scale 1:50,000 at A4

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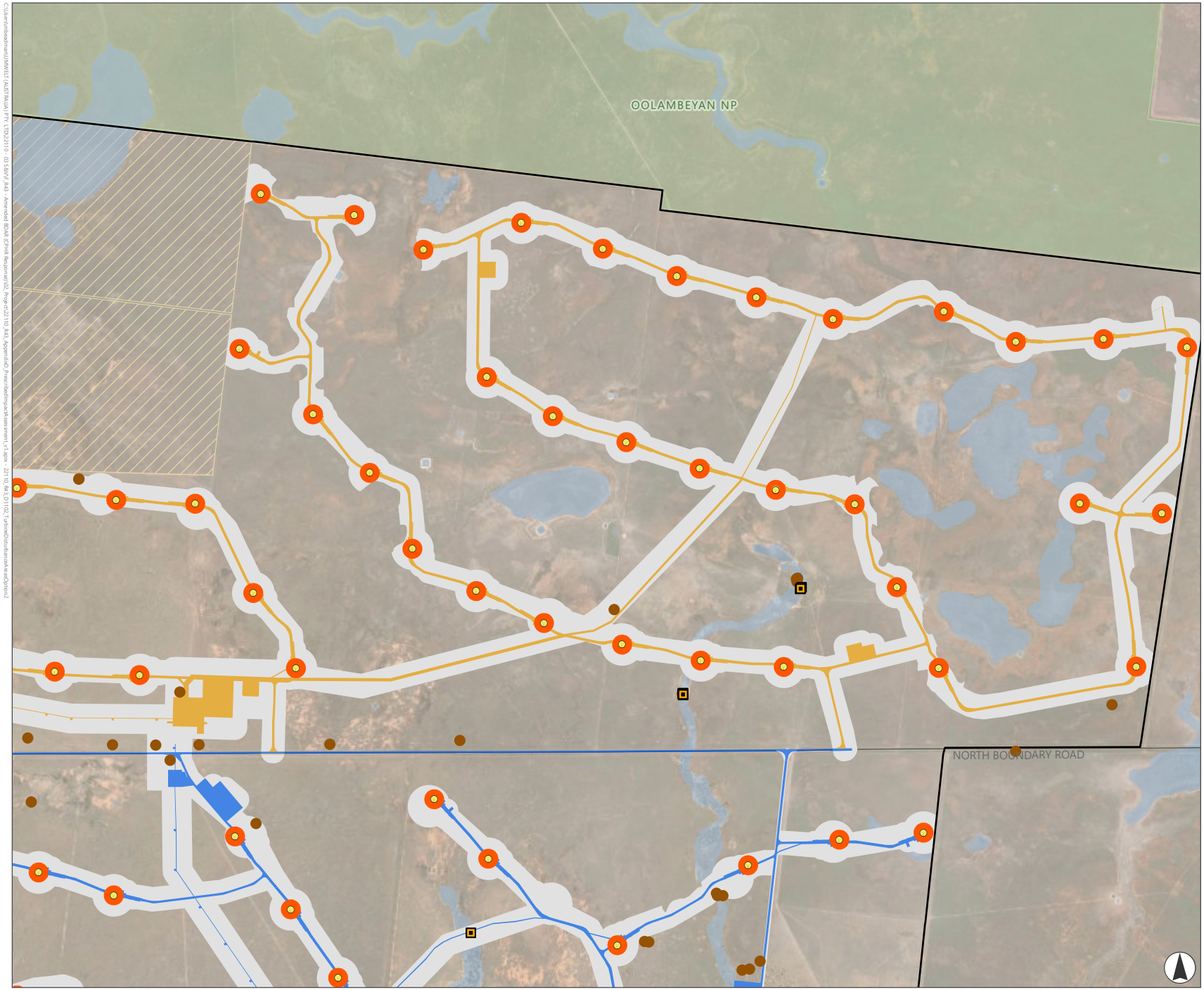
Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

FIGURE 11.2B

Turbine Disturbance Areas - Option 2



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (83 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

0 975 1,950

Meters

Scale 1:50,000 at A4

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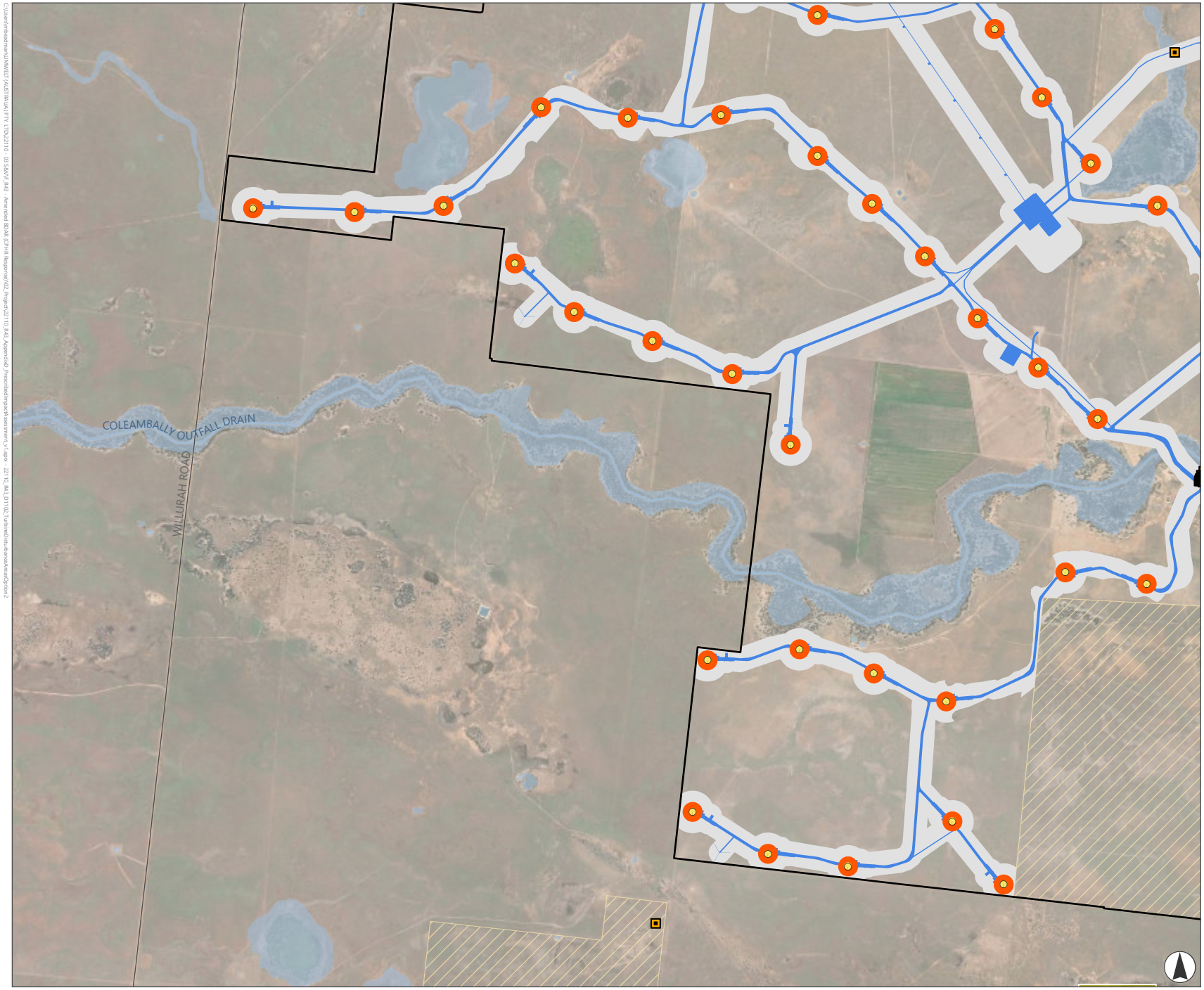

FIGURE 11.2C

Turbine Disturbance Areas - Option 2

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (83 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Road
- Hydroline

0 975 1,950

Meters

Scale 1:50,000 at A4

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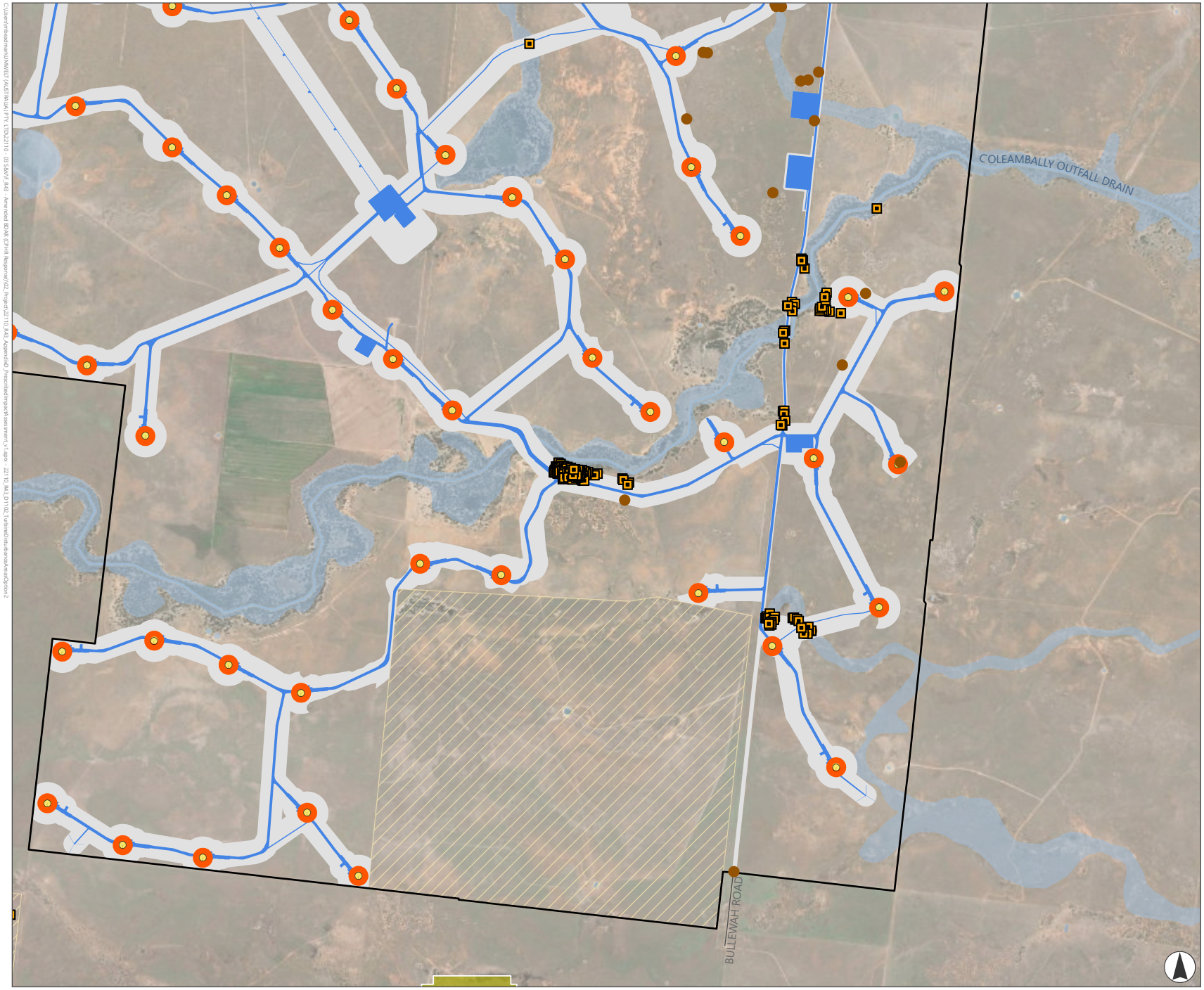
FIGURE 11.2D

Turbine Disturbance Areas - Option 2



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (83 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Stick Nests
- Road
- Hydroline

0 975 1,950

Meters

Scale 1:50,000 at A4

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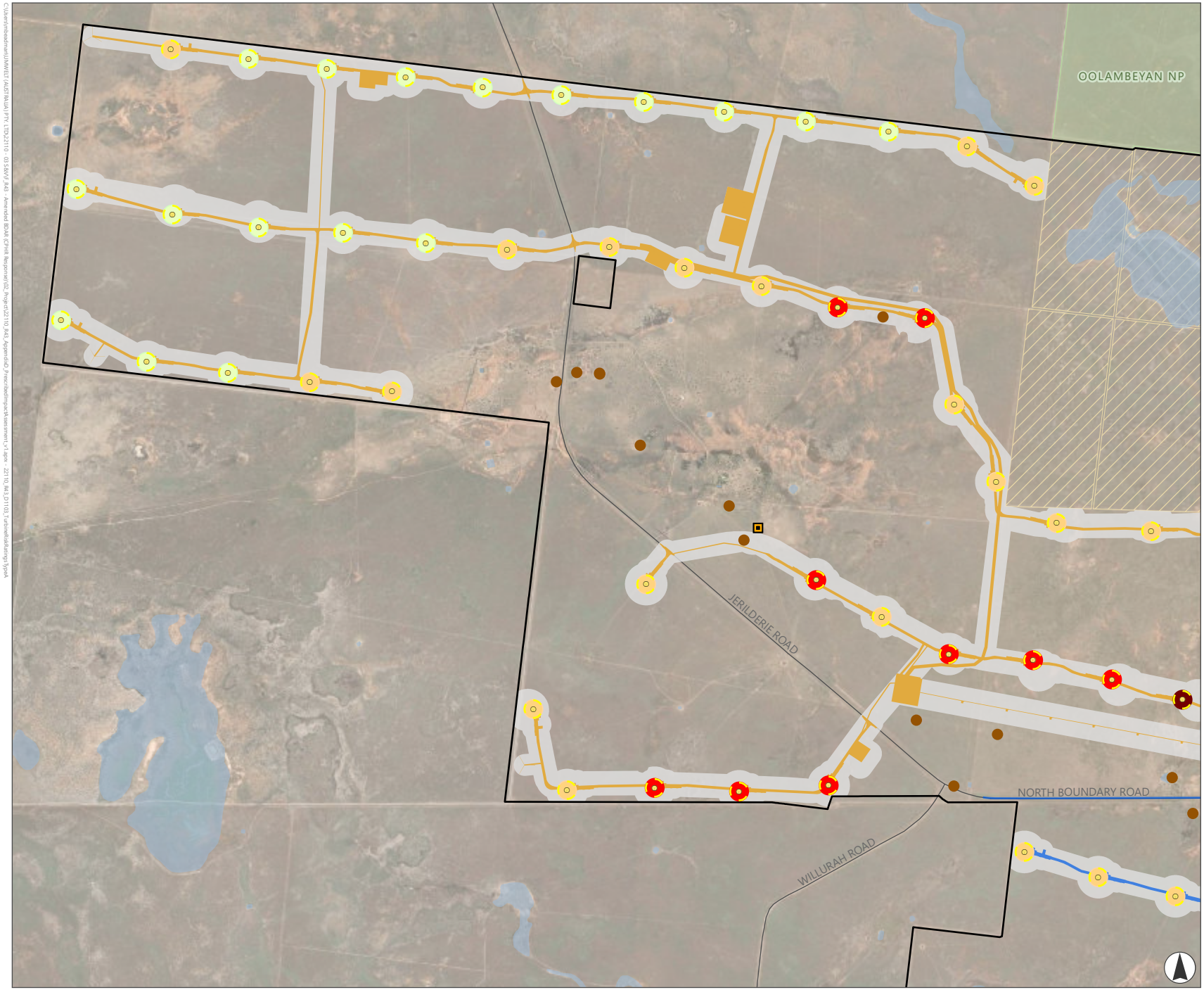
FIGURE 11.3A

Turbine Risk Ratings - Type A



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

Turbine Risk (Comparative) RSA Type A (100m-300m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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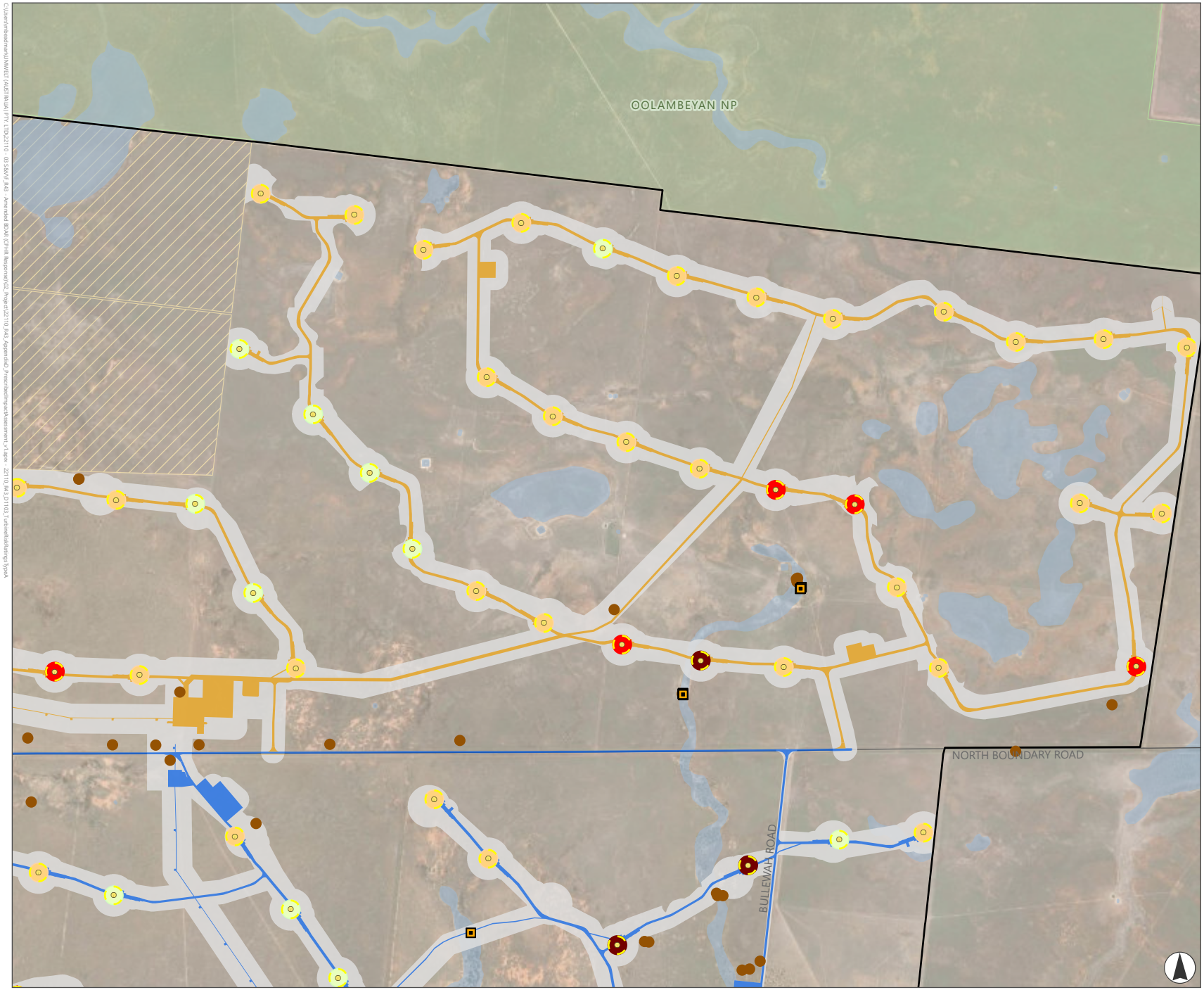
FIGURE 11.3B

Turbine Risk Ratings - Type A



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

Turbine Risk (Comparative) RSA Type A (100m-300m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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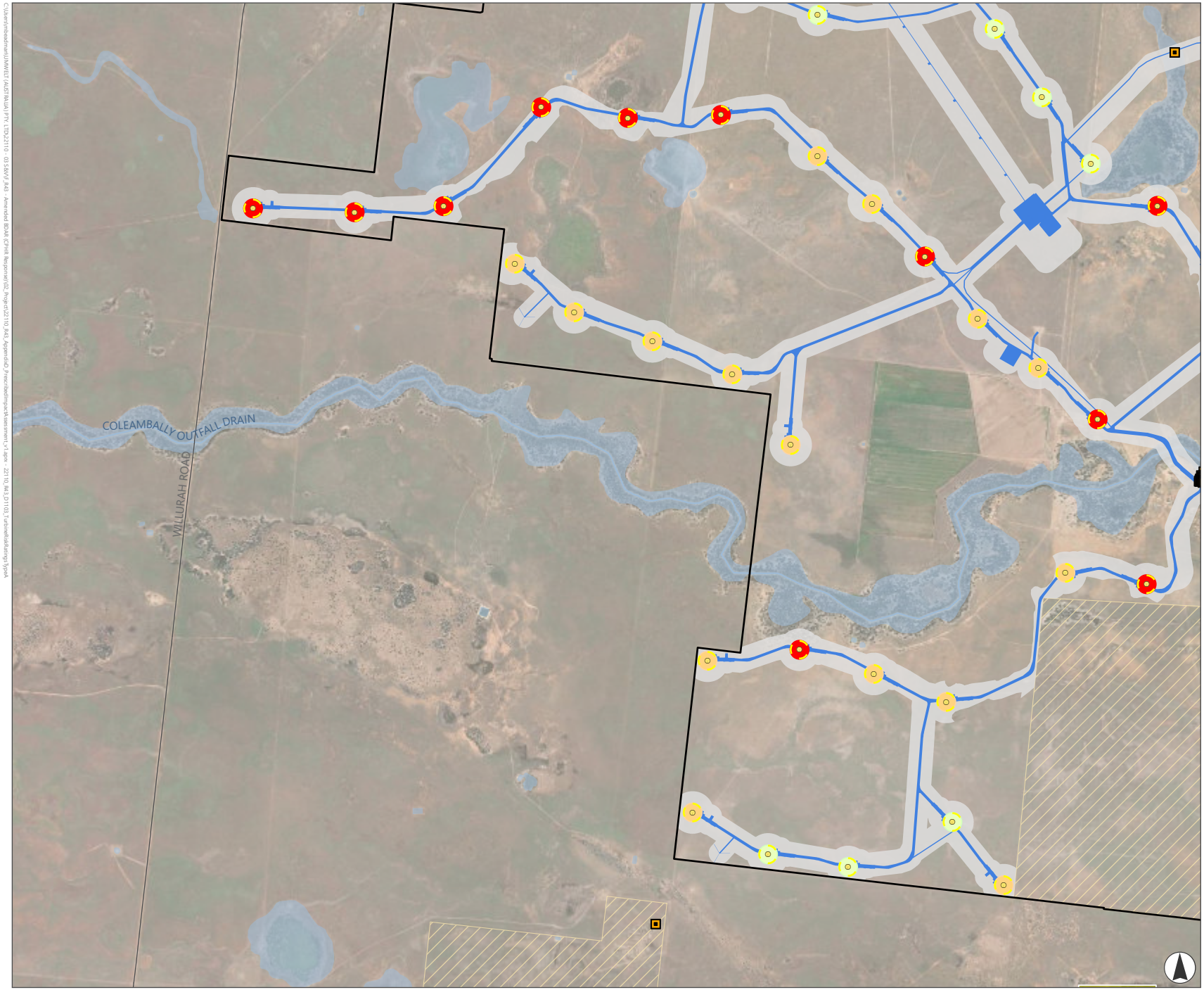

FIGURE 11.3C

Turbine Risk Ratings - Type A

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Road
- Hydroline

Turbine Risk (Comparative) RSA Type A (100m-300m)

- Low
- Moderate
- High

0 975 1,950

Meters

Scale 1:50,000 at A4

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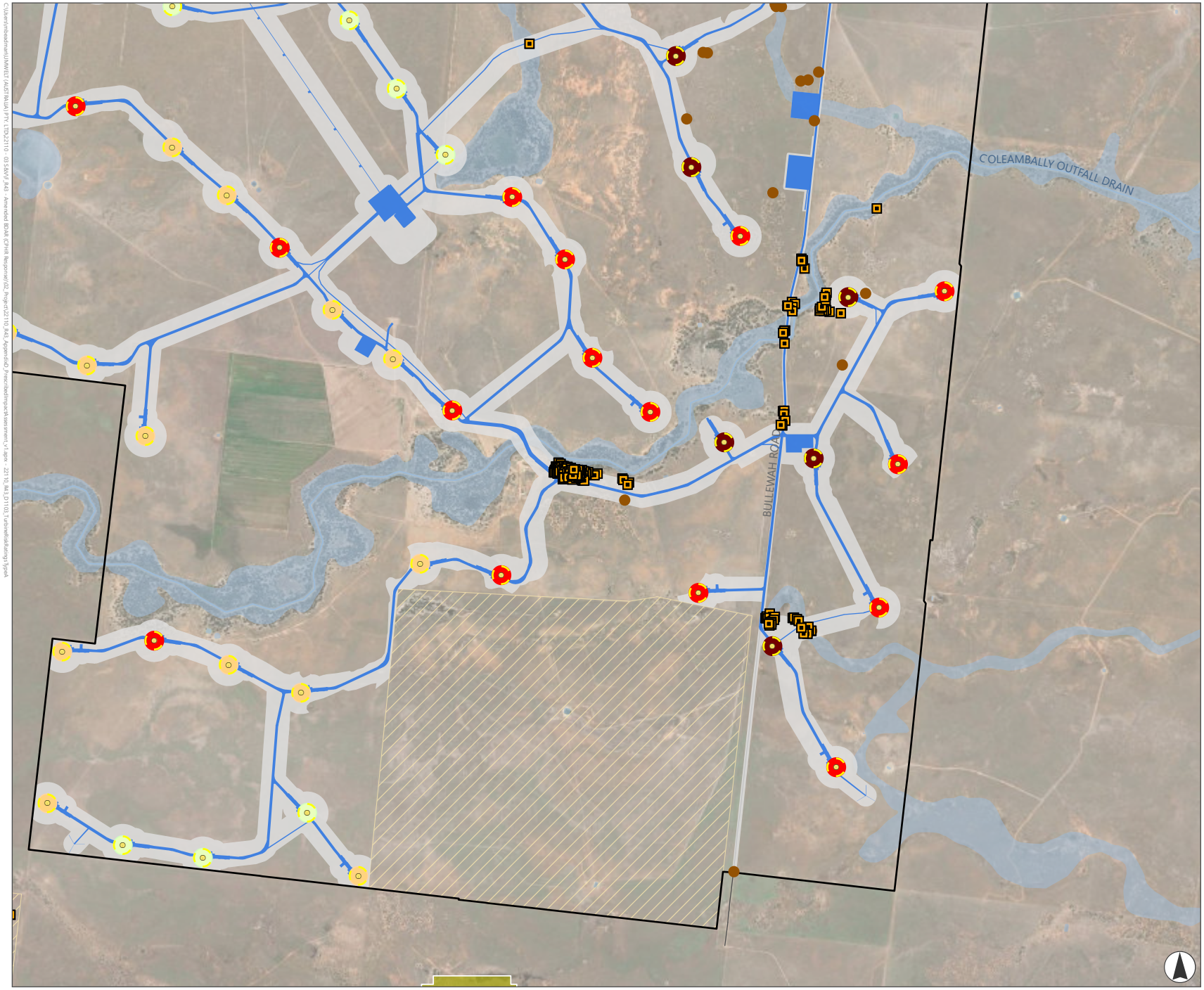
FIGURE 11.3D

Turbine Risk Ratings - Type A



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Stick Nests
- Road
- Hydroline

Turbine Risk (Comparative) RSA Type A (100m-300m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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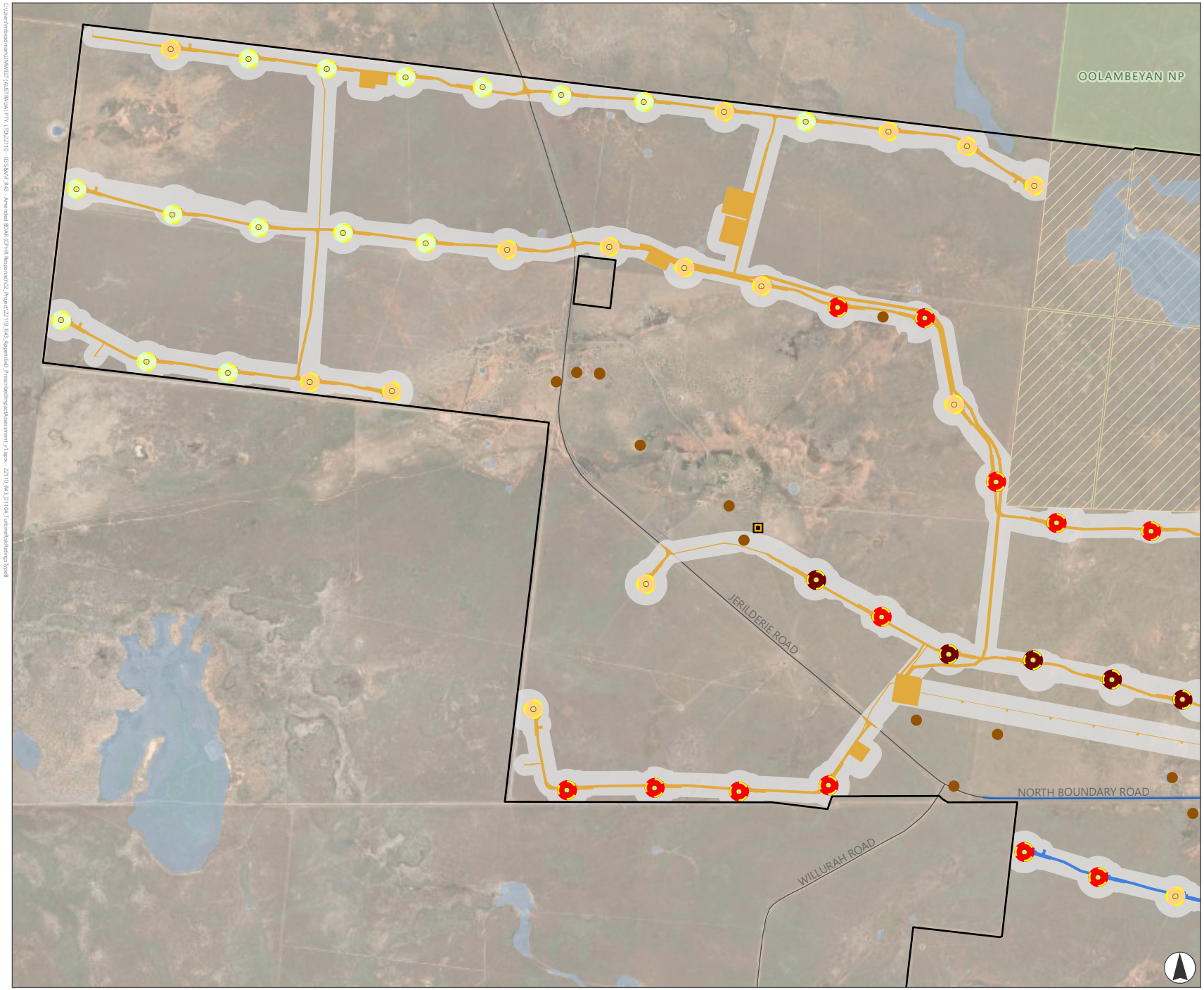
FIGURE 11.4A

Turbine Risk Ratings - Type B



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

Turbine Risk (Comparative) RSA Type B (60m-240m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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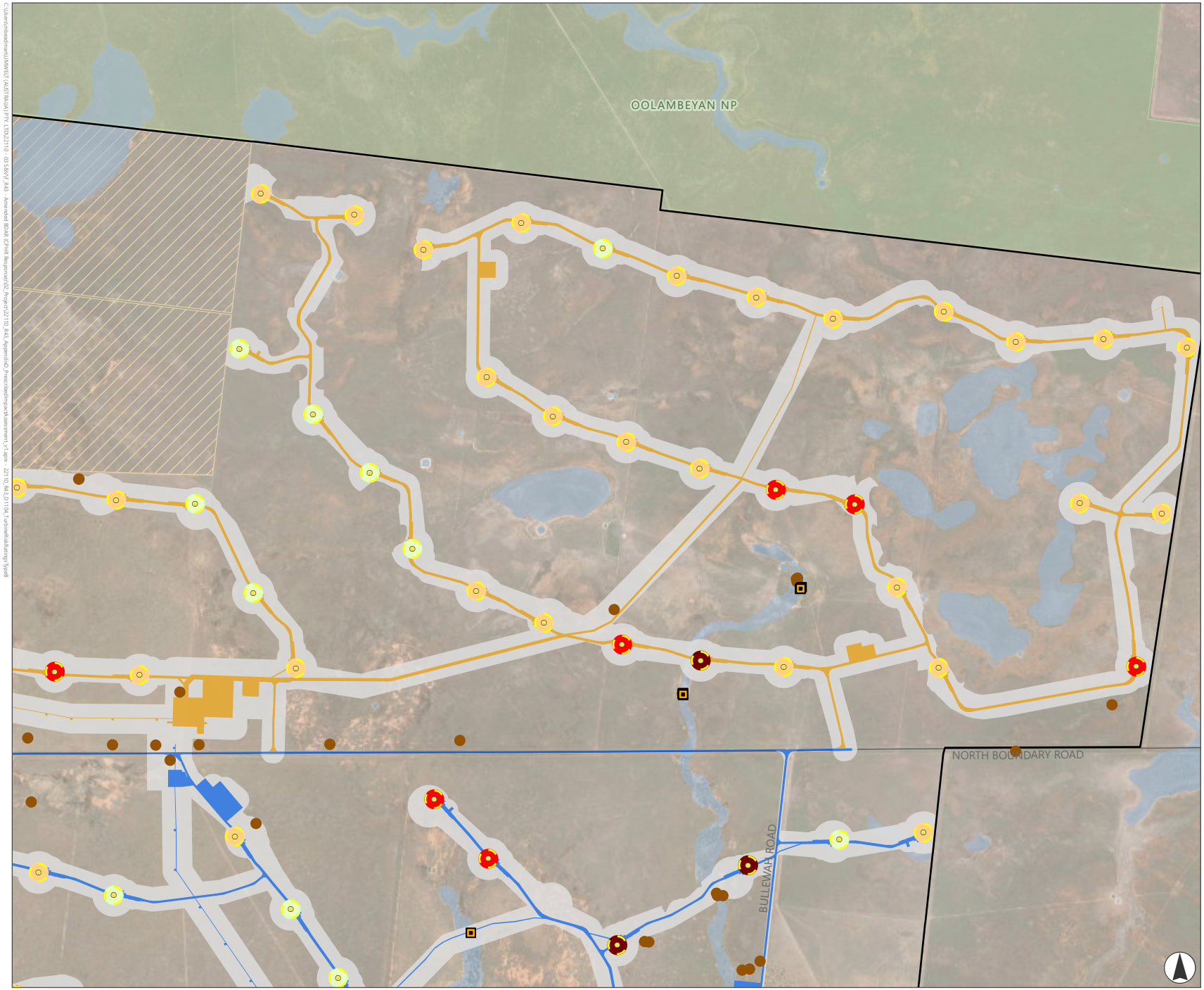
Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

FIGURE 11.4B

Turbine Risk Ratings - Type B



Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Waterbody
- Conservation Agreement Area
- NPWS Reserves
- Hollow-bearing Tree
- Stick Nests
- Road

Turbine Risk (Comparative) RSA Type B (60m-240m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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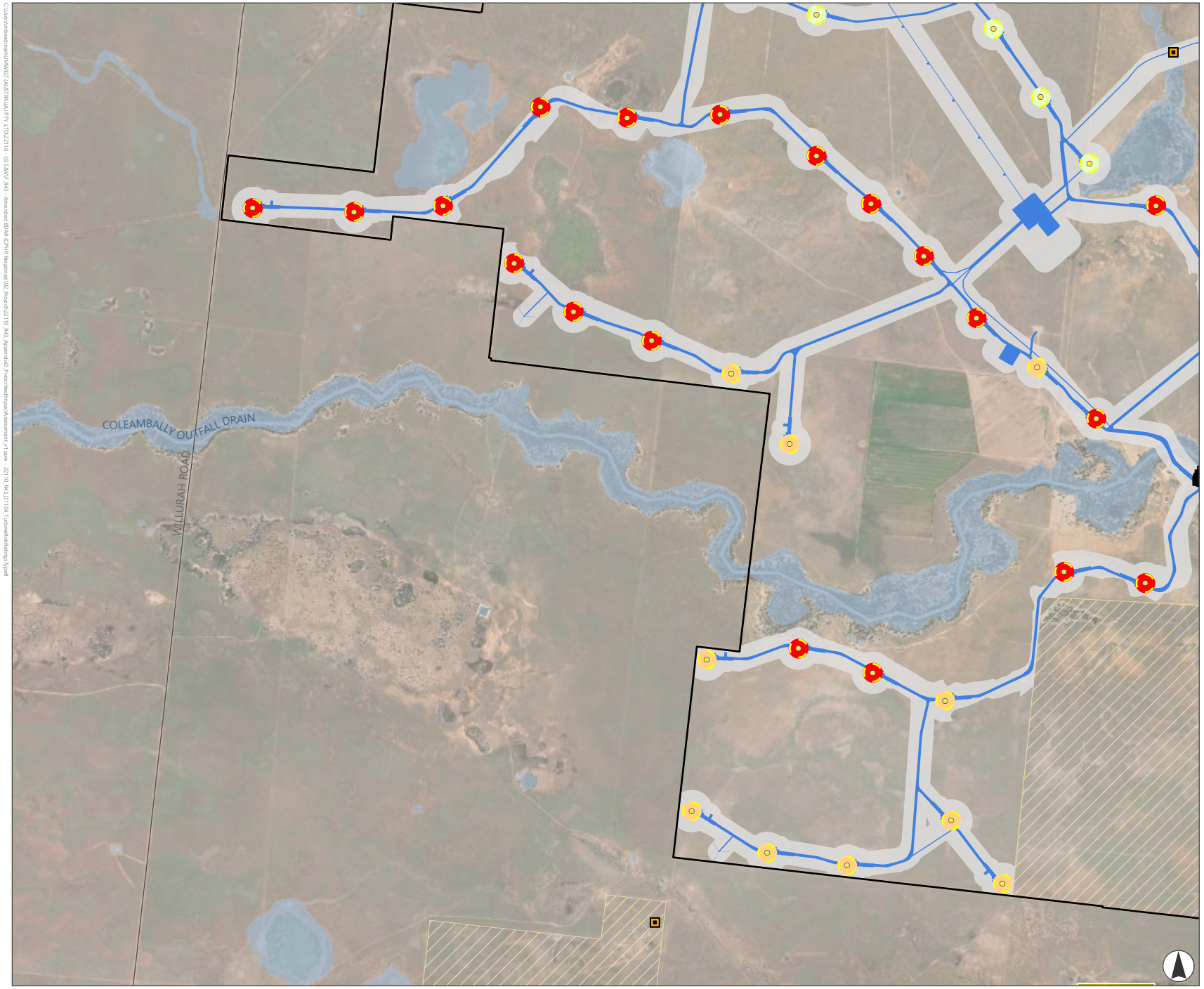

FIGURE 11.4C

Turbine Risk Ratings - Type B

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Road
- Hydroline

Turbine Risk (Comparative) RSA Type B (60m-240m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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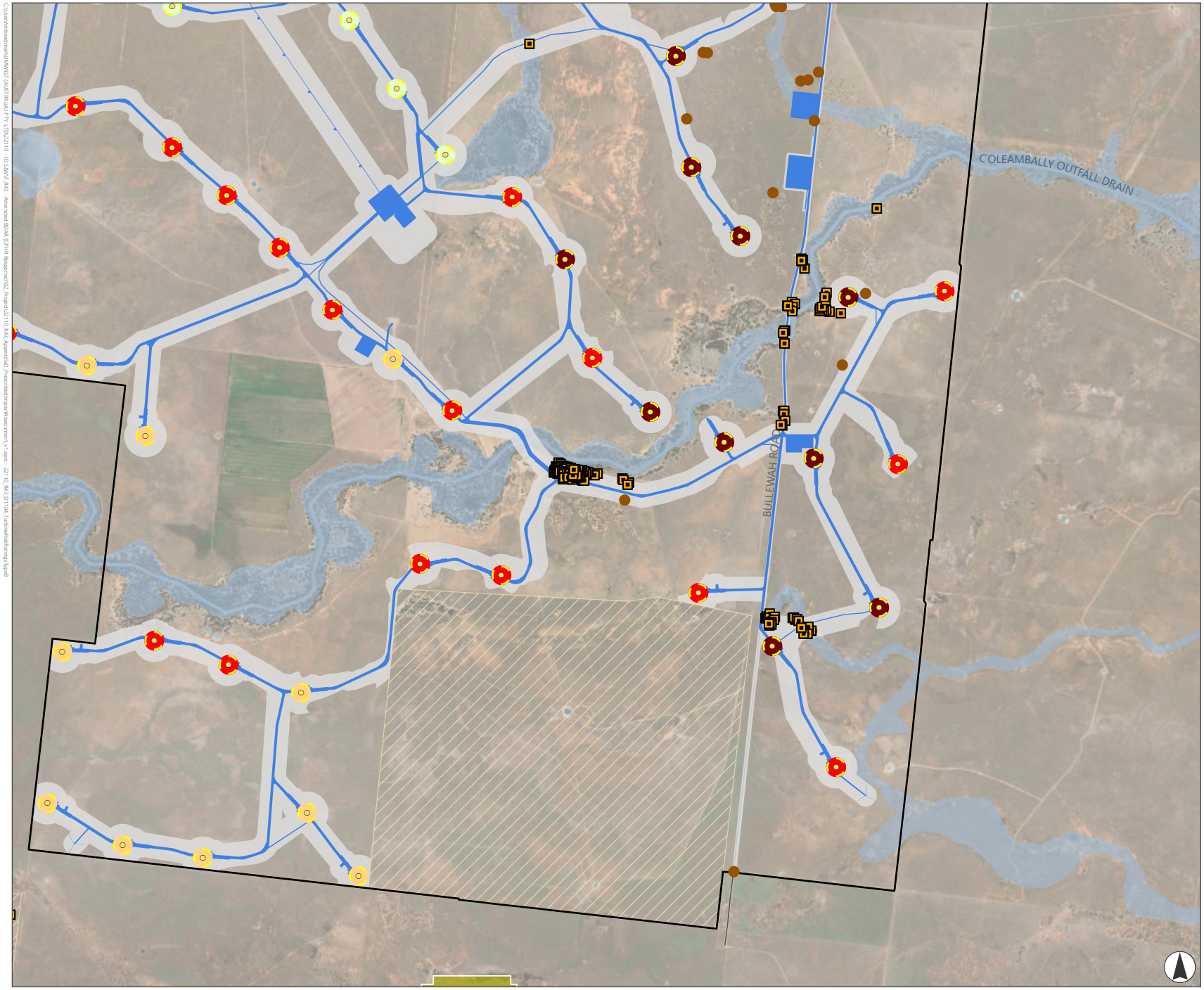

FIGURE 11.4D

Turbine Risk Ratings - Type B

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Wind Turbine Generators
- Potential Aeraial Impact Zone (100 Meter Turbine Buffer)
- Floodplain Wetland
- Waterbody
- Conservation Agreement Area
- Hollow-bearing Tree
- Stick Nests
- Road
- Hydroline

Turbine Risk (Comparative) RSA Type B (60m-240m)

- Low
- Moderate
- High
- Very High

0 975 1,950

Meters

Scale 1:50,000 at A4

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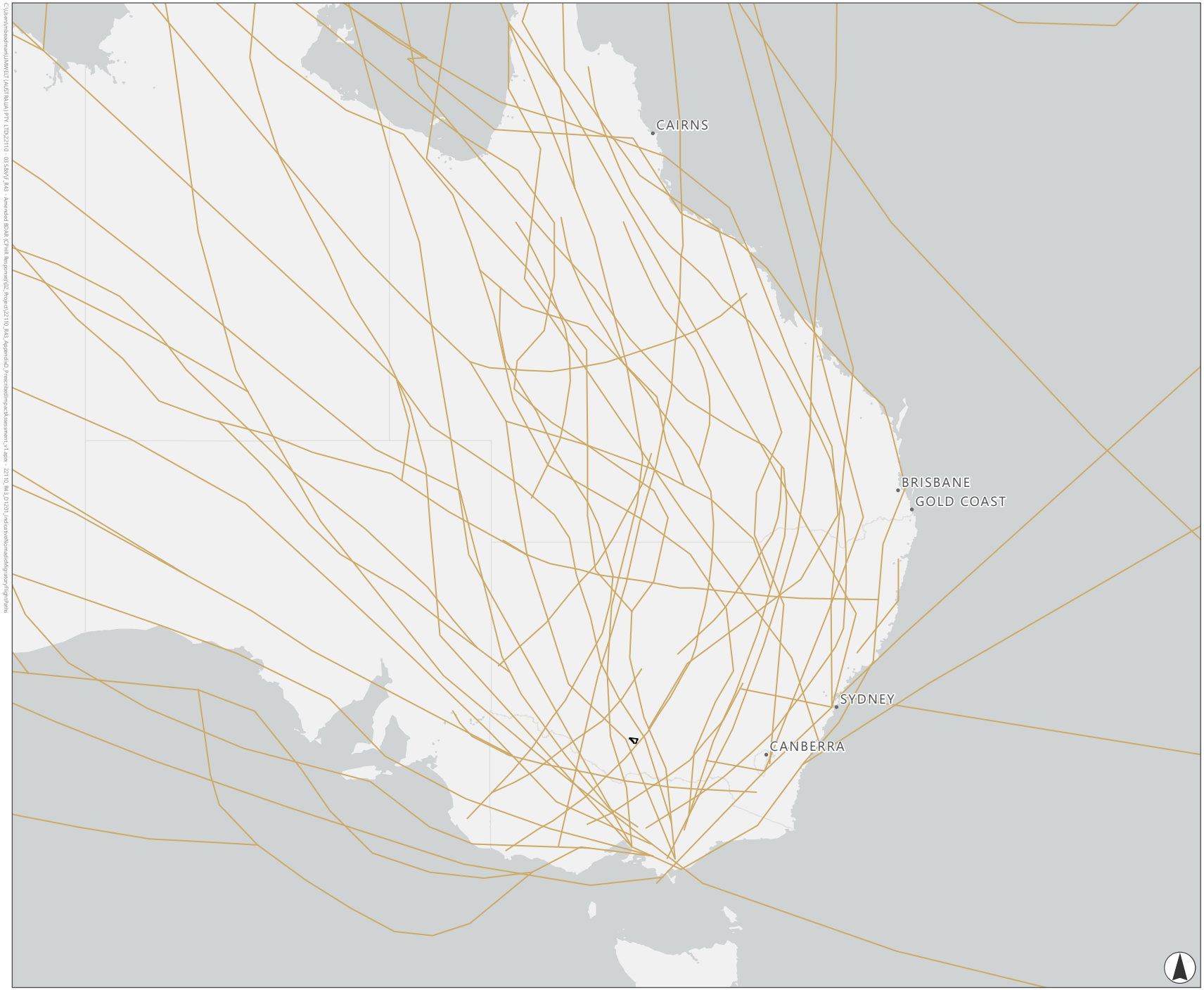
12.0 Flight Path Mapping

Mapping of high-level flight paths within the Project Area is provided in **Figure 12.1** below. These flight paths focus on landscape connectivity features such as woodland vegetation and riparian corridors, and the locations of key foraging locations such as swamps and grasslands. This figure shows that the majority of turbine and infrastructure sites have been located outside of major flight paths.

FIGURE 12.1

Indicative nomadic and migratory flight paths



Legend

- Project Boundary
- Indicative Nomadic Migratory Flight Path

0 250 500

Kilometres

Scale 1:17,500,000 at A4
GDA2020

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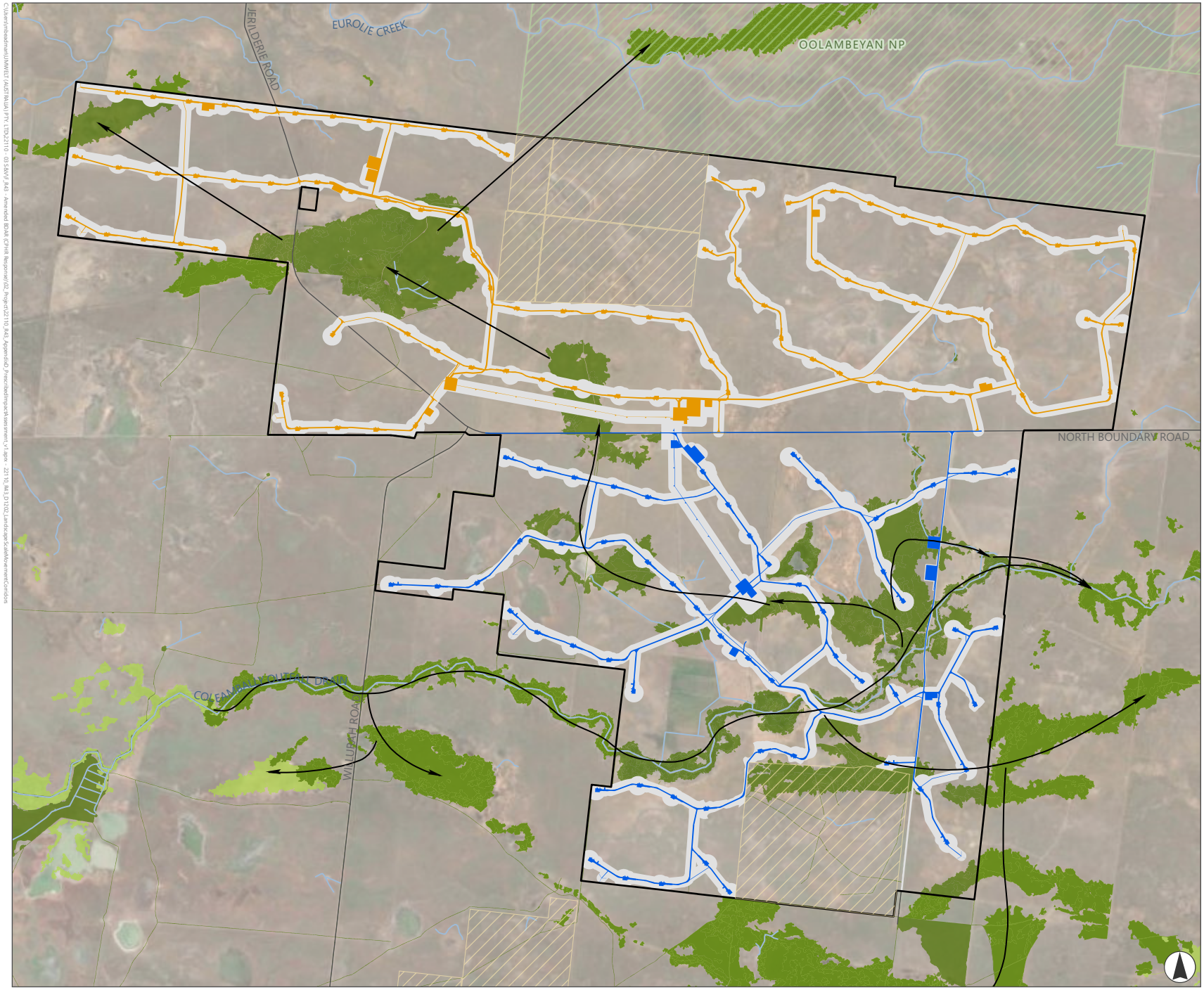

FIGURE 12.2.1

Indicative landscape scale movement corridors for resident avifauna

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Disturbance Footprint
- Stage 2 (North) Disturbance Footprint
- Conservation Agreement Area
- Woody Vegetation Formation (Umwelt)
- Woody Vegetation Formation (SVTM)
- NPWS Reserves
- Habitat Connectivity
- Road
- Hydroline

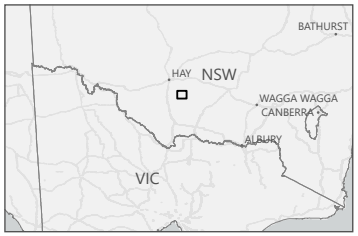

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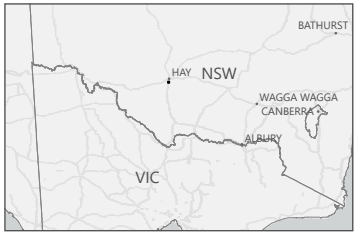
FIGURE 12.2.2

Indicative landscape scale movement corridors for resident avifauna

Legend

- Stage 1 (South) Disturbance Footprint
- Woody Vegetation Formation (SVTM)
- Habitat Connectivity
- Road
- Hydroline



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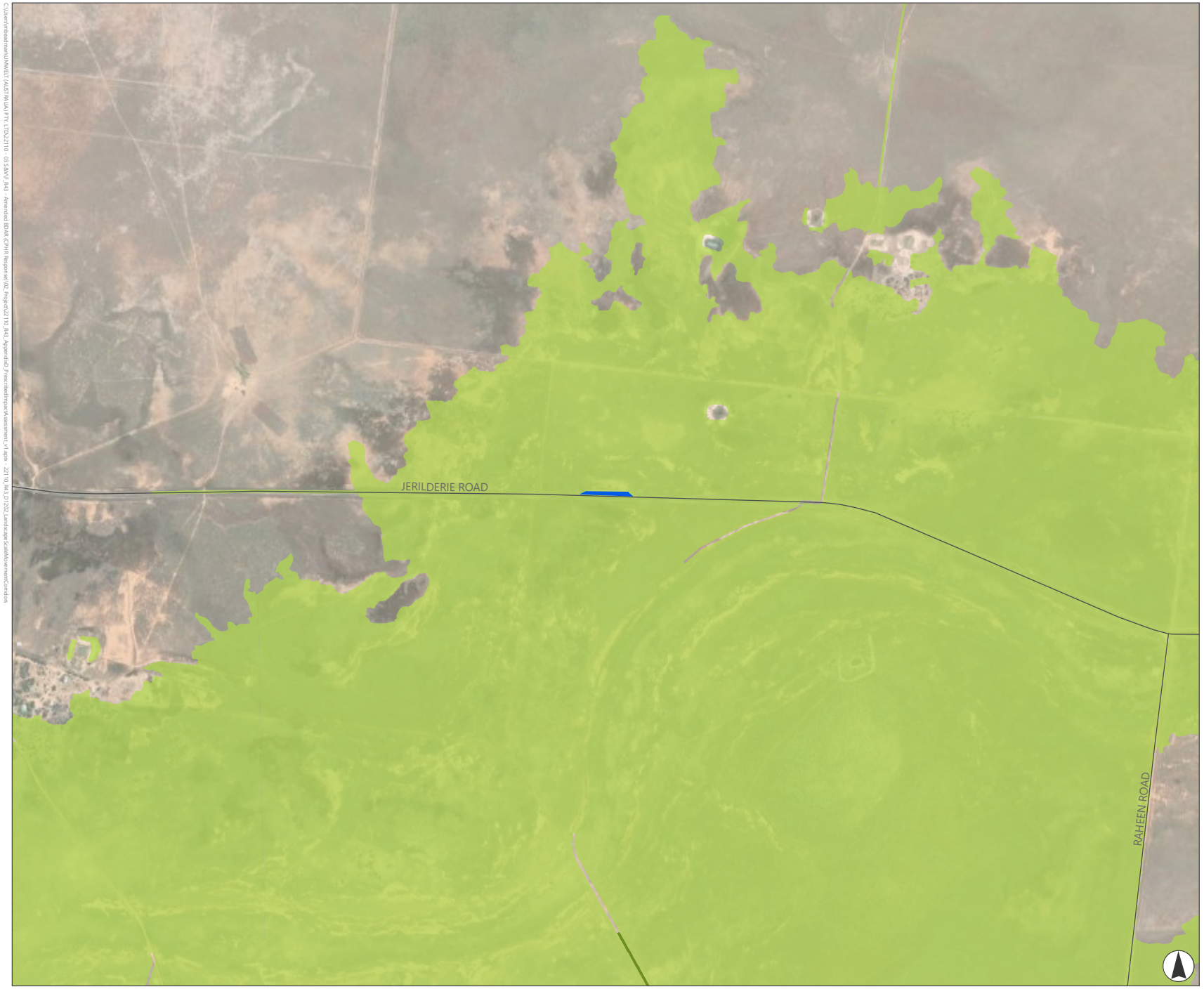

FIGURE 12.2.3

Indicative landscape scale movement corridors for resident avifauna

Legend

- Stage 1 (South) Disturbance Footprint
- Woody Vegetation Formation (Umwelt)
- Woody Vegetation Formation (SVTM)
- Habitat Connectivity
- Road

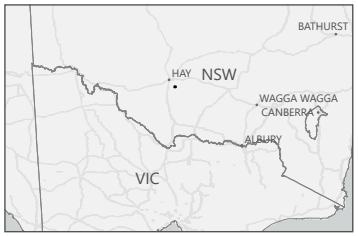

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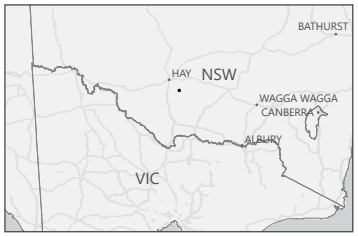
FIGURE 12.2.4

Indicative landscape scale movement corridors for resident avifauna

Legend

- Stage 1 (South) Disturbance Footprint
- Woody Vegetation Formation (Umwelt)
- Woody Vegetation Formation (SVTM)
- Habitat Connectivity
- Road
- Hydroline



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13.0 Minimisation and Management of Impacts

A BBAMP will be implemented to measure, assess and react to impacts on aerial fauna by the Project. The development and implementation of the BBAMP is an integral part of managing impacts to bird and bat species and a key mitigation measure to address the prescribed impacts associated with turbine strike. The BBAMP will provide guidance to develop a framework for monitoring impacts and will include baseline and ongoing monitoring.

The BBAMP will also include trigger levels for particular species and groups of species and mitigation measures designed to manage impacts, in consultation with BWF. Proposed mitigation measures that may be adopted should the Project trigger impacts on a species or species':

- Carrion removal program.
- In consultation with landowners and where feasible, modifications to agricultural land management activities, particularly back burning, slashing, ploughing, clearing etc..
- Additional monitoring of sensitive fauna habitats i.e. confirmed active nest sites.
- Removal of any identified breeding nests, to be specifically offset or artificially reproduced elsewhere.
- Pest animal control.
- Raptor perch management.
- Lighting and deterrents.
- Collation and analysis of cumulative impacts on black falcon from surrounding wind farms, a regional mitigation approach to address regional impacts on the species.
- Curtailment of turbines based on specific wind speeds and/or environmental conditions and/or seasons known to constitute a higher risk of bird and bat strike.
- Alteration of cut-in speeds.
- Temporary shutdown of turbines.
- Acoustic deterrents.
- Transmission line warning markers.
- Triggers for the deployment of radars to inform the need for curtailment and shutdown in real time.
- Offset requirements.

Formal commitment to any particular mitigation measures will only be made in consultation with CPHR and/or DCCEEW following activated triggers and associated impact reporting has been completed. However mitigation measures relevant to species assessed as having a High risk rating for prescribed impacts of turbine strike has been identified in **Section 8.2** (threatened bird species), **Section 8.3** (non-threatened bird species), and **Section 8.4** (threatened bat species).

The BBAMP will be prepared following approval of the Project in consultation with relevant government agencies, however, a comprehensive conceptualisation of the BBAMP is provided below in **Table 13.1** of the Amended BDAR.

It is considered appropriate that in order to adequately manage impacts to species within a site and broader locality, that cumulative impacts from surrounding projects are considered. Furthermore, it is critical that those impacts results in a shared and/or regional mitigation approach. Positive biodiversity outcomes for these impacts species will not work in the absence of a regional approach. As such, it makes sense that all approved wind projects in the region directly correspond about impacts on key threatened avifauna, to support assessment of cumulative impacts as well as facilitating regional mitigation measures appropriate for the species.

Table 13.1 Conceptual BBAMP Components

Component	Description	Timeframe
Objectives of the BBAMP		
Purpose and objectives of the BBAMP	The BBAMP will present an adaptive management strategy to monitor and mitigate impacts to birds and bats attributable to the construction and operation of the wind farm development. The overall objective of the BBAMP will be to ensure the wind farm development does not result in a significant impact on birds and bats by retaining viable local populations of threatened species. It will achieve this by undertaking on-going bird and bat utilisation surveys and operational carcass studies to estimate bird and bat mortality and identify any factors that influence mortality rates (e.g. season). The mitigation and management measures to address Project impacts will be iteratively updated as required pending the outcomes of the monitoring program.	Operational life of the Project
Baseline Survey Programs		
Bird Utilisation Surveys	As agreed with CHPHR, the methods utilised to inform the two year BBUS program through the impact assessment satisfies the requirements of the baseline survey program for bird utilisation. The methodology of this program is detailed in **Section 2.0**.	Autumn 2022 Winter 2022 Spring 2022 Summer 2022/23 Autumn 2023 Winter 2023 Spring 2023 Summer 2023/24
Bat Utilisation Survey	As agreed with CHPHR, the methods utilised to inform the two year BBUS program through the impact assessment satisfies the requirements of the baseline survey program for bat utilisation. The methodology of this program is detailed in **Section 2.0**.	Autumn 2022 Winter 2022 Spring 2022 Summer 2022/23 Autumn 2023 Winter 2023 Spring 2023 Summer 2023/24
Targeted Bird Surveys	Area searches were carried out in accordance with Survey guidelines for Australia's threatened birds (DEWHA, 2010b) and were completed by 2 ecologists per survey, covering areas of tree cover to search for hollows and the presence of breeding Pink Cockatoo's. Surveys were comprised of the 20 min / 2 ha area searches were undertaken at 12 survey locations, repeated four times. Nine (9) acoustic recorders (Titley Chorus programmed to record stereo acoustic) were deployed for a duration of 10 nights.	**Pink Cockatoo/Superb Parrot:** 30 September 2024 1–2 October 2024 1–2 November 2024 **Barking Owl:** 8–18 August 2023
Habitat Assessments for Avifauna	Meandering transects in proximity to wind turbines, recorded suitable habitat for aerial species, such as large stick nests for raptors, abundance of winter flowering gums, hollow bearing trees, and hollows with an aperture of >20 cm and suitable depth for barking owls, masked owls and cockatoos.	Autumn 2023

Component	Description	Timeframe
Operational Monitoring		
Bird Utilisation Surveys	Replication of the BBUS program that was undertaken during the impact assessment. In the absence of any substantial Project design changes, the same BBUS sites should be used for operational monitoring for statistical robustness. Additional BBUS sites will be added into the BBAMP monitoring to allow for changes to sampling density described within the *'Draft Wind Farm Assessment Guidance - South West REZ Projects'* in July 2023.	First year, third year and fifth year (after the commencement of each stage i.e., Stage 1 and Stage 2) within three months of commencement of wind farm operation, that is, once all of the following have occurred: • all turbines are commissioned and tested (including testing dependent on wind conditions) • all turbines have been handed over from the Contractor to BWF • Australian Energy Market Operator (AEMO) testing is complete (grid compliance testing).
Bat Utilisation Survey	Replication of the of the BBUS program that was undertaken during the impact assessment. In the absence of any substantial Project design changes, the same BBUS sites should be used for operational monitoring for statistical robustness. Additional BBUS sites will be added into the BBAMP monitoring to allow for changes to sampling density described within the *'Draft Wind Farm Assessment Guidance - South West REZ Projects'* in July 2023.	First year, third year and fifth year (after the commencement of each stage i.e., Stage 1 and Stage 2) within three months of commencement of wind farm operation, as described above.
Targeted Bird Surveys	Replication of the Pink Cockatoo and Superb Parrot surveys described above. A survey method involving targeted surveys for potential breeding locations for Barking Owl would be prepared in consultation with CPHR during the drafting and approval of the BBAMP.	First year, third year and fifth year (after the commencement of each stage i.e., Stage 1 and Stage 2) within three months of commencement of wind farm operation, as described above.
Carcass Search Program	Carcass searches will be undertaken to estimate the frequency of bird and bat mortality due to collision at the Project, from which the total number of collisions can be estimated. Searches are undertaken to identify and record any carcasses beneath wind turbines. Carcass searches will be undertaken at approximately 50% of the constructed wind turbines, with the same wind turbines being monitored each event. Carcass searches will be conducted once per month throughout the survey years, involving surveying inner (120 m diameter) and outer (240 m diameter) search zones beneath a subset of wind turbines. Transect intensity varies between the inner (6 m apart) and outer (12 m apart) search zones and will be completed preferentially by conservation dogs (and handler) with human searches being permissible where conservation dogs are not available. All carcasses recorded as part of this program will be subject to a strict reporting and timeframe commitments. All carcasses will be reported to the Environmental Representative (BWF) as well as to CHPR and/or Commonwealth DCCEEW in the event of the impacted species being listed as a threatened species.	First and second year initially, starting within commencement of operation, as described above. The search program will be reviewed for efficacy after two years, with the possibility of extension for a further three years, potential total five-year program. Requirement for extension of the program if there is clear discrepancy between estimated and realised frequency of bird and bat mortality.
Carcass Persistence Trial	Carcass persistence trials are undertaken to estimate persistence rates of different sized carcasses beneath turbines (to aid estimation of mortality rates of birds and bats impacted by turbines). The trial will occur at a subset of wind turbines. A pre-determined number of bird and bat carcasses, varying in size, will be used in the trial. Carcass persistence trials can either be undertaken by human searches or use of remote survey cameras.	Completed during the first- and second-year carcass search program, but once per season (not each month).
Carcass Detectability Trials	Carcass detectability varies depending on a range of factors such as efficacy of the observer, size of the carcass and type of ground cover. Given this, carcass detectability trials will be undertaken to determine the efficacy of the conservation dog and handler; or the ecologist undertaking searches at finding carcasses. Determining the probability of the selected trained dog or observers detecting a carcass and how it may vary depending on turbine site ground conditions or carcass size is important to ascertain the correction factor needed to accurately estimate total number of collisions.	During the first-year carcass search program, but one per season (not each month).
Incidental Finds Protocol	Any carcass or feather spot discovered incidentally by site personnel or any contractor during the operational lifetime of the Project will be formally recorded and the find reported to the Environmental Representative as well as to CHPR and/or Commonwealth DCCEEW in the event of the impacted species being listed as a threatened species.	Operational lifetime of the Project.
Mortality Estimation	All data will be analysed to estimate annual number of collisions for birds and bats overall and species. This will be estimated in consideration of the carcass search area and effort, and the observed carcass persistence times and observer detectability rates. Estimates of the number of carcasses per turbine per year will also be determined and 95% confidence intervals around total annual estimates and rates of mortality calculated.	During the reporting periods, described below.

Component	Description	Timeframe
Impact Triggers and Response Procedure		

Threatened Species	• Impact triggers will be determined for threatened species listed under the EPBC Act and/or BC Act, which will relate to a particular number of carcasses, injured individual or featherspot recorded through formal searches or incidentally.
	• Impact trigger criteria will be based on the combination of the following factors:
	  ○ BC Act listing status
	  ○ EPBC Act listing status
	  ○ number of individuals impacted
	  ○ number of turbines where the species has been impacted
	  ○ frequency of impacts for the particular species across monitoring events (i.e., has the impact been recorded in two consecutive monitoring events)
	  ○ particular season the impact was recorded (i.e., breeding season for the particular species).
	• In the event of a trigger being recorded, it is the responsibility of the person who discovered the carcass, injured individual or featherspot to notify the Environmental Representative* upon discovery (allowing for identification if required). The Environmental Representative* must then notify CPHR and/or Commonwealth DCCEEW of the trigger event within two working days.
	• Additional actions and mitigation measures may be required in the event of an impact trigger being recorded, these would be determined through consultation with CPHR and/or Commonwealth DCCEEW. It is not considered suitable to specify particular mitigation measures for a potential impact at this point in time due to the large number of variables that should be considered to assess the severity of a particular impact. Rather, following notification of the initial impact trigger consultation with CPHR/Commonwealth DCCEEW will include (but not be limited to) the following:
	  ○ An initial online or in-person meeting within five working days (excluding government shutdown periods and subject to the availability of government agency personnel) of the impact trigger being recorded, with the consultation stakeholders specified above. Should the impact trigger or consultation period occur during government shutdown periods, this meeting is required to occur within five working days following conclusion of the shutdown period (subject to the availability of government agency personnel).
	  ○ Additional online or in-person meetings may be required depending on the nature of the consultation. The specific timeframe of this additional consultation will be determined in the initial meeting.
	• The BBAMP will not ascribe numerical values to what should be considered an adverse impact at the total population and/or the local population scale. Rather, the BBAMP will describe an assessment process through which an ecologist first prepares an impact investigation that examines whether the event may be regular or may constitute, or lead to, an adverse impact on the species' local or total population.
	The findings of this impact investigation will determine whether consultation with CPHR and/or Commonwealth DCCEEW regarding the need for additional monitoring or mitigation action is required.
	The minimum requirements of the impact investigation report are detailed below:
	  ○ Specify the particular impact trigger level that was recorded including the species and number of individuals.
	  ○ Specify the date/s and location/s of recovered carcasses/featherspot.
	  ○ Discuss any potentially influential ecological factors that may have contributed to the impact trigger such as recent climate, weather, presence of prey species/foraging opportunities or seasonal factors (i.e., migration).
	  ○ Estimate whether the event is likely to be rare or regular.
		Not applicable.

Component	Description	Timeframe
	○ Verify whether or not the species has been impacted (including number of individuals and frequency) at neighbouring wind farms within a 10 km radius of the Project by accessing their publicly available annual BBAMP reports. Neighbouring wind farms within this radius will be considered at the time the impact trigger is recorded to consider any future wind farms. • For the purposes of the BBAMP, post-trigger assessment of impacts on threatened and/or migratory species is to be conducted with reference to the species' total population and local population. ○ Total population refers to the estimated total Australian population or, in the case of international migrants, the relevant subspecies' entire population. Local population refers to the estimated population in the Project Site. Density is to be estimated using data from the pre-construction surveys in combination with existing density estimates from primary literature (preferably from temperate woodland in south-eastern Australia where distinction is made between different habitat types). ○ Local population estimates are to be derived using vegetation mapping for the Project. Estimates should take into consideration population dynamic assumptions such as, but not limited to, seasonal or inter-annual fluctuations in abundance in the Project Site. The local population of a given species is to be estimated by the contracted ecologist if an impact trigger for that species is met.	
Non-threatened Species	• Impact triggers will not be required for all non-threatened species and common species such as the sulphur-crested cockatoo and little corella will not be included. • Impact triggers will be determined separately for wedge-tailed eagle and other non-threatened species in recognition of increased susceptibility of wedge-tailed eagles to turbine strike. • No management actions are triggered following mortality of introduced species. • In the event of a trigger species being recorded, it is the responsibility of the person who discovered the carcass, injured individual or featherspot to notify the Environmental Representative upon discovery (allowing for identification if required). The Environmental Representative must then notify CPHR of the trigger event within five working days. • The BBAMP will not ascribe numerical values to what should be considered an adverse impact at the total population and/or the local population scale. Rather, the BBAMP will describe an assessment process through which an ecologist first prepares an impact investigation that examines whether the event may be regular or may constitute, or lead to, an adverse impact on the species' local or total population. The findings of this impact investigation will determine whether consultation with CPHR and/or DCCEEW regarding the need for additional monitoring or mitigation action is required. The minimum requirements of the impact investigation report are detailed below: ○ Specify the particular impact trigger level that was recorded including the species and number of individuals. ○ Specify the date/s and location/s of recovered carcasses/featherspot. ○ Discuss any potentially influential ecological factors that may have contributed to the impact trigger such as recent climate, weather, presence of prey species/foraging opportunities or seasonal factors (i.e., migration). ○ Estimate whether the event is likely to be rare or regular. ○ Verify whether or not the species has been impacted (including number of individuals and frequency) at neighbouring wind farms within a 10 km radius of the Project by accessing their publicly available annual BBAMP reports. Neighbouring wind farms within this radius will be considered at the time the impact trigger is recorded to consider any future wind farms. ○ For the purposes of the BBAMP, post-trigger assessment of impacts on non-listed species, is to be conducted with reference to the species' local population only. ○ Local population estimates are to be derived using vegetation mapping for the Project. Estimates should take into consideration population dynamic assumptions such as, but not limited to, seasonal or inter-annual fluctuations in abundance in the Project Site. The local population of a given species is to be estimated by the contracted ecologist if an impact trigger for that species is met.	Not applicable.

Component	Description	Timeframe
Mitigation Measures	Mitigation measures may include consideration of the following, amongst others: • Carrion removal program. • Pest animal control. • Raptor perch management. • Lighting and deterrents. • Alteration of cut-in speeds. • Temporary shutdown of turbines. • Acoustic deterrents. • Transmission line warning markers. • Triggers for the deployment of radars to inform the need for shutdown in real time. • Offset requirements. • Formal commitment to any particular mitigation measures will only be made in consultation with CPHR and/or DCCEEW.	Operational lifetime of the Project.
Reporting Requirements	• Carcass search programs will be reported annually for two years. Review of the program will be undertaken following two years of operation. • Impact trigger reporting will be required as described above. · Annual reports will be prepared for three years and once following the fifth year of bird and bat monitoring. • Minor review of the BBAMP will occur once after the first year, following completion of the first annual report. • Major review of the BBAMP will occur after the third year, following completion of the first annual report. After the fifth year, following the completion of the annual report.	Not applicable.

13.1 Species-Specific Measures

The following outlines the Projects approach to providing species-specific measures for the plains-wanderer (a SAII entity) and black falcon.

13.1.2 Specific-specific Measures – Plains-wanderer and Black Falcon

13.1.2.1 Plains-wanderer

One (1) SAII entity, the plains-wanderer, has been recorded or assumed present in the Subject Land. Section 8.4.3 of the Amended BDAR provides an assessment of impacts to plains-wanderer, having regard to the requirements of the Biodiversity Conservation Regulation 2017 (BC Regulation), relevant criteria under Section 9.1.2 of the BAM and Guidance to Assist a Decision-Maker to Determine a Serious and Irreversible Impact (DPIE 2019b).

The Project has been designed and progressively refined to avoid all impacts to the NSW Important Habitat Mapping for the plains-wanderer. Notwithstanding, there is 4,940.21 ha of Supplementary Habitat within the Project Boundary, representing 15% of the species' national area of occupancy. The Project would require 170.86 ha (3% of that within the Project Boundary and 0.58% of its total area of occupancy) of this habitat to be cleared for turbine pads, access roads and other infrastructure. It is estimated that up to 0.3 to 5 birds may be directly impacted (3% of the site's population) as a result of the Project.

CPHR and Commonwealth DCCEEW have advised that offsets for the species are not required and have instead requested the preparation of a PWMP. Details of the PWMP are contained with Section 7.4.4 and Section 9.1. of the Amended BDAR.

BWF has proposed species-specific measures, being a proposed partnership with Riverina Local Land Services to support pest and weed management, as well as contributions to local land management, as detailed in the subsections below.

It is noted that feral predators including feral cats, pigs and foxes are identified as key threats to the recovery of the Plains-wanderer, as identified in the National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (Australian Government, 2016) and relevant threat abatement plans including the Threat abatement plan for predation by feral cats 2024 (Commonwealth of Australia), Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017) and Threat abatement plan for predation by the European red fox (Commonwealth Department of the Environment, Water, Heritage and the Arts, 2008).

Additionally, the National Recovery Plan for the Plains-wanderer states that that a key strategy to mitigate the threat of climate change is to build resilience into the grasslands upon which plains-wanderers rely, through weed management.

With respect to mitigation for offsetting potential impact to plains-wanderer, BWF is of the view that it has:

- made all reasonable efforts to avoid and reduce impacts to plains-wanderer
- proposed offsets in accordance with relevant offset policies
- proposed additional and appropriate measures beyond the requirements of the BAM to offset all impacts to the plains-wanderer.

13.1.2.2 Measures in relation to Black Falcon

This Prescribed Impact Assessments has been prepared to consider the potential impacts from turbine strikes on significant bird and bat species. These assessments have been prepared in accordance with Section 6.1.5 and 8.3.5 of the BAM.

To assess the likelihood and consequence of impacts on aerial species, a qualitative risk-based assessment based on an assessment methodology developed by the Arthur Rylah Institute (Lumsden et al. 2019) has been conducted. The assessment approach comprises consideration of the likelihood of blade strike based on a species' recorded flight behaviour and status in the Project Area, as well as consideration of existing turbine strike data from Australia. The relative consequence of potential collisions and/or barotrauma is assessed with consideration of a species' total population size and degree of concentration in certain areas, conservation status and demographic resilience.

The black falcon was assigned an unmitigated risk rating of high. This species was frequently observed foraging within the Project Area and Disturbance Footprint during field surveys including BBUS surveys, vegetation assessment and targeted threatened species surveys. Potential nests for the species were observed on the existing transmission towers present within the Project Area, with potentially two (2) breeding pairs present within the Project Area.

Turbine strike risks will be adaptively managed under a BBAMP which would include consideration of ongoing monitoring, pest animal control, raptor perch management, lighting and deterrents, alteration of cut-in speeds and temporary shutdown of turbines. With the application of the BBAMP framework, the species has been assigned a mitigated risk rating of moderate.

Section 10.2.1 of the Amended BDAR outlines a proposed offsetting approach to be implemented where impacts to a threatened bird and/or bat species listed under the BC Act and/or EPBC Act are recorded on the Project through the implementation of the BBAMP. In summary, this would involve the funding of a biodiversity conservation action, as permitted under the BC Regulation. Any biodiversity conservation action proposed would be agreed to through consultation with both CPHR, the Nature Markets and Offsets Division, and DCCEEW, where necessary.

BWF has proposed species-specific measures being a proposed partnership with Riverina Local Land Services to support pest and weed management, as well as contributions to local land management, as detailed in the subsections below.

The proposed BBAMP framework, offsetting approach and species-specific measures proposed by BWF relating to Black falcon are considered to more than adequately mitigate and, where impacts cannot be avoided, offset the prescribed impacts to species.

13.1.2.3 Riverina Local Land Services Partnership

Riverina Local Land Services (LLS) is currently leading conservations programs within the Riverina Region aimed at safeguarding vulnerable and endangered species and their habitat.

Relevantly, current LLS programs include:

- *Bringing the Plains-wanderer back from the Brink*: In collaboration with the NSW DCCEEW, and with funding from the Australian Government's National Landcare Program/Natural Heritage Trust and the NSW Government's Saving Our Species Program, LLS successfully implemented a conservation program for the Plains-wanderer. The program, commenced in 2017 and involves working with seven (7) landholders in the Murray and Riverina area to improve grazing management practices on areas of Plains-wanderer grassland habitat. Additionally, the program supports landholders in managing paddocks for both livestock production and plains-wanderer conservation, by offering incentives for pest and weed control, fencing, water points, saltbush plantations, stock management areas, and feeding infrastructure.

- *Securing the Black Falcon in the Riverina*: With funding from the Natural Heritage Trust, LLS has partnered with 12 landholders in the Riverina area to protect and enhance native active nest sites, as well as establishing new artificial nest sites. The program has also included pest animal control and targeted box thorn removal within habitat areas.

To ensure the ongoing success of these two (2) programs, effective pest animal control and management of African boxthorn (*Lycium ferocissimum*) is critical in safeguarding the plains-wander, black falcon, and their respective suitable habitat areas:

- Feral animal night-shooting: Night shooting is a key strategy to reduce predation pressure on native species like the plains-wanderer and black falcon. While existing methods like baiting, trapping, and fencing help control foxes and feral cats, additional night shooting is needed.

- Target Bait-Resistant and Trap-Shy Predators: Some foxes and feral cats learn to avoid baits or don't take them due to alternative food sources. Night shooting targets these survivors, ensuring they don't continue hunting endangered wildlife.

- Immediate Response to Threats: If a managed habitat site has a sudden increase in predator activity, night shooting can rapidly remove the threat.

- Reducing Predator Numbers Before Bird Releases: to support existing programs such as the release of captive-bred plains-wanderers, intensive predator control is needed. Night shooting can help to ensure the success of bird release programs.

- African boxthorn removal: African boxthorn creates dense thickets which reduce suitable habitat and foraging areas while providing shelter for pest animals.

Through ongoing engagement, BWF has identified an opportunity to partner with Riverina LLS to support the above activities. The control measures will target conservation sites established through the Bringing the Plains-wanderer back from the Brink and Securing the Black Falcon in the Riverina Programs. BWF has committed to provide monetary support for feral animal night shooting and African boxthorn removal to a total value of $300,000. Nominally, this would equate to $60,000 per year for five (5) years, beginning at the commencement of Project construction.

13.1.2.4 Contributions to Local Land Management

BWF has committed to provide funding to Hay Local Aboriginal Land Council (LALC) to support ongoing land management, with a focus on weed and pest control, in the vicinity of the Oolambeyan National Park boundary. This support is valued at $10,000 per year and forms part of the BWF's overarching commitments to First Nations collaboration and participation under the South West REZ Access Rights Benefits Scheme

14.0 Conclusion

Of the 11 assessed threatened bird species that were recorded in the Project Area, a total of two (2) species (black falcon and little eagle) were assigned a High risk rating, three (3) species (blue-winged parrot, plains wanderer and spotted harrier) were assigned a Moderate risk rating, one (1) species (barking owl) was assigned a Minor risk rating and the remaining five (5) species were assigned a Negligible risk rating.

Of the four (4) threatened bat species that were recorded in the Project Area one (1) was assigned a High risk rating (yellow-bellied sheathtail-bat), two (2) species (Corben's long-eared bat and little pied bat) were assigned a Moderate risk rating and the remaining one (1) species (little pied bat) was assigned a Minor risk rating. Of the 13 non-threatened, white-striped freetail-bat was assigned a High risk rating. Four (4) were assigned a Moderate risk rating, seven (7) were assigned a Minor risk rating, and two (2) were assigned a Negligible risk rating.

Of the 19 threatened bird species that were not recorded during the 2022–2024 surveys but are likely to occasionally occur in the Project Area two (2) were assigned a moderate risk rating whilst the remaining 17 species were assigned a minor or negligible risk rating. Of the 92 non-threatened bird species that were recorded in the Project Area five (5) species were assigned a moderate risk rating, 26 were assigned a minor risk rating and the remaining 61 were assigned a negligible risk rating.

A complete summary of these results outlined above are provided in **Table 14.1** below addressing likelihood, consequence, unmitigated risks and residual risks as a result of the post trigger and mitigation measures outlined in this report.

Table 14.1 Risk Assessment Results

Common Name	Species Name	Likelihood	Consequence	Unmitigated Risk Rating	Residual Risk Rating
Birds					
barking owl	*Ninox connivens*	Low	Moderate	Minor	Minor
black falcon	*Falco subniger*	High	Moderate	High	Moderate
blue-winged parrot	*Neophema chrysostoma*	Moderate	Moderate	Moderate	Minor
diamond firetail	*Stagonopleura guttata*	Low	Low	Negligible	Negligible
flame robin	*Petroica phoenicea*	Low	Low	Negligible	Negligible
grey-crowned babbler	*Pomatostomus temporalis*	Low	Low	Negligible	Negligible
little eagle	*Hieraaetus morphnoides*	High	Moderate	High	Moderate
plains-wanderer	*Pedionomus torquatus*	Low	High	Moderate	Minor
southern whiteface	*Aphelocephala leucopsis*	Low	Low	Negligible	Negligible
spotted harrier	*Circus assimilis*	Moderate	Moderate	Moderate	Minor
white-fronted chat	*Epthianura albifrons*	Low	Low	Negligible	Negligible
Wedge-tailed eagle	*Aquila audax*	High	Low	Moderate	Minor
Bats					
white-striped freetail-bat	*Austronomus australis*	High	Moderate	High	Moderate
inland free-tailed bat	*Ozimops petersi*	Moderate	Moderate	Moderate	Minor
southern free-tailed bat	*Ozimops planiceps*	Moderate	Moderate	Moderate	Minor
Ride's free-tailed bat	*Ozimops ridei*	Moderate	Moderate	Moderate	Minor
chocolate wattled bat	*Chalinolobus morio*	Moderate	Low	Minor	Minor
Gould's wattle bat	*Chalinolobus gouldii*	High	Low	Moderate	Minor
little forest bat	*Vespadelus vulturnus*	Moderate	Low	Minor	Minor
lesser long-eared bat	*Nyctophilus geoffroyi*	Moderate	Low	Minor	Minor

Common Name	Species Name	Likelihood	Consequence	Unmitigated Risk Rating	Residual Risk Rating
large forest bat	*Vespadelus darlingtoni*	Low	Low	Negligible	Negligible
southern forest bat	*Vespadelus regulus*	Low	Low	Minor	Minor
yellow-bellied sheathtail-bat	*Saccolaimus flaviventris*	High	Moderate	High	Moderate
Corben's long-eared bat	*Nyctophilus corbeni*	Moderate	Moderate	Moderate	Minor
Inland forest bat	*Vespadelus baverstocki*	Moderate	Moderate	Moderate	Minor
Little pied bat	*Chalinolobus picatus*	Low	Moderate	Minor	Minor
Gould's long-eared bat	*Nyctophilus gouldi*	Moderate	Low	Minor	Minor
Inland broad-nosed bat	*Scotorepens balstoni*	Moderate	Low	Moderate	Minor
Little broad-nosed bat	*Scotorepens greyii*	Moderate	Low	Minor	Minor

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APPENDIX 1

Vantage Point Surveys Photographs

Photograph 1 VP 1 – View North

Photograph 2 VP 1 – View East

Photograph 3 VP 1 – View South

Photograph 4 VP 1 – View West

Photograph 5 VP 2 – View North

Photograph 6 VP 2 – View East

Photograph 7 VP 2 – View South

Photograph 8 VP 2 – View West

Photograph 9 VP 3 – View North

Photograph 10 VP 3 – View East

Photograph 11 VP 3 – View South

Photograph 12 VP 3 – View West

Photograph 13 VP 4 – View North

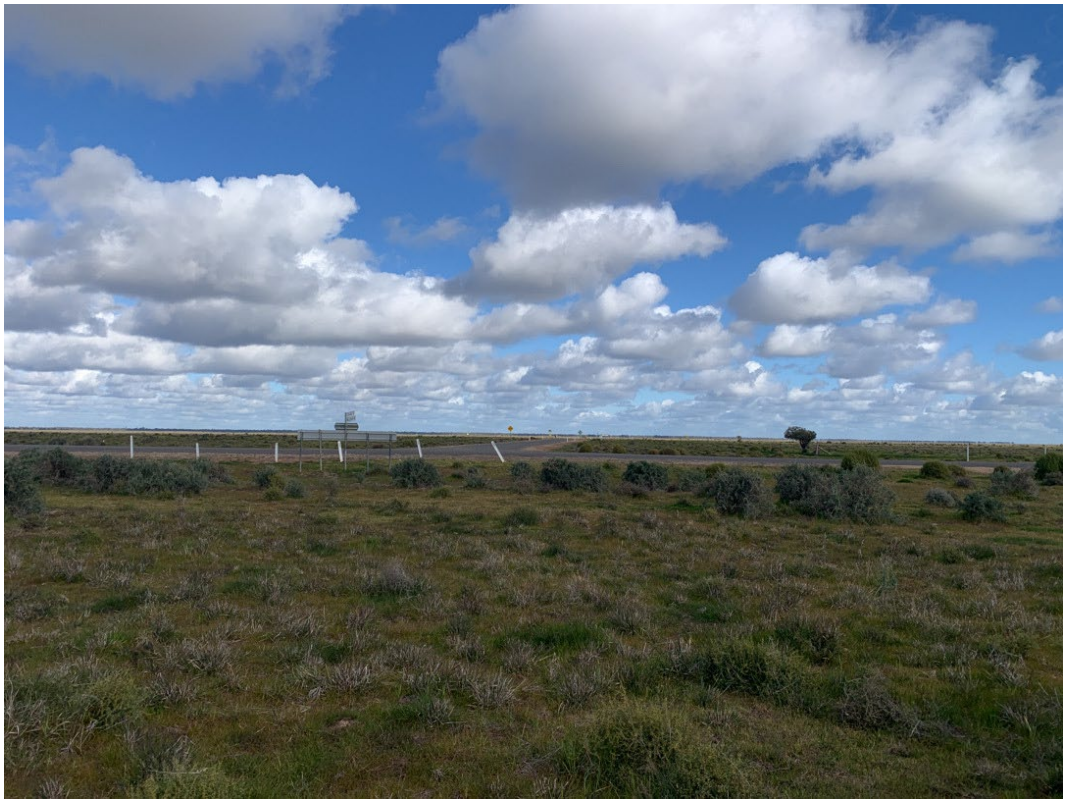
Photograph 14 VP 4 – View East

Photograph 15 VP 4 – View South

Photograph 16 VP 4 – View West

Photograph 17 VP 5 – View North

Photograph 18 VP 5 – View East



Photograph 19 VP 5 – View South

Photograph 20 VP 5 – View West

Photograph 21 VP 6 – View North

Photograph 22 VP 6 – View East

Photograph 23 VP 6 – View South

Photograph 24 VP 6 – View West

Photograph 25 VP 7 – View North

Photograph 26 VP 7 – View East

Photograph 27 VP 7 – View South

Photograph 28 VP 7 – View West

Photograph 29 VP 8 – View North

Photograph 30 VP 8 – View East

Photograph 31 VP 8 – View South

Photograph 32 VP 8 – View West

Photograph 33 VP 9 – View North

Photograph 34 VP 9 – View East

Photograph 35 VP 9 – View South

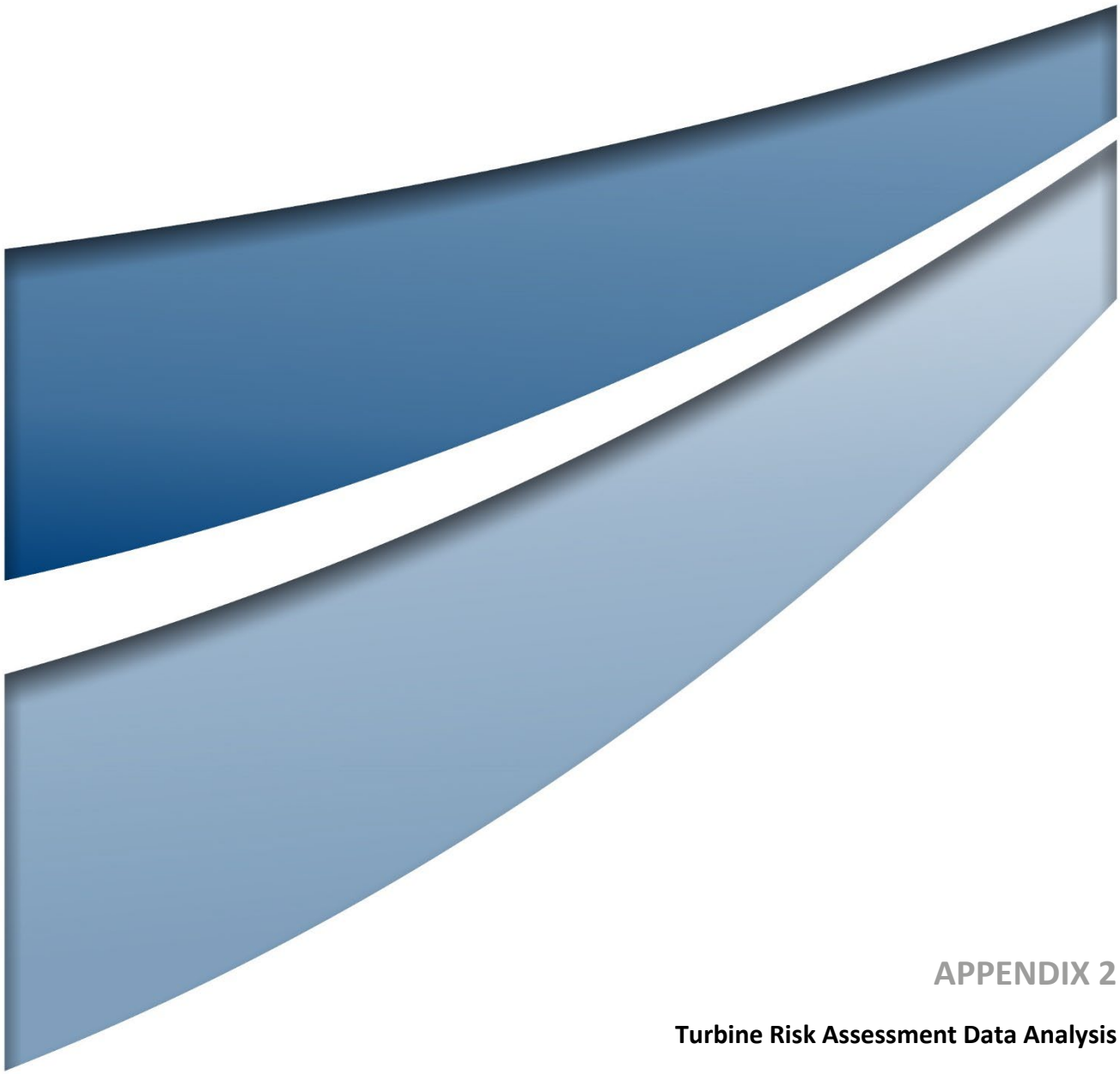
Photograph 36 VP 9 – View West

Photograph 37 VP 10 – View North

Photograph 38 VP 10 – View East

Photograph 39 VP 10 – View South

Photograph 40 VP 10 – View West



APPENDIX 2

Turbine Risk Assessment Data Analysis

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
1	2	1	1	1	2	1	1	3	4	3	18	18	Moderate	Moderate
2	1	1	2	1	1	1	1	2	2.5	3	13.5	14.5	Low	Low
3	1	1	2	1	1	1	1	1	2.5	3	12.5	13.5	Low	Low
4	1	1	2	1	1	1	1	1	2.5	3	12.5	13.5	Low	Low
5	1	1	2	1	2	1	1	2	2.5	3	14.5	15.5	Low	Low
6	2	1	1	1	1	1	1	2	1.5	3	13.5	13.5	Low	Low
7	1	1	2	1	1	1	1	1	2	3	12	13	Low	Low
8	4	1	1	1	1	1	1	1	1.5	3	14.5	14.5	Low	Low
9	4	1	1	1	1	1	1	1	2.5	3	15.5	15.5	Low	Low
10	4	1	1	1	1	1	1	1	1.5	3	14.5	14.5	Low	Low
11	4	1	1	1	2	1	1	1	3	3	17	17	Moderate	Moderate
12	2	1	1	1	1	1	1	2	1.5	3	13.5	13.5	Low	Low
13	4	1	1	1	1	1	1	1	1.5	3	14.5	14.5	Low	Low
14	4	1	1	1	1	1	1	1	1.5	3	14.5	14.5	Low	Low
15	4	1	1	1	1	1	1	4	2.5	3	18.5	18.5	Moderate	Moderate
16	4	1	1	1	2	1	1	3	1.5	3	17.5	17.5	Moderate	Moderate
17	1	1	2	1	3	1	1	1	2.5	3	14.5	15.5	Low	Low
18	1	1	2	1	3	1	1	1	2.5	3	14.5	15.5	Low	Low
19	2	1	2	1	1	1	1	2	3	3	15	16	Low	Moderate

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
20	2	1	2	1	1	1	1	1	3.5	3	14.5	15.5	Low	Low
21	2	1	2	1	1	1	1	2	3.5	3	15.5	16.5	Low	Moderate
22	2	1	2	1	1	1	1	3	4.5	3.5	18	19	Moderate	Moderate
23	2	1	2	1	1	1	1	3	3	3.5	16.5	17.5	Moderate	Moderate
24	4	1	1	1	1	2	1	2	3.5	3	18.5	18.5	Moderate	Moderate
25	4	1	1	1	1	2	1	3	3	3	19	19	Moderate	Moderate
26	4	1	1	1	1	1	1	4	1.5	3	17.5	17.5	Moderate	Moderate
27	2	1	2	1	1	3	1	4	3.5	3.5	20	21	High	High
28	2	1	2	1	1	4	1	4	3	3.5	20.5	21.5	High	High
29	2	1	2	1	1	1	1	4	3	3.5	17.5	18.5	Moderate	Moderate
30	4	1	4	1	1	1	1	3	2.5	3.5	18	21	Moderate	High
31	4	1	4	1	1	1	1	4	2.5	3.5	19	22	Moderate	High
32	4	1	4	1	1	1	1	4	2.5	3.5	19	22	Moderate	High
33	2	1	1	1	1	3	1	4	1.5	3.5	18	18	Moderate	Moderate
34	2	1	1	1	1	4	1	4	2	3	19	19	Moderate	Moderate
35	2	1	1	1	1	1	1	4	1.5	3	15.5	15.5	Low	Low
36	2	1	1	1	1	1	1	2	1.5	3	13.5	13.5	Low	Low
~~37~~	~~4~~	~~1~~	~~1~~	~~1~~	~~1~~	~~2~~	~~1~~	~~4~~	~~3~~	~~3~~	~~20~~	~~20~~	~~High~~	~~High~~
~~38~~	~~4~~	~~1~~	~~1~~	~~1~~	~~2~~	~~4~~	~~4~~	~~4~~	~~1.5~~	~~3.5~~	~~25~~	~~25~~	~~Very High~~	~~Very High~~

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
39	4	1	4	1	2	3	1	3	3.5	3.5	22	25	High	Very High
40	4	1	4	1	1	2	1	2	3.5	3.5	19	22	Moderate	High
41	4	1	4	1	1	3	1	4	3	3.5	21.5	24.5	High	Very High
42	4	1	4	1	1	3	1	4	2.5	3.5	21	24	High	Very High
43	4	1	4	1	2	2	1	4	3.5	3	21.5	24.5	High	Very High
44	2	1	1	1	4	4	1	4	4.5	3	24.5	24.5	Very High	Very High
45	2	1	1	1	2	3	1	4	3	3	20	20	High	High
46	2	1	1	1	1	3	1	4	3	3	19	19	Moderate	Moderate
47	2	1	1	1	1	3	1	2	2.5	3	16.5	16.5	Moderate	Moderate
48	4	1	1	1	1	2	1	2	2.5	3	17.5	17.5	Moderate	Moderate
49	4	1	1	1	1	1	1	4	1.5	3	17.5	17.5	Moderate	Moderate
50	4	1	4	1	1	1	1	4	2.5	3	18.5	21.5	Moderate	High
51	4	1	4	1	2	1	1	4	3	3.5	20.5	23.5	High	High
52	4	1	4	1	2	1	1	4	3	3.5	20.5	23.5	High	High
53	4	1	4	1	1	2	1	4	5	3.5	22.5	25.5	High	High
54	2	1	2	1	1	1	1	3	3	3	16	17	Moderate	Moderate
55	2	1	1	1	1	1	1	3	3	3	16	16	Moderate	Moderate
56	3	2	2	1	1	1	1	2	2	3	16	16	Moderate	Moderate
57	3	2	2	1	1	1	1	1	3	3	16	16	Moderate	Moderate

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
58	3	2	2	1	1	1	1	1	2	3	15	15	Low	Low
59	3	2	2	1	2	1	1	1	2	3	16	16	Moderate	Moderate
60	3	2	2	1	2	1	1	1	3	3	17	17	Moderate	Moderate
61	3	2	2	1	2	1	1	1	3	3	17	17	Moderate	Moderate
62	3	2	2	1	3	1	1	2	3	3	19	19	Moderate	Moderate
63	3	2	2	1	2	1	1	3	2	3	18	18	Moderate	Moderate
64	3	2	2	1	3	1	1	2	2	3	18	18	Moderate	Moderate
65	3	2	2	1	3	1	1	2	2	3	18	18	Moderate	Moderate
66	3	2	2	1	1	1	1	2	3	3	17	17	Moderate	Moderate
67	3	2	2	1	1	1	1	3	3.5	3	18.5	18.5	Moderate	Moderate
68	3	2	2	1	1	1	1	3	2	3	17	17	Moderate	Moderate
69	3	2	2	1	2	1	1	2	2.5	3	17.5	17.5	Moderate	Moderate
70	3	2	2	1	3	2	2	2	2	3	20	20	High	High
71	3	2	2	1	2	2	2	3	2	3	20	20	High	High
72	3	2	2	1	2	2	2	1	2	3	18	18	Moderate	Moderate
73	3	2	2	1	3	1	1	3	2.5	3	19.5	19.5	Moderate	Moderate
74	2	1	1	1	1	1	1	2	1.5	3	13.5	13.5	Low	Low
75	2	1	1	1	1	1	1	2	2.5	3	14.5	14.5	Low	Low
76	2	1	1	1	1	1	1	1	1.5	3	12.5	12.5	Low	Low

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
77	2	1	1	1	2	1	1	2	1.5	3	14.5	14.5	Low	Low
78	3	2	2	1	3	1	1	2	3.5	3	19.5	19.5	Moderate	Moderate
79	3	2	2	1	1	1	1	2	2	3	16	16	Moderate	Moderate
80	3	2	2	1	3	2	1	1	4	3	20	20	High	High
81	3	2	2	1	4	4	3	2	3.5	3	25.5	25.5	Very High	Very High
82	3	2	2	1	2	2	2	2	2.5	3	19.5	19.5	Moderate	Moderate
83	3	2	2	1	2	1	1	3	2	3	18	18	Moderate	Moderate
84	3	2	2	1	2	1	1	3	2	3	18	18	Moderate	Moderate
85	3	2	2	1	2	4	1	3	2	3	21	21	High	High
86	4	1	4	1	1	2	1	3	3.5	3	19.5	22.5	Moderate	High
87	4	1	4	1	2	1	1	2	3.5	3	18.5	21.5	Moderate	High
88	2	1	1	1	2	2	1	3	3	3	18	18	Moderate	Moderate
89	2	1	1	1	1	3	1	3	1.5	3	16.5	16.5	Moderate	Moderate
90	2	1	1	1	1	2	1	2	1.5	3	14.5	14.5	Low	Low
91	3	2	3	1	2	1	1	4	2.5	3	19.5	20.5	Moderate	High
92	3	2	3	1	3	1	1	3	2.5	3	19.5	20.5	Moderate	High
93	3	2	3	1	4	1	1	3	2.5	3	20.5	21.5	High	High
94	3	2	3	1	2	1	1	4	2.5	3	19.5	20.5	Moderate	High
95	3	2	3	1	3	1	1	2	2.5	3	18.5	19.5	Moderate	Moderate

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
96	3	2	4	1	3	1	1	4	3	3	21	23	High	High
97	2	1	1	1	1	4	1	2	3.5	3	18.5	18.5	Moderate	Moderate
98	2	1	1	1	1	2	1	1	1.5	3	13.5	13.5	Low	Low
99	2	1	1	1	1	1	1	2	1.5	3	13.5	13.5	Low	Low
100	2	1	1	1	1	1	1	4	1.5	3	15.5	15.5	Low	Low
101	3	2	4	1	3	1	1	4	3	3	21	23	High	High
102	3	2	4	1	4	1	1	4	4	3	23	25	High	Very High
103	3	2	4	1	3	1	1	3	3	3	20	22	High	High
104	3	2	4	1	4	2	2	3	4	3	24	26	High	Very High
105	3	2	4	1	4	3	2	3	3.5	3	24.5	26.5	Very High	Very High
106	3	2	4	1	3	3	3	3	3.5	3	24.5	26.5	Very High	Very High
107	3	2	4	1	1	4	1	3	3	3	21	23	High	High
108	2	1	4	1	1	3	1	3	2	3	17	20	Moderate	High
109	2	1	4	1	2	1	2	4	1.5	3	17.5	20.5	Moderate	High
110	3	2	4	1	3	4	1	4	3	3	24	26	Very High	Very High
111	3	2	4	1	3	4	1	4	4	3	25	27	Very High	Very High
112	3	2	4	1	2	3	2	4	3	3	23	25	High	Very High
113	3	2	4	1	3	3	3	4	3.5	3	25.5	27.5	Very High	Very High
114	3	2	4	1	1	1	1	4	4	3	20	22	High	High

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
115	3	2	4	1	3	4	1	3	4.5	3	24.5	26.5	Very High	Very High
116	3	2	2	1	1	1	1	1	2.5	3	15.5	15.5	Low	Low
117	3	2	2	1	1	1	1	4	2	3	18	18	Moderate	Moderate
118	3	2	3	1	2	1	1	3	4	3	20	21	High	High
119	3	2	3	1	3	1	1	4	2.5	3	20.5	21.5	High	High
120	4	1	4	1	3	1	1	4	2.5	3	20.5	23.5	High	High
121	4	1	4	1	3	1	1	4	4.5	3	22.5	25.5	High	High
122	3	2	3	1	4	1	1	4	3.5	3	22.5	23.5	High	High
123	3	2	3	1	3	1	1	4	3.5	3	21.5	22.5	High	High
124	3	2	3	1	2	1	1	4	2.5	3	19.5	20.5	Moderate	High
125	3	2	3	1	1	1	1	4	3	3	19	20	Moderate	High
126	3	2	3	1	1	1	1	4	3.5	3	19.5	20.5	Moderate	High
127	3	2	3	1	1	1	1	2	2.5	3	16.5	17.5	Moderate	Moderate
128	3	2	3	1	2	1	1	2	2.5	3	17.5	18.5	Moderate	Moderate
129	3	2	3	1	2	1	1	3	3	3	19	20	Moderate	High
130	3	2	4	1	2	1	1	4	3	3	20	22	High	High
131	3	2	4	1	2	2	1	4	3	3	21	23	High	High
132	4	2	4	1	3	4	2	4	2.5	3	25.5	27.5	Very High	Very High
133	3	2	4	1	4	3	1	3	3	3	23	25	High	Very High

Turbine	Bird Utilisation – Number of Records	Bird Utilisation - RSA Type A (100 m–300 m)	Bird Utilisation – RSA Type B (60 m–240 m)	Distance to wetlands	Distance to hydrology	Distance to stick nest	Distance to HBT	Distance to vegetation	Bird Risk Rating	Bat Risk Rating	Turbine Score RSA Type A (100 m–300 m)	Turbine Score RSA Type B (60 m–240 m)	Turbine Risk RSA Type A (100 m–300 m)	Turbine Risk RSA Type B (60 m–240 m)
134	3	2	4	1	3	1	1	2	4	3	20	22	High	High
135	3	2	3	1	2	1	1	2	2.5	3	17.5	18.5	Moderate	Moderate
136	3	2	3	1	2	1	1	4	3	3	20	21	High	High
137	3	2	3	1	3	1	1	3	2.5	3	19.5	20.5	Moderate	High
138	3	2	3	1	2	1	1	2	2.5	3	17.5	18.5	Moderate	Moderate
139	3	2	3	1	1	1	1	2	4.5	3	18.5	19.5	Moderate	Moderate
140	3	2	3	1	1	1	1	1	2.5	3	15.5	16.5	Low	Moderate
141	3	2	3	1	1	1	1	1	2.5	3	15.5	16.5	Low	Moderate
142	3	2	3	1	1	1	1	1	2.5	3	15.5	16.5	Low	Moderate
143	3	2	3	1	1	1	1	4	2.5	3	18.5	19.5	Moderate	Moderate

Note: WTG 37 and 38 have been removed from the Amended Project.

BayWa r.e.

r.e. think energy

Appendix E - MNES Report

umwelt
Environmental & Social Consultants

BayWa r.e.

BULLAWAH WIND FARM PROJECT

Matters of Environmental Significance Report

FINAL

August 2025

BULLAWAH WIND FARM PROJECT

Matters of Environmental Significance Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Bullawah Wind Farm Pty Ltd

Project Director:	Nathan Baker
Project Manager:	Thomas Buchan
Technical Director:	Rachel Musgrave
Report No.	22110/R43/Appendix E
Date:	August 2025

Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

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Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
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Final V2	Rachel Musgrave	27 August 2025	Nathan Baker	28 August 2025

Abbreviations

Abbreviation	Definition
AEMO	Australian Energy Market Operator
AGL	above ground level
AoS	Assessment of Significance
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Calculator
BAM VI	Biodiversity Assessment Method Vegetation Integrity
BayWa r.e.	BayWa r.e. Projects Australia Pty Ltd
BC Act	*Biodiversity Conservation Act 2016* NSW
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
BVMTT	Biodiversity Values Map Threshold Tool
BWF	Bullawah Wind Farm Pty Ltd
CEEC	Critically Endangered Ecological Community
Commonwealth CCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DoEWHA	Department of the Environment, Water, Heritage and the Arts
DoSEWPC	Department of Sustainability, Environment, Water, Population and Communities
DPE	NSW Department of Planning and Environment (current)
DPHI	NSW Department of Planning, Housing and Infrastructure
DPIE	NSW Department of Planning, Industry and Environment (superseded)
EAH	Environment Agency Head
EEC	Endangered Ecological Community
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning & Assessment Act 1979* NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* Commonwealth
EMI	*electromagnetic interference*
EMF	*electric and magnetic fields*
FM Act	*Fisheries Management Act 1994* NSW
FTE	full time equivalent
GDE	groundwater dependent ecosystem
GHG	greenhouse gas emissions
GIS	Geographic Information Systems
GW	Gigawatt
IBRA	Interim Biogeographic Regionalisation for Australia
KBA	Key Biodiversity Area
LALC	Local Aboriginal Land Council

Abbreviation	Definition
LEP	Local Environment Plan
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013* NSW
LLS Regulation	Local Land Services Regulation 2014 NSW
MNES	Matters of National Environmental Significance
MW	megawatts
NPW Act	*National Parks and Wildlife Act 1974* NSW
NSW	New South Wales
NSW DCCEEW	New South Wales Department of Climate Change, Energy, the Environment and Water
NVMP	Native Vegetation (Multi Attribute)
NVR	Native Vegetation Regulatory
PAH	Planning Agency Head
PCT	Plant Community Type
PMST	Protected Matters Search Tool
RES	Renewable Energy Systems
REZ	Renewable Energy Zone
RtS	Response to Submissions
SAT	Spot Assessment Technique
SAII	Serious And Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community
TSSC	Threatened Species Scientific Committee
Umwelt	Umwelt (Australia) Pty Limited
WTG	wind turbine generators

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1.0 Introduction

1.1 Title of the Action

The New South Wales (NSW) Government's Electricity Strategy and Electricity Infrastructure Roadmap (Electricity Strategy) sets out a plan to deliver the State's first five Renewable Energy Zones (REZs). These REZs will play a vital role in delivering affordable, reliable energy generation to help replace the State's existing power stations as they come to their scheduled end of operational life.

Bullawah Wind Farm Pty Ltd (BWF) proposes to develop the Bullawah Wind Farm (the Project, or 'the Proposed Action' where relevant), located approximately 36 kilometres (km) south east of Hay, within the South West Renewable Energy Zone (South West REZ). The Proposed Action is therefore strategically located in an area identified by the NSW Government as suitable for renewable energy projects and will assist the NSW government in delivering on the objectives for the Electricity Strategy and the South West REZ.

The Proposed Action will include the installation, operation, maintenance and decommissioning of up to 141 wind turbine generators (WTGs), battery storage, ancillary infrastructure and temporary facilities associated with construction of the Proposed Action. The Project design incorporates up to 141 wind turbines, with a maximum blade-tip height of 300 metres (m) above ground level, and an installed capacity of up to 803.7 megawatts (MW).

The Project is a State Significant Development (SSD) under the State Environmental Planning Policy (Planning Systems) 2021, being a development for the purposes of electricity generating works and with a capital investment value of over $30 million. An Environmental Impact Statement (EIS) for the Project was submitted to the NSW Department of Planning, Infrastructure and Housing (DPHI) in July 2024. A summary of the Project as described in the EIS (i.e. the EIS Project) is included in **Section 2.0.**

Public exhibition of the EIS took place between 27 August 20242 and 23 September 2024 with 87 unique submissions made by the public as well as submissions from three (3) local councils and 19 government agencies. A formal response to these submissions and government agency advice received on the Project EIS was provided in the form of a Submissions Report, prepared in consideration of the State significant development guidelines – preparing a submissions report (i.e. the SSD Submissions Report Guidelines) (DPHI, 2022a) to address the key public submission issues and agency advice raised.

Since submission of the EIS, and in response to select community submissions and government agency advice, BWF has conducted a thorough review of the layout and optimised the Project design to enhance its efficiency while minimising associated environmental and social impacts. The proposed amendments to the Project design are discussed in **Section 1.2** below.

The Amended BDAR (August 2025 version), to which this report is appended, forms part of the broader response to a formal request for information (RFI) raised by NSW Department of Planning, Housing and Infrastructure (DPHI) on 23 June 2025 (i.e. RFI#2), which included feedback from the Regional Delivery Division (RD), South West of the Conservation Programs, Heritage, and Regulation (CPHR) (formerly South West BCD) section of NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) on the Amended Project.

This amended Project design is hereafter referred to as the 'Proposed Action' or where required the 'Proposed Action (as amended)', and is equivalent to the 'Amended Project' term used in the NSW SSD approvals documentation.

This appendix consolidates the Commonwealth Department of Climate Change, Energy, the Environment and Water (Commonwealth DCCEEW) assessment requirements, as provided in the supplementary Secretary's Environmental Assessment Requirements (SEARs) for the Proposed Action to support the controlled action determination (EPBC 2022/09423, determined on 20 March 2023).

1.2 The Proposed Action (as Amended)

A number of amendments are proposed for the Project in response to public submissions and agency advice received on the Project EIS during the exhibition period, along with technical advancements to the design of the Project. These amendments are all design refinements and do not materially change the nature of the Proposed Action.

A summary of the key proposed amendments to the EIS Project are provided in **Table 1.1**.

Table 1.1 Proposed Amendments

No.	Description
1	**Construction staging amendments** – BWF has identified that Stage 2 (North) is now likely to commence sooner than was previously indicated in the Project EIS, and may commence prior to Stage 1 (South). As a result, a greater overlap between the construction periods for Stage 1 (South) and Stage 2 (North) is now anticipated. Consequently, the peak workforce has increased from 350 workers at the height of construction as identified in the Project EIS, to 380 workers in this Amendment Report. As a result this amendment also reduces the overall duration of the construction period from 44 to 35 months.
2	**Transport route amendments** – The Proposed Action (as amended) encompasses two (2) port options, being Port of Newcastle (considered in the EIS but with impacts only being assessed for the "Local Transport Route" component) and Port Adelaide (a new port option considered in the Amendment Report). Accordingly, BWF is now seeking consent for any and all impacts associated with off-site road works and modifications between the nominated Ports and the Project Area, noting that consent associated with the SSDA is wholly limited to works within NSW. The Proposed Action (as amended) proposes five (5) Port to Hay Over-size Over-mass (OSOM) transport route options. This includes three (3) route options from the Port of Newcastle, and two (2) route options from the Port Adelaide.
3	**WTG amendments** – The Proposed Action (as amended) includes two (2) potential scenarios with respect to WTG dimensions. The Project EIS identified a maximum turbine size, being a tip height of up to 300 m and a blade length of up to 100 m. BWF has subsequently identified a maximum alternate turbine size (being a tip height of up to 233 m and a blade length of up to 80 m) for the purposes of identifying and assessing required road upgrades to the Port to Hay Transport Routes. However, BWF is seeking to retain flexibility to install a larger turbine (up to 300 m tip height and 100 m blade length), should the necessary Port to Hay upgrades be undertaken by the NSW Government or a third party.
4	**Obstacle Lighting Amendments** – The provision of obstacle lighting on select WTGs and meteorological masts (where masts are installed prior to WTG installation or are not in close proximity to a boundary WTG (>900 m)) in accordance with CASA requirements.
5	**Project Design Refinements** – Includes the removal of two (2) WTGs (WTG 37 and 38), related infrastructure and associated disturbance from the Project design.

1.3 Purpose and Objectives

The purpose of this revised MNES report is to enhance where necessary any previous assessment undertaken at the Project EIS phase, incorporate the methodology, results and findings of any new or additional survey and assessment that has occurred since, and then address the WTG and obstacle lighting amendments i.e. item 3 and item 4 in **Table 1.1** above. This report also incorporates additional assessment to MNES values is response to a formal RFI raised by CPHR and Commonwealth DCCEEW on the Amended BDAR.

Project amendments 1 (construction staging) and 5 (Project design refinements) are considered to have neutral or reduced biodiversity-related impacts and are not considered further in this report.

Project amendment 2 (transport route) was considered within two (2) separate and additional BDAR prepared to assess impacts associated with any off-site road works, refer to Appendix J and Appendix K of the Amended BDAR. These BDARs concluded that no MNES are likely to be impacted by the off-site road works, and hence, this amendment is not considered further in this report.

1.4 The Proponent

The Proponent (i.e. Person proposing to take the action) is BWF, a subsidiary of BayWa r.e.

Based in 34 countries, BayWa r.e. is a leading global renewable energy developer, service provider, distributor and energy solutions provider, and is actively shaping the future of energy. BayWa r.e. delivers end to end project solutions, ongoing operations management and is an Independent Power Producer with an expanding energy trading business. BayWa r.e. has successfully brought over 6 GW of renewable energy online, while managing over 10.5 gigawatts (GW) of renewable energy assets.

Through its subsidiary, BayWa r.e. Projects Australia Pty Limited, BayWa r.e. has hubs in Brisbane, Melbourne and Sydney, focussing on delivering wind, solar, battery storage and hydrogen projects within Australia and New Zealand. BayWa r.e. Projects Australia has commissioned over 270 MW of solar and wind projects, and their project pipeline reports more than 5.7 GW under development**.**

Key details of the Proponent (i.e. Person proposing to take the action) are provided in **Table 1.2**.

Table 1.2 Proponent Details

Requirement	Details
Full Name/s	Bullawah Wind Farm Pty Limited (BWF)
Postal Address	Suite 2, Level 11, 555 Lonsdale Street, Melbourne, Victoria, 3000
Street Address (Project Area)	4549 Jerilderie Road, Hay South, NSW 2711
ABN	15 660 244 182
Nominated Contact	Aidan O'Mahony

BWF has no prior EPBC Act Referrals, however one previous referral was submitted by BayWa r.e in December 2022, which is the Kariboe Wind Farm Project EPBC 2022/09428. This referral is currently in the process of being reviewed by the (Commonwealth DCCEEW). In May and June 2024, BayWa r.e. submitted referrals under the EPBC Act for its Wimmera Plains Energy Facility in Victoria, and its Hughes Road Battery Energy Storage System in Queensland, respectively.

BayWa r.e. has a satisfactory record of responsible environmental management. As noted above it has commissioned over 270 MW of solar and wind projects, and their project pipeline reports more than 5.7 GW under development. The projects in Australia which include Ferguson Wind Farm (10.8 MW), Diapur Wind Farm (7.4 MW) and Timboon Wind Farm (7.2 MW), Karadoc (112 MW) and Yatpool (106 MW) Solar Farm in Vic and Hughendon Solar Farm (20 MW) in QLD. These projects have been undertaken under Council and State approvals and has satisfactory implemented all the conditions of its previous Council and State Approvals. BayWa r.e. is committed to meaningful and transparent engagement with planning and environmental authorities with respect to its project.

BayWa r.e. has not been subject to any past or present proceedings Commonwealth, State or Territory Law for the protection of the environment or the conservation and sustainable use of natural resources.

BayWa r.e. Projects Australia provides an extensive range of services from project development and implementation to finance and the operation of large-scale solar and wind farms in Australia.
Its experienced team, comprised of local and international staff delivering on Project development, Turnkey construction, Financing and Power Purchase Agreements and Operation services.

BayWa r.e. does not have a stand-alone environmental policy or planning framework as these matters are addressed regionally, and in Australia, to meet all relevant Commonwealth, State or Territory and Local environmental and planning related requirements applicable to each project. Overall, and in delivering the above-mentioned services in Australia, BayWa r.e. aims to comply with all laws, legislation and policy applicable to them. BayWa r.e. will comply with all Commonwealth and NSW laws, legislation and policy applicable to the Proposed Action, inclusive of any Local planning aspects. For a wind farm the following environmental matters are acknowledged by BayWa r.e. and have been assessed for the Proposed Action, as part of the preparation of the Environmental Impact Statement (EIS): biodiversity (flora and fauna); heritage (Aboriginal Cultural and historical); water and soils; landscape character and visual, shadow flicker and blade glint; acoustics (noise and vibration); traffic and transport; telecommunications (electromagnetic interference, EMI); electric and magnetic fields (EMF); other hazards such as bushfire, blade throw and aviation; and social.

These BayWa r.e. commitments to the environment, and relevant planning related matters, align with BayWa r.e. broader sustainability values. BayWa r.e. recognizes that sustainability is a holistic endeavour and as an organisation aims to go ‘beyond carbon’ and address a wide range of sustainability aspects for society, economy and the environment.

The above-mentioned performance standards and commitments apply in full to BWF.

1.5 NSW and Commonwealth Bilateral Agreement

Commonwealth DCCEEW published a decision for the Proposed Action’s EPBC Act assessment approach in March 2023, stating that the ‘Bilateral Agreement’ applies to the Project. Supplementary SEARs were subsequently issued by DPE to address matters protected under the EPBC Act.

The Bilateral Agreement was made under Section 45 of the EPBC Act and allows a single environmental assessment process to be jointly implemented by the Commonwealth DCCEEW and NSW Department of Planning, Housing and Infrastructure (DPHI). This Agreement was signed by both parties in 2015. When the assessment process for a project is complete, DPHI provides a report to Commonwealth DCCEEW assessing the potential impacts on Matters of National Environmental Significance (MNES) listed under the EPBC Act.

This MNES Report will be used by the DPHI to prepare its assessment report of the Project for Commonwealth DCCEEW review. DPHI and Commonwealth DCCEEW will make separate approval decisions under the EP&A Act and EPBC Act, respectively.

An Amending Agreement between Commonwealth DCCEEW and DPHI was entered into on 24 March 2020, which endorses the NSW Biodiversity Assessment Method (BAM) for assessing impacts on MNES under the EPBC Act (DPIE 2020a). Offsets are required under the EPBC Act for any residual significant adverse impacts on MNES. The Bilateral Agreement applies to all NSW projects that require approval under the EPBC Act to achieve streamlining benefits for projects that use the Biodiversity Offset Scheme (BOS).

1.5.1 Likely Impacts on Matters of National Environmental Significance

The supplementary SEARs issued by DPE identified that, based on the information in the EPBC Act Referral for the Proposed Action, it is likely to have significant impacts on the following MNES.

- Threatened ecological communities:
    - Natural Grasslands of the Murray Valley Plains – Critically Endangered.
    - Weeping Myall Woodlands – Endangered.
- Threatened fauna species:
    - Plains-wanderer (*Pedionomus torquatus*) – Critically Endangered.

1.5.2 Potential Impacts on Matters of National Environmental Significance

Additionally, the supplementary SEARs identified the potential for significant impacts on the following MNES, requiring further investigation.

- Threatened ecological communities:
    - Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – Endangered
    - Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions – Endangered
    - Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions – Critically Endangered
    - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered.
- Threatened flora species:
    - Slender Darling Pea (*Swainsona murrayana*) – Vulnerable
    - Chariot Wheels (*Maireana cheelii*) – Vulnerable
    - Mossgiel Daisy (*Brachyscome papillosa*) – Vulnerable
    - Winged Peppercress (*Lepidium monoplocoides*) – Endangered.

- Threatened fauna species:
    - Superb Parrot (*Polytelis swainsonii*) – Vulnerable
    - Painted Honeyeater (*Grantiella picta*) – Vulnerable
    - Grey Falcon (*Falco hypoleucos*) – Vulnerable
    - Southern Bell Frog (*Litoria raniformis*) – Vulnerable
    - Grey Snake (*Hemiaspis damelii*) – Endangered.

Further, the following species were either considered to have a moderate or higher likelihood of being present within the Project Area or recorded during Umwelt surveys. They were therefore identified to be at risk from the Proposed Action and have been assessed in this report.

- Threatened flora species:
    - A spear-grass (*Austrostipa wakoolica*) – Endangered (based on likelihood of occurrence)
    - A burr daisy (*Calotis moorei*) – Endangered (based on likelihood of occurrence)
    - Claypan Daisy (*Brachyscome muelleroides*) – Vulnerable (based on likelihood of occurrence)
    - Red Darling Pea (*Swainsona plagiotropis*) – Vulnerable (based on likelihood of occurrence)
    - Spike-rush (*Eleocharis obicis*) – Vulnerable (based on presence in the Project Area)
    - Turnip Copperburr (*Sclerolaena napiformis*) – Endangered (based on likelihood of occurrence).
- Threatened fauna species:
    - Southern Whiteface (*Aphelocephala leucopsis*) – Vulnerable (based on presence in the Project Area)
    - Blue-winged Parrot (*Neophema chrysostoma*) – Vulnerable (based on presence in the Project Area)
    - Diamond Firetail (*Stagonopleura guttata*) – Vulnerable (based on presence in the Project Area).

1.5.3 Current Status

As part of the application for SSD approval, an EIS has been prepared in accordance with the SEARs and supplementary SEARs issued for the Proposed Action. As part of the EIS process, Umwelt was engaged by BWF to prepare a Biodiversity Development Assessment Report (BDAR) in accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act) and the BAM (DPIE, 2020a) under the NSW Biodiversity Offset Scheme (BOS).

The EIS for the Project (SSD-50505215) was submitted to DPHI in July 2024 and publicly exhibited between 27 August 2024 and 23 September 2024 with 87 unique submissions made by the public as well as submissions from three (3) local councils and 19 government agencies. Through the NSW planning system "Submissions Phase", an Amendment Report (including an Amended BDAR) has been prepared to which this MNES report is an appendix to (Appendix E).

Since lodgement of the EIS, BWF has conducted a thorough review of the layout and optimised the design to enhance Project efficiency while minimising associated environmental and social impacts, including impacts to MNES. Project amendments, as summarised in **Section 1.2**, have occurred to address government agency and community submissions and to encompass the findings of the layout review and design optimisation process.

This 'Matters of Environmental Significance Report' has been prepared to support the Amended BDAR which addresses the supplementary SEARs and potential impacts on MNES for DCCEEW consideration. The Amended BDAR also responds to comments received from CPHR. This report incorporates relevant updates to the Amended BDAR conducted in response to CPHR comments, including information and results obtained from additional field surveys carried out between September 2024 and March 2025.

It is noted that a 'Submissions Report' was prepared as required for the NSW planning system, and in addition to the above-mentioned 'Amendment Report'. However, detailed responses with regard to all aspects of biodiversity assessment (incl. MNES) are provided solely within the Amendment Report, and factor in the layout and design optimisations discussed above.

This report has been prepared in accordance with the MNES Significant Impact Guidelines 1.1 (CoA, 2013). More specifically, potential impacts associated with the Proposed Action (as amended) have been assessed for threatened ecological communities (TECs), threatened species and migratory species that are known or likely to occur in the Project Area against the significant impact criteria. This report has also been prepared in accordance with the *'BCS Bilateral Assessment information and data requirements guidance'* provided within Attachment C of CPHR's comments on the BDAR. Consistent with the guidance from the CPHR, the MNES assessment includes the following key information:

- Summary of the Proposed Action.
- Description of the Project Area.
- Assessment of potential impacts on MNES.
- Confirmation that all MNES (that have the potential to be impacted by the Proposed Action) have been addressed in the Environmental Impact Statement (EIS).
- Summary of consultation undertaken to date, and consultation activities planned, as part of the EIS.
- Measures to avoid and minimise impacts and any proposed alternatives.
- Administrative details of the proponent.

1.6 MNES Assessment Requirements under the NSW Bilateral Agreement

The biodiversity requirements for MNES are set out in the supplementary SEARs as replicated in **Table 1.3**, including cross-references to the relevant section of this report and the BDAR (Umwelt 2024) where each requirement is addressed. Submissions from the Regional Delivery Division, South West of CPHR on the BDAR, including this MNES Report that were addressed within the Amended BDAR (April 2025), have been addressed herein and a summary of these responses is provided in **Table 1.3**.

Further comments from CHPR on the Amended BDAR, including comments received as part of RFI#2 and a summary of Umwelt's responses are contained in **Table 1.5.**

Table 1.3 Commonwealth DCCEEW Supplementary SEARs for Bullawah Wind Farm (EPBC 2022/09423)

Key Issue	Supplementary SEARs Requirement	MNES Report Reference	Amended BDAR Reference
Introduction	3. The proponent must undertake an assessment of all protected matters that may be impacted by the development under the controlling provision identified in paragraph 1 (i.e. listed threatened species and communities (sections 18 and 18A). The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) considers that the proposed action is likely to have a significant impact on threatened species and communities listed in Appendix A.	Whole Document	Section 1.3.2 and Section 8.5.
	The DCCEEW considers that there is likely to be a significant impact on the following MNES		Section 8.5
	Plains-wanderer (*Pedionomus torquatus*) – Critically Endangered	**Section 8.2.12** and Section 3.5 of **Appendix 2**	Section 5.3.5.8 and 8.4.3
	Natural Grasslands of the Murray Valley Plains – Critically Endangered	**Section 8.1.1**	Section 4.5.5
	Weeping Myall Woodlands – Endangered.	**Section 8.2.2** and Section 2.1 of **Appendix 2**	Section 4.5.4
	4. The proponent must consider each of the protected matters under the triggered controlling provisions that may be impacted by the action. Note that this may not be a complete list and it is the responsibility of the proponent to undertake an analysis of the relevant impacts and ensure all protected matters that are likely to be impacted are assessed for the Commonwealth Minister's consideration.	Whole Document	Section 1.3.2
	The DCCEEW considers that there is some risk that there may be significant impacts on the following listed threatened species and communities and levels of impact should be further investigated:		Section 1.3.2
	Slender Darling Pea (*Swainsona murrayana*) - Vulnerable	**Section 8.2.4** and Section 4.1 of **Appendix 2**	Section 5.3.4.12 Section 8.1.2 Section 8.5.2
	Chariot Wheels (*Maireana cheelii*) - Vulnerable	**Section 8.2.3** and Section 4.2 of **Appendix 2**	Section 5.3.4.5 Section 8.1.2 Section 8.5.2

Key Issue	Supplementary SEARs Requirement	MNES Report Reference	Amended BDAR Reference
	Winged Peppercress (*Lepidium monoplocoides*) – Endangered	**Section 8.2.6** and Section 3.2 of **Appendix 2**	Section 5.3.4.16 Section 8.1.2 Section 8.5.2
	Superb Parrot (*Polytelis swainsonii*) – Vulnerable	**Section 8.2.15** and Section 4.11 of **Appendix 2**	Section 5.3.5.9 Section 8.5.2
	Painted Honeyeater (*Grantiella picta*) – Vulnerable	**Section 8.2.11** and Section 4.7 of **Appendix 2**	Section 5.2.1 Section 5.2.2 Section 8.1.1
	Grey Falcon (*Falco hypoleucos*) – Vulnerable	**Section 8.1.3**	Section 5.2.1 Section 5.2.2 Section 8.1.1
	Southern Bell Frog (*Litoria raniformis*) – Vulnerable	**Section 8.2.16** and Section 4.9 of **Appendix 2**	Section 5.3.5.11 Section 8.1.2 Section 8.3.1 Section 8.5.2
	Grey Snake (*Hemiaspis damelii*) – Endangered	**Section 8.1.3**	Section 5.3.5.12 Section 8.5.2
	Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – Endangered	**Section 8.1.1**	N/A
	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions – Endangered	**Section 8.1.1**	N/A
	Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions – Critically Endangered	**Section 8.1.1**	N/A
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered.	**Section 8.1.1**	N/A

Key Issue	Supplementary SEARs Requirement	MNES Report Reference	Amended BDAR Reference
General Requirements *Relevant Regulations*	5. The Environmental Impact Statement (EIS) must address all matters outlined in Schedule 4 of the EPBC Regulations and all matters outlined below in relation to the controlling provisions.	Whole document	Whole document
General Requirements ***Project Description***	6. The title of the action, background to the action and current status.	**Section 1.0**	Section 1.0
	7. The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on MNES.	**Section 2.1** **Section 2.2**	Section 2.0 and Section 3.1
	8. How the action relates to any other actions that have been, or are being taken in the region affected by the action.	**Section 2.5**	N/A
	9. 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 on MNES.	**Section 5.1** **Section 5.0**	Section 7.1.3 Section 7.2.2
General Requirements *Impacts*	10. The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including: i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts; ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible; iii. analysis of the significance of the relevant impacts; and iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	**Section 6.0**	Section 8.0
General Requirements ***Avoidance, mitigation and offsetting***	11. For each of the relevant matters protected that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including: i. a description, and an assessment of the expected or predicted effectiveness of the mitigation measures; ii. any statutory policy basis for the mitigation measures; iii. the cost of the mitigation measures;	**Section 5.0**	Section 7.0 and Section 9.0

Key Issue	Supplementary SEARs Requirement	MNES Report Reference	Amended BDAR Reference
	iv. 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; v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.		
	12. Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.	**Section 7.0**	Section 7.0 Section 9.0 and Section 12.0
	13. For <u>each</u> of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any: i. conservation advice or recovery plan for the species or community; ii. relevant threat abatement plan for the species or community; iii. wildlife conservation plan for the species; and iv. any strategic assessment.	**Section 3.1.4** and **Appendix 2**	Appendix E of Amended BDAR
	14. In addition to the general requirements described above, specific information is required with respect to each of the determined controlling provisions. These requirements are outlined in paragraphs 15-17.	Provided below for 15–17	Provided below for 15-17.
Biodiversity (threatened species and communities) ***<u>Assessment Requirements</u>***	15. The EIS must identify each EPBC Act listed threatened species and community likely to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.	**Section 3.2** **Section 8.1**	Section 4.5 Section 5.1 Section 5.2 Section 8.0 Section 10.1.2
	16. For each of the EPBC Act listed threatened species and communities likely to be impacted by the action the EIS must provide a separate: i. description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans;	**Section 3.0** **Section 4.0** **Section 5.0** **Section 8.2**	Section 4.0 Section 5.0 Section 7.4 Section 8.0 Section 9.0

Key Issue	Supplementary SEARs Requirement	MNES Report Reference	Amended BDAR Reference
	ii. details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements; iii. description of the relevant impacts of the action having regard to the full national extent of the species or community's range; iv. description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action; v. identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account; vi. a description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established. vii. details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts; and vi. details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites.		Section 10.0 Section 12.0
	17. Any significant residual impacts not addressed by the BAM may need to be addressed in accordance with the EPBC Act 1999 Environmental Offset Policy. http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.	**Section 7.0**	Section 1.3 Appendix E

Table 1.4 Summary and Reference Table for CPHR Submissions addressed within the Amended BDAR (April 2025)

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
A BBAMP based on sufficient survey data and documenting commitments to monitor, mitigate and offset residual impacts to avifauna, is yet to be provided.			
4	A draft Bird and Bat Management Plan needs to be to be prepared. Recommendation: *4.1. Provide a draft BBAMP as an Appendix to the BDAR as required by section 2.7 of the BAM Operational Manual Stage 2*.	Section 7.4.1 of the Amended BDAR detailed a comprehensive Bird and Bat Adaptive Management Plan (BBAMP) framework to inform the preparation of the BBAMP following approval of the Project. The framework includes details of surveys proposed (including methods and frequency) as part of operational monitoring of turbine strike on avifauna, as well as details on impact triggers and associated response procedures for both threatened and nonthreatened species, mitigation measures, and reporting requirements. Preparing a BBAMP prior to Project approval and the finalisation of detailed design risks unnecessary rework as key design elements have yet to be designed. Furthermore, both NSW and Commonwealth agencies will have the opportunity to review and comment of the BBAMP as part of agency consultation prior to the BBAMP being adopted and implemented. In lieu of a complete BBAMP, Umwelt has supplemented the detail which would be included within the BBAMP in Section 7.4.1 of the Amended BDAR, as well as provided a Table of Contents for the BBAMP in Appendix G.	Section 7.4.1 and Appendix 4 of the Amended BDAR
5	Additional Bird and Bat Utilisation Survey (BBUS) effort is needed to ensure that the BBUS can be used to reliably inform the draft BBAMP. *Recommendations:* *5.1. Establish a BBUS survey program with sufficient coverage of the site in line with best practice (i.e. 80 per cent of the project area).* *5.2. Revise the collision risk assessment for all species*	In August 2022, Umwelt consulted with CPHR regarding the proposed BBUS methodology. As part of this consultation, CPHR was provided with the Bird and Bat Utilisation Survey and Assessment Method (Umwelt, 2022) for review and comment. A meeting was also held between CPHR and Umwelt to discuss the methodology. CPHR provided a written response to the BBUS methodology on 5 September 2022 (Reference: DOC22-477467) which stated "BCD is satisfied that the proposed BBUS methodology has been designed to record the required information to inform preapproval survey and assessment".	Appendix D of the Amended BDAR

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
		Following the release of 'Draft Wind Farm Assessment Guidance - South West REZ Projects' in July 2023, Umwelt clarified the need to implement the new guidance, specifically the 'Suggested BBUS Method' (i.e. 80 percent of the project area, as referred to in CPHR's RtS comments), given August 2022 consultation and advice. CPHR provided a written response via email dated 6 February 2024 which stated "BCD is satisfied with the BBUS methodology and does not require amendments based on guidance required". The advice provided by CPHR as part of the RtS submission of the BDAR is not consistent with previous advice. On this basis, Umwelt is not proposing carrying out further BBUS surveys to inform the turbine strike prescribed impact assessment. In order to address recommendation 5.2, Umwelt has reviewed and updated the collision risk assessment prepared in Appendix D. In addition.	
The BDAR requires additional information to demonstrate that impacts have been avoided and minimised, including to SAII entities.			
6	The BDAR needs to be revised to include more detail to demonstrate that biodiversity impacts have been avoided or minimised. *Recommendations:* *6.1. Revise maps and tables in Section 7.1 to clearly demonstrate how priority biodiversity constraints have been avoided, including Plains-wanderer important habitat, TECs and land managed for conservation.* *6.2 Identify where and how breeding habitat for raptors has been avoided.*	Further information relating to how the Project has avoided and minimised impacts has been provided in Section 7.0. Specifically, • Tabulated avoidance data has been provided for different design iterations to quantitatively show a reduction in biodiversity related impacts. • Additional figures which more clearly demonstrate how the project has been designed to avoid impacts to key biodiversity constraints. • Further information regarding how the Project has avoided breeding habitat for raptors, including Black Falcon has been provided.	Section 7.1 and Section 7.2

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
Plant Community Type (PCT), Threatened Ecological Communities (TEC), and vegetation zone identification and mapping need to be revised, and the biodiversity credit calculation updated.			
7	The outcomes of the TEC assessment need to be clear, and all criteria are to be applied. *Recommendations:* *7.1. Update all TEC justification tables to include all assessment criteria at the patch scale and outcomes for each vegetation zone assessed.* *7.2 Clarify if the occurrence of the Weeping Myall TEC is consistent with vegetation zone 4 or 5 or both.*	Additional information relating to the detailed TEC consideration and analysis against vegetation recorded, identified and assessed on the Project has been provided. Regarding the Weeping Myall Woodlands EEC under the EPBC Act, Vegetation Zone 6 (Moderate to Good) of PCT 26 intersecting the Subject Land conforms with Weeping Myall Woodlands, while all patches of Vegetation Zone 5 (DNG) do not.	Section 4.5 and Section 4.5.4 of the Amended BDAR, as well as **Section 4.3.1.1** of this document
8	Wet benchmarks have been applied to all vegetation integrity (VI) survey periods which may affect the ecosystem credit liability. *Recommendations:* *8.1. Provide the preceding 12 months of rainfall data for each VI plot survey period to support the use of either wet or dry benchmarks.* *8.2 Create a separate vegetation zone for VI plots collected in May 2024 to account for average benchmarks instead of wet benchmarks*	In order to address recommendation 8.1, Umwelt has added the preceding 12 months of rainfall data for each VI plot survey period to Table 4.2 in Section 4.1.2.3. Umwelt carried out a detailed analysis to assess the suitability of the benchmark attributed for each vegetation zone, the impact of WET versus AVERAGE rainfall benchmarks on VI scores as detailed in Section 4.1.5. For plots carried out in 2023, the composition and structure scores within the BAM VI plots collected within the Subject Land exceeded the AVERAGE benchmark values within BioNet Vegetation Classification for the PCTs recorded within the Subject Land for the key structural components of each PCT (i.e. grass richness and cover) indicating that the significant and above average rainfall has resulted in an overestimation of vegetation condition values. The WET benchmark values better reflect the composition and structure scores of the BAM VI plots collected onsite, indicating that they are more representative of VI during the 2023 survey period. As such, WET benchmarks can be where available. Plots surveyed in 2024 have been treated in the following way: • The plot in PCT 17 Moderate-good that was surveyed in 2024 was removed, and the VI score calculated utilising WET benchmarks. The removal of this plot did not affect the minimum plot requirements for this vegetation zone required under the BAM.	Table 4.2 in Section 4.1.2.3 and Section 4.1.5

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
		• AVERAGE benchmarks were applied to PCT 160 Moderate-good as all plots were carried out in 2024 when the total rainfall for the preceding 12-month period did not exceed the WET rainfall threshold for the PCT in question. • WET benchmarks were applied to all vegetation zones within PCT 26, PCT 28 and PCT 164 as the analysis demonstrated that the VI scores derived from both WET and AVERAGE benchmarks were essentially the same for the 2024 plots.	
9	Additional information is needed to justify the PCT selection. *Recommendation:* *9.1. Include a short list of PCTs considered for each PCT, why certain PCTs were discarded and why the final PCT is the best fit.*	Further information has been provided in this Amended BDAR relating to the process undertaken to consider, analyse and finalise PCT classification for the Project has been provided in the subsections of Section 4.3 of Amended BDAR. Specifically, a 'Justification of PCT Selection' is provided with regard to each PCT.	Section 4.3
Targeted survey methods are to be correctly applied and species polygons correctly prepared to ensure the credit calculation is accurate.			
10	There needs to be a consistent approach to adding and removing predicted species in the BAM calculator (BAM-C). *Recommendations:* *10.1. Ensure any ecosystem or candidate species added to the BAM-C due to observations on site are then retained in at least one vegetation zone in the BAM-C habitat suitability: predicted tab.* *10.2. Review vegetation zones for predicted species and retain all vegetation zones where suitable foraging and/or breeding habitat occurs in the BAM-C.*	The list of candidate species considered in the Amended BDAR has been reviewed and considered with regard to habitat availability across vegetation zones, and where necessary updated in the Amended BDAR and BAM-C to ensure consistency in approach. All species which have been added to the BAM-C have had at least one vegetation zone retained in the 'habitat suitability: predicted tab' of the BAM-C.	Section 5.1.2 and BAM-C child cases
11	Retain Plains-wanderer as a candidate species for survey. *Recommendations:* *11.1. Retain Plains-wanderer as a candidate species in the BAM-C child cases even though the proponent has avoided important mapped habitat*	Plains-wanderer has been retained as a candidate species for survey in the BAM-C child cases.	Section 5.4.3.10

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
12	Survey conditions for Austral Pillwort are unknown. *Recommendation:* *12.1. Provide further evidence about the specific drying mud conditions for Austral Pillwort to show that the survey conditions for the species were suitable in October and November 2023 or address the requirements set out in section 5.2.3 of the BAM*	Further evidence and justification relating to the survey conditions for Austral Pillwort have been provided in Table 5.11.	Table 5.11 in Section 5.3.4
13	Species grouped together for targeted flora surveys should share the same or similar habitat requirements. *Recommendation:* *13.1. Provide further evidence addressing section 5.2.3 of the BAM to support flora species groupings where specific survey requirements or microhabitats do not overlap.*	Further evidence and justification relating to how threatened flora surveys groups were derived has been provided in Table 5.7.	Table 5.7 in Section 5.3.4
14	Additional survey is needed to demonstrate compliance with threatened fauna targeted survey requirements. *Recommendation:* *14.1. Provide additional evidence that threatened fauna species are absent or assume candidate fauna species to be present.*	Additional targeted fauna surveys were carried out between September 2023 and March 2025. Details of these surveys have been documented in Section 5.3.5. Targeted surveys for hollow dependent bird species credit species (e.g. superb parrot, pink cockatoo) were carried out between September to November 2024. The surveys comprised of targeted searches of suitable habitat within breeding season in line with EPBC survey guidelines and BAM. Details of this survey has been documented in Section 5.3.5.5 and Section 5.3.5.9. Under the BAM, breeding habitat is considered to be presence of habitat constraint and presence of individual birds. Prior to investing significant time to do targeted surveys for raptor species at each stick nest located on site, it is important to determine that the species is utilising the site. Vantage point surveys are recommended survey method in Draft Wind Farm Assessment Guidance because they are an effective method to determine whether raptors are utilising a site. Little Eagle was detected during BBUS surveys (as well as incidentally) as being present within the Project Area, and offsets calculated accordingly.	Section 5.3.5

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
		Targeted surveys for Bush-stone Curlew were carried out in spring 2023 in accordance with survey methods detailed within Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (2004 Working Draft) (DEC 2004). These surveys included flushing of the species within suitable habitat, which was carried out concurrently with the systematic flora survey transects which were walked across the Subject Land (4,330.4 ha) a total of three times of over a three-month period. A total of 4797.34 km were walked. In addition to the flushing surveys, 161 nights of acoustic call detection was carried out within areas suitable habitat. Whilst not a formally recognised as a survey method in the DEC (2004), the species is known for its vocalisation and could be easily detected via passive acoustic recording. In addition to the surveys completed in 2023, the following surveys were carried out for Bush-stone Curlew in spring/summer 2023 and autumn 2025: • Spotlighting transects via vehicle. • Call playback.	
Direct, indirect and prescribed impacts need to be appropriately assessed.			
15	Perimeter fencing and firebreaks need to be included in the impact assessment. *Recommendations:* *15.1. Include specifications and location for perimeter fencing, fire breaks and APZs.* *15.2. Revise the BDAR and impact assessment to include impacts to native vegetation and threatened species from perimeter fencing, fire breaks and APZs.*	All impacts associated with Asset Protection Zones (APZs) and fencing requirements have been considered within the current Project layout and designed to occur within the Disturbance Footprint assessed within this report. The APZs were established as per the Bush Fire Hazard Assessment, and their scale and extent factored into the design. A detailed fencing design/layout would be prepared during the detailed design phase of the Project.	Section 2.3
16	The indirect impact assessment at Table 8.6 needs to be revised. *Recommendations:* *16.1. Review and revise the indirect impacts in Table 8.6 to ensure the likelihood of impact, likelihood of consequences and indirect impact levels are realistic.*	The indirect impact assessment, including Table 8.6, has been reviewed and updated with regard to CPHR's comments.	Section 8.2

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
	16.2. Update Table 8.6 to list specific at-risk fauna species. *16.3. Map the conservation agreement area (CA0465) and the Local Land Services land management agreement areas and apply appropriate buffers*		
17	The indirect and prescribed impact assessment for Plains-wanderer needs revision. *Recommendations:* *17.1. Discuss the impacts of the proposal on connectivity and fragmentation for the existing Plains-wanderer conservation areas.* *17.2. Discuss the potential for areas of Plains-wanderer important mapped habitat to be sterilised as they may be isolated by proposed infrastructure, in the context of maintaining movement crucial to the species life cycle.* *17.3. Review the application of the SAII assessment criteria for Plains-wanderer to consider indirect impacts including fragmentation.*	Impacts on the connectivity and fragmentation of Plains-wanderer resulting from the proposal are detailed in Section 8.3.2.1 of the Amended BDAR.	Section 8.3.2.1
18	Revise the prescribed impact assessment to adequately consider flight paths and connectivity. *Recommendations:* *18.1. Map flight paths across the project site, discuss potential impacts on these and where avoidance or minimisation would be applied.* *18.2. Update Figure 3.4 to map all connectivity features across the site.*	Flyway and flight path data can only be accurately collected via radar or smart cameras. Any data which maps flight paths without the use of specialist technology is not an accurate data provision, which may understate impacts and/or overstate avoidance measures. Noting the inherent uncertainty around turbine strike risk assessment, Umwelt had opted to ensure the assessment is accurate as possible and provide alternative data. Specifically, Figure 8.1 to 8.7 within Appendix G of the BDAR showed the distance and direction of bird observations from the observer which provides indicative bird utilisation patterns across the Project Area. In order to provide additional information with regard to landscape scale movements of avifauna, Appendix G has been revised to include the following: • Figure 8.1 to Figure 8.7 of Appendix G have been revised so that bird observation records also depict flight direction and height. Key habitat features have also been included on figures to provide additional context.	Section 8.3.2, Figure 3.4 and Appendix G

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
		• Additional figures have been provided detailing indicative landscape scale movement pathway for avifauna across the Project Area, and indicative migration pathways for migratory and nomadic fauna. Additional detail has also been provided Section 8.3.2 with regard to impacts on connectivity to avifauna. Furthermore, Figure 3.4 has been updated to include indicative connectivity corridors across the Project Area.	
19	The prescribed impact assessment for vehicle strike requires revision and needs to consider all vehicle strike impacts. *Recommendations:* *19.1. Revise the assessment to include all additional species at risk of vehicle strike and update in Table 6.1 and include in a table similar to Tables 8.7 to 8.9.* *19.2. Assess vehicle strike impacts for all roads and tracks constructed or used for the project.* *19.3. Detail the nature, extent and timing of vehicle movement and include in the assessment of prescribed impacts.*	Additional detail has been provided in Section 6.0, Section 7.2.2 and Section 8.3.5 as requested by CPHR. Specifically: • Table 6.1 has been updated to consider vehicle strike as a prescribed impact and provide additional detail regarding species at risk of impact • Table 7.3 has been revised to provide additional detail regarding Plains-wanderer and raptor species • A risk assessment has been provided within Section 8.3.5 for all species considered to be at risk of vehicle strikes. Impacts associated with the Project's transport routes are included within two Streamlined BDARs, Appendix J and Appendix K. As such, these works are not discussed this report.	Section 6.0, Section 7.2.2 and Section 8.3.5
20	Prescribed impacts need to be assessed for each impacted entity. *Recommendations:* *20.1. Assess the risk of sedimentation (from construction and operation) on threatened species habitat for individual species during and after high rainfall events when water is moving through the landscape.* *20.2. Revise Table 6.1 identify specific prescribed impact risks to individual entities.* *20.3. Update Table 6.1 to list all threatened entities that may be dependent on or use the habitat features associated with each prescribed impact.*	Additional detail has been provided in Section 6.0 and Section 8.3 as requested by CPHR. Specifically: • Table 8.9 has been updated described the outcomes of the Water Resources Impact Assessment (WRM, 2024) to support the discussion relating to risks associated with sedimentation on threatened species habitat during construction and operation. • Table 6.1 has been revised to list all threatened species which may be dependent on the habitat features associated with each prescribed impact and identifies specific prescribed impact risks for individual entities.	Section 6.0 and Section 8.3

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
Proposed offsets for prescribed impacts need to be explained and agreed			
21	Offsets for prescribed impacts needs to be fully explored. *Recommendation:* *21.1. Review and update section 10.1.4.1 to include feasible conservation actions that are separate to those required for mitigation measures.*	There is no current policy, guideline or mechanism in NSW to facilitate the offsetting of prescribed impacts such as turbine strike impacts. The mechanism proposed in Section 10.1.4.1 is considered the only feasible offset approach for turbine strike prescribed impacts as it is widely considered that the biodiversity credit scheme is not a suitable mechanism. The primary reason being that it does not allow for an equitable credit calculation between species-credit species and ecosystem-credit species. It is not considered appropriate or possible to finalise the feasible conservation actions to offset prescribed impacts from turbine strike as the conservation actions should be specifically tailored to the species or species' that are impacted. Those impacts will only be realised, if they occur, during the implementation of the operational monitoring through the BBAMP. At which time, consultation with relevant agencies will ensure conservation actions are appropriately designed. However the approach and examples presented in this Amended BDAR provide suitable level of clarity for CPHR to ensure the conservation actions that will be considered are suitable and fit for purpose: • Funding of a PhD Project. • Funding of existing research programs, such as the Difficult Bird Research Group. • Funding of Saving our Species conservation projects. • Funding of breeding programs. • Funding of local habitat enhancements programs. • Funding the implementation and monitoring of operational mitigation measures (such as curtailment) to assess the interaction with birds and bats.	Section 10.1.4.1

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
22	Mitigation measures are to be detailed in the BDAR to demonstrate impacts will be effectively effective managed and to give confidence that the offset liability is adequate. *Recommendation:* *22.1. Update Section 9 of the BDAR (including Table 9.1) to detail auditable mitigation and management measures that follow the SMART principles.*	The wording within Table 9.1 has been reviewed and updated to remove ambiguous language and incorporate smart goals where applicable. It is noted that the use of 'where possible' in BIO12 refers to vegetation within the Development Footprint thus its use is appropriate within this context.	Section 9.0
Matters of National Environmental Significance			
23	Areas of EPBC Act listed Natural Grasslands of the Murray Valley Plains TEC may be underestimated because it has not been assessed at the patch scale. *Recommendations:* *23.1. Review the Key Diagnostic Characteristics and Condition Thresholds in the Australian Government listing advice for the Natural Grasslands of the Murray Valley Plains TEC across the combined areas of PCT 44 and 46.* *23.2. If required, calculate impacts to the Natural Grasslands of the Murray Valley Plains TEC and assess impacts.*	Vegetations surveys for the BWF were carried out across a two-year period and consisted of the collection of detailed data as part of BAM VI plots, and RMPs. Data was captured across all four seasons in order to capture the seasonal variation of native vegetation composition. Furthermore, data was collected following durations of good rainfall and not during time of drought. An assessment against the Conservation Advice found that patches of PCT 44 and PCT 46, both as patches of each vegetation zone (PCT) and as patches of the vegetation class Riverine Plain Grasslands, do not conform with Natural Grasslands of the Murray Valley Plains CEEC.	Section 4.5.5
24	Impacts and potential offsets to Plains-wanderer habitat outside the important mapped areas is unknown. *Recommendations:* *24.1. Develop Spring 2024 survey methods for Plains-wanderer outside the important mapped areas in consultation with the species Accountable Officer and the Australian Government DCCEEW.* *24.2. Use the outcomes of targeted surveys to apply additional avoidance of Plains-wanderer habitat.* *24.3. Consult with the Australian Government DCCEEW on requirements for any additional offsets for Plains-wanderer.*	The Project has avoided all impacts to the NSW Important Habitat Mapping for the Plains-wanderer, Section 7.1 and Section 7.2 of the Amended BDAR provides further detail regarding the efforts of avoidance undertaken. As such, the Project does not have a species credit offset liability for the Plains-wanderer associated with the NSW Important Habitat Mapping. In consultation with Commonwealth DCCEEW, a detailed analysis of habitat within the Subject Site has been undertaken to identify Supplementary Habitat present and that would be impacted by the Project. A high-level approach to offsetting in relation to this species was discussed. Supplementary Habitat was identified for the species through a comprehensive process including drone surveys to support detailed habitat classification, in combination with associated PCTs and known records. Targeted surveys were completed for the species in 2025.	Section 5.3.5 and Section 5.4.3.10

Key Assessment Issues	CPHR Submission	Summary of approach	Reference to where it has been addressed
		Details of this analysis are provided in Section 8.4.3.1 of the Amended BDAR. There is 4,940.21 ha of Supplementary Habitat mapped within the Project Area. The Project would result in direct impacts to 170.86 ha of Supplementary Habitat which may be suitable habitat for between 0.3 and 5 birds. **The Project has avoided all impacts to the NSW Important Habitat Mapping and the proposed impacts to supplementary habitat do not generate a credit obligation. However, following consultation with Commonwealth DCCEEW and CPHR, BWF has committed to prepare and implement a Plains-wanderer Management Plan (PWMP) to minimise and mitigate unavoidable impacts to Plains-wanderer associated with the Project, and support the species within the Subject Land, as detailed in Section7.4.4 of the Amended BDAR (August 2025).**	
25	A complete MNES assessment should be provided to address the Assessment Bilateral requirements. *Recommendation:* *25.1. Amend Appendix E of the BDAR and specifically address each of the bilateral assessment requirements as detailed in Attachment C to this response.*	This Amended BDAR, specifically Section 8.5 and Appendix E have been updated to provide a complete MNES assessment for the Project.	Section 8.5, Section 12.2 and Appendix E
Other administrative matters			
26	Vegetation zone and species polygon impact areas need to be consistent with the figures in the spatial data. *Recommendation:* *26.1. Update the spatial data, BDAR and BAM-C to ensure all areas entered for each stage, vegetation zone and species polygon match the spatial data.*	A comprehensive re-analysis of the BAM – Vegetation Integrity Plots undertaken for the Project against the PCTs and associated Vegetation Zones has occurred as part of this Amended BDAR. In addition to this, reanalysis of the areas of impact and interaction with BAM-C assessment cases have been updated accordingly.	Section 4.1.2.3 and Section 8.1
27	Any threatened flora records should be verified by a herbarium. *Recommendation:* *27.1. Provide verification of all threatened flora from a herbarium*.	The necessary verifications have been provided in Appendix L.	Appendix L of the BDAR

Table 1.5 Summary and Reference Table for CPHR comments on Amended BDAR as detailed within RFI#2

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
4.1	**Provide a draft BBAMP as an Appendix to the BDAR as required by section 2.4 of the BAM Operational Manual Stage 2.** Section 7.4.1 of the Amended BDAR includes additional information in the BBAMP framework. However, the following outstanding issues are required to be resolved: • The BBAMP must include specific thresholds or triggers for the implementation of adaptive management actions. • RD does not support an 'impact investigation' without consultation with RD as is suggested in Table 7.5 of the BDAR. All strike events should be reported to RD. • Section 11.2.1 of Appendix D of the Amended BDAR provides the turbine risk assessment methods. Given the BBAMP may not be developed for some time, CPHR recommends completing additional BBUS and breeding habitat surveys between now and the development of the BBAMP, to ensure relevant up to date data is used to inform the turbine risk ratings in the BBAMP. *Recommendation:* *Prepare a Bird and Bat Adaptive Management Plan prior to commissioning of any wind turbines to the satisfaction of RD.*	Noted, a BBAMP will be prepared prior to commissioning of any wind turbines to the satisfaction of CPHR. The BBAMP will address the outstanding issues noted by CPHR. CPHR's recommendation regarding additional BBUS and breeding habitat surveys is acknowledged, noting that this (and all other aspects of the BBAMP) are a post-determination matter, consistent with CPHR's advice. On this basis no changes to the August 2025 update to the Amended BDAR have been made in response to CPHR's feedback.	Not applicable
17.3	**Review the application of the SAII assessment criteria for Plains-wanderer to consider indirect impacts including fragmentation.** While section 8.3.2.1 of the amended BDAR has been updated, the SAII assessment at Table 8.13 has not. For example, section 8.3.2.1 states that 'the project infrastructure may isolate areas of important habitat and BCT conservation areas' and that this 'may potentially isolate and sterilise areas of occupied habitat'. However, Table 8.13 states that 'the Project is unlikely to fragment the habitat of the Plains Wanderer as no mapped important habitat would be removed'.	The SAII assessment has been updated to better detail the potential indirect impacts, including fragmentation, on Plains-wanderer to reflect CPHR's comments.	Section 8.4.3 of the Amended BDAR. Section 8.2.12 and Appendix 2 of this report.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
	Irrespective of the SAII assessment not being updated to consider the impacts of habitat sterilisation or isolation, CPHR considers that the impacts of the project would be consistent with Principle 1 of section 6.7 of the Biodiversity Conservation Regulation 2017. See Attachment B for advice on SAII entities. *Recommendation:* • Update the *SAII* assessment at Table 8.13 to reflect amendments made in section 8.3.2.1 of the BDAR.		
19	**The prescribed impact assessment for vehicle strike requires revision and needs to consider all vehicle strike impacts.** While mitigation measure BIO23 of Table 9.1 of the Amended BDAR sets a speed limit of 40 km/hr to reduce the risk of vehicle strikes to fauna, Table 7.4 states 80 km/hr speed limits would be imposed for the project. CPHR considers that a speed limit of 80 km/hr would be unlikely to be successful in reducing the risk of vehicle strike to fauna. Mitigation measure BIO11 of Table 9.1 of the Amended BDAR requires that 'a qualified ecologist will conduct on-foot preclearance surveys at the start of each day prior to daily construction' but contradicts this with text that allows for a driving method, i.e. 'regular driving through areas of planned construction in the development footprint prior to planned clearance works to disturb the area and deter fauna from utilising these areas'. CPHR does not support the driving method as a suitable measure to mitigate impacts to fauna, particularly given the records of Plains-wanderer and Southern Bell Frog throughout the subject land. *Recommendation:* *Update mitigation measures BIO23 and BIO11 and remove contradictory text from the BDAR to ensure clarity of measures to be implemented.*	Umwelt has revised the Project's updated mitigation measures (BIO23 and BIO11) and Table 7.4 of the Amended BDAR to provide consistency and ensure clarity of the measures to be implemented. Table 7.4 of the Amended BDAR and BIO23 now clearly express that the 80 km/h speed limit refers to Project vehicles travelling on nearby public roads (i.e. North Boundary Road, Jerilderie Road and Bullewah Road) as they move around the Project Area, while the 40 km/h speed limit is applicable to Project vehicles using the internal (i.e. private) roads associated with the Project.	Section 7.2.2 and Section 9.1 of the Amended BDAR.

20	**Prescribed impacts need to be assessed for each impacted entity.** Tables 8.7 and 8.9 of the Amended BDAR do not include supporting evidence to conclude that the Southern Bell Frog will not be impacted by the removal of vegetation along Coleambally Outfall Drain or permanent wetlands. The BDAR should be amended to provide evidence that the species will persist in the subject land after the development. Table 8.7 of the Amended BDAR also states that the bridges over Coleambally Outfall Drain are not considered important to Southern myotis, however provides limited evidence to support this statement. *Recommendation:* • Provide evidence that Southern Bell Frog will persist in the subject land after the development. • Provide photographs and the survey methodology to support absence of habitat and activity for Southern myotis.	**Southern Bell Frog** Table 8.8 of the Amended BDAR has assessed the impact associated with the removal of 1.8 ha of vegetation around Coleambally Outfall Drain on Southern Bell Frog. Given the removal of this vegetation equates to 0.48% of the suitable habitat for the species within the Subject Land, and an even smaller proportion of suitable habitat across the Project Area, the assessment concluded that the impacts were unlikely to have a significant impact on the local and bioregional persistence of the species. It is noted that the breeding activities for this species was observed at almost all waterbodies across the Subject Land, including farm dams, which further supports the assessment. No permanent wetlands or farm dams would be impacted by the Project; however, Table 8.8 of the Amended BDAR considers impacts associated with the removal of 6.57 ha of PCT associated with ephemeral wetlands, and Table 8.9 of the Amended BDAR considers impacts associated with changes to hydrology and water quality. As detailed within Table 8.9 of the Amended BDAR, the Water Resources Impact Assessment (WRM, 2024) found that potential impacts associated with the construction and decommissioning phases can be mitigated such that the risk is negligible. The removal of 6.57 ha of ephemeral wetland vegetation communities, represents 1% of native vegetation expected to be impacted by the Project. None of the 6.57 ha of impacts to the ephemeral wetland vegetation communities occur within the threatened species polygon for Southern Bell Frog. We highlight that BWF has committed to a Threatened Species Management Sub-plan being prepared as part of the overarching Biodiversity Management Plan, which would monitor the impacts of the Project on the species (refer Section 7.4.3 of the Amended BDAR). On this basis no changes to the August 2025 update to the Amended BDAR have been made in response to CPHR's feedback.	Sections 5.3.5.11 (Southern Bell Frog) and 5.3.5.14 (Southern Myotis) of the Amended BDAR.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
		Southern Myotis Umwelt confirms that no 'possible' Southern Myotis calls were recorded during the active ultrasonic detection surveys. Two (2) example videos taken along Coleambally Outfall Drain which show the flying patterns of the microbats observed were provided to CPHR via email on 16 July 2025. Within these videos Umwelt notes the fairly steep and rapid dives and the bats just glancing the water. This contrasts with the foraging behaviour of Southern Myotis, which fly low and parallel to the water while they rake the surface with their large feet. Further detail about he surveys and results have been provided within Section 5.3.5.14 of the Amended BDAR.	
21	**Potential offsets for prescribed impacts need to be fully explored.** The RTS report states that there are currently no policy, guideline or mechanism in NSW to facilitate the offsetting of prescribed impacts such as turbine strike impacts. CPHR highlights section 4.5.11 of the Biodiversity Assessment Method 2020 Operational Manual – Stage 2, which indicates: it is best practice to propose compensatory measures such as additional biodiversity credits or conservation measures to compensate for any residual prescribed impacts. Section 10.1.4.1 of the Amended BDAR should be revised to include any conservation actions considered, that are separate to those required for mitigation measures. For example, some of the measures proposed in section 10.2 of the BDAR and section 13.1.2 of Appendix D. The Stage 2 BAM Operational Manual requires the conservation actions for residual prescribed impacts to be documented in the BDAR. Given the conservation actions listed in the BDAR are vague and remain at an options level, the final conservation actions will need to be developed in consultation with and to the satisfaction of RD.	Section 10.1.4.1 of the Amended BDAR (April 2025) provided six (6) conservation measures (including a proposed approach for their implementation) which could be adopted to offset the predicted prescribed impacts that are associated with the Project in accordance with clause 6.5 of the Biodiversity Conservation Regulation 2017 (BC Regulation 2017), and as detailed within Section 4.5.11 of the Biodiversity Assessment Method 2020 Operational Manual – Stage 2. Umwelt acknowledges that the sixth proposed conservation measure *"Funding the implementation and monitoring of operational mitigation measures (such as curtailment) to assess the interaction with birds and bats"* could be misinterpreted as funding of the mitigation measure itself, rather than the intended funding to research of effectiveness. In order to provide clarity, the sixth dot point within Section 10.1.4.1 Amended BDAR (August 2025) has been reworded to the following: *"Funding of a research project to investigate the long-term effectiveness of operational mitigation measures (such as curtailment) on impacts to bird and/or bat species".*	Section 10.1.4.1 of the Amended BDAR.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
	Such actions will need to be above and beyond those required by the mitigation measures and specifically outline how the action will compensate for impacts to the species. *Recommendation:* • Update section 10.1.4.1 of the Amended BDAR to include conservation actions *that are separate to those required for mitigation measures.* • *RD will be recommending to DPHI that a condition of approval be included in the consent that requires the development of conservation actions to be* developed in consultation with and to the satisfaction of RD.	It is noted and accepted that the conditions of approval will include a requirement for the development of conservation actions to the satisfaction of CPHR. It is anticipated that this process would form part of the BBAMP.	
22	**Mitigation measures are to be detailed in the BDAR to demonstrate impacts will be effectively managed and to give confidence that the offset liability is adequate.** Section 4.4 of the BAM 2020 Operational Manual – Stage 2 outlines the detail required to be provided in a BDAR for proposed mitigation measures. Ecologically based criteria or indicators are required, with the SMART principles employed for determining: • if the mitigation action(s) are successful • when the mitigation action(s) are complete • when remedial actions leading to adaptive management is required The above has not been provided in the Amended BDAR. Performance and completion criteria are required to be included in Table 9.1 of the Amended BDAR. Furthermore, the 'likely efficacy of mitigation' in Table 9.1 of the Amended BDAR is not specific to the Project. Risk of failure should be determined by the constraints of implementation (e.g. financial, resource availability, etc).	The mitigation table in Section 9.1 of the Amended BDAR has been reviewed and contradictory statements rectified, where present. Table 9.1 has been set out as per the example provided within BAM 2020 Operational Manual – Stage 2 (noting 'method/technique' has been swapped for 'outcome'). Given the scale of the development and that detailed design is yet to occur, we suggest that the inclusion of all the requested information in the mitigation table of the Amended BDAR is not feasible. Much of the detail requested relating to 'performance and completion criteria' would be included within a BMP and associated sub-plans, as well as the BBAMP, to be prepared in consultation with to the satisfaction of CPHR following consent. This approach is consistent with other wind energy projects in the South West REZ. BWF has been proactive in avoiding and minimising impacts to stick nests during project design, as detailed within Section 7.1.3 of the Amended BDAR. Specifically: • Seven (7) WTG were relocated within the Development Corridor to maximise distance offsets to nearby stick nests • Three (3) WTG were removed between Scoping and EIS to	Section 9.1 of the Amended BDAR.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
	Table 9.1 of the BDAR also includes contradictory measures, e.g. 'BIO01: breeding habitat for fauna, threatened species, and habitat trees will be avoided and minimised with the design of the access tracks' however, BIO21 and section 13 of Appendix D of the Amended BDAR lists removal of breeding nests as a measure to mitigate turbine strike. Table 9.1 should be amended to remove contradictive measures, or the risk of failure be noted as 'high'. It is also unclear how some proposed measures will effectively mitigate impacts, i.e. BIO22 lists 'Clearing/works will be contained within approved areas' as a mitigation measure for fragmentation. It is unclear how clearing will result in no reduction of connectivity. The above examples are not exhaustive of amendments required in Table 9.1 of the Amended BDAR. The entire table should be reviewed and amended to be consistent with the BAM. CPHR does not agree that removing nests is a mitigation measure. Removal of breeding habitat is a direct impact and should be assessed as such. Detailed design should avoid the placement of turbines within 200 m of nests to mitigate impacts associated with turbine strike, not reduce available breeding habitat across the site. *Recommendation:* • Update section 9 of the Amended BDAR to be consistent with the requirements *outlined in Section 4.4 of the BAM 2020 Operational Manual – Stage 2.* • *Remove any contradictory mitigation measures proposed in Table 9.1 of the Amended BDAR.* • *Update BIO21 to remove* any reference to removing nests and replace it with 'avoid locating wind turbines within 200 m of a nest'.	avoid stick nests. Of the seven (7) WTG relocated within the Development Footprint, six (6) are already located more than 200 m from any stick nest. One (1) WTG (WTG 107) is located approximately 30 m from a stick nest, however, as the nest falls within the Development Footprint it has already been assessed as a direct impact within the Amended BDAR. BIO21 aims to address potential impacts to birds utilising stick nests that are built subsequent to the surveys being carried out, including those built during construction, whilst providing certainty to BWF with regard to project design. Therefore, Umwelt has amended the BIO21 mitigation measure to the following: "*Active searches for new stick nests would be carried out periodically as part of the BMP and/or BBAMP. The BMP and/or BBAMP would include a risk assessment for assessing potential impacts, plus mechanisms for mitigation as part of an adaptive management process*."	

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
23	**Areas of EPBC Act listed Natural Grasslands of the Murray Valley Plains Threatened Ecological Community (TEC) may be underestimated because it has not been assessed at the patch scale.** Section 4.5.5 comprehensively details TEC characteristics from the listing advice but does not provide corresponding detail from the survey data, such as species lists. Table 4.32 does not adequately justify excluding areas of PCTs 44 and 46 from the TEC based on assumed grassland origin (derived) and TEC distribution. Specifically: *Distribution and natural grassland structure* • The northern boundary of the TEC extent is approximate. The Approved Conservation Advice, which is more recent than the Listing Advice, states that the community has not been comprehensively surveyed so may occur outside the mapped and known extent. • Reference to derived grasslands on Hay Plains is outdated - natural grasslands have only relatively recently been recognised in the Riverina. McDougall (2008)1 provides evidence from floristic analysis for the existence of natural grasslands in areas previously thought to be derived from Acacia pendula woodland or chenopod shrubland dominated by Atriplex vesicaria. • *Characteristic vascular plant species present and condition threshold* • Table 4.32 does not provide a list of the plant species recorded in patches of VZ9 and VZ10 against Table 1 or Appendix A of the listing advice to demonstrate lack of alignment with plant species diagnostic of the TEC.	The recommendation to consult with Commonwealth DCCEEW regarding the vegetation within the Subject Land, was noted and actioned by Umwelt/BWF on 18 June 2025 via a combined teleconference with Commonwealth DCCEEW, CPHR and DPHI. Umwelt's presentation was subsequently provided via email on 20 June 2025, which noted our appreciation of the Commonwealth DCCEEW feedback regarding this item and that our justifications provided are reasonable to demonstrate both PCT 44 and 46 showed poor alignment with plant species diagnostic with the TEC, as well as contained species more likely to be more frequent in similar communities not considered to be the TEC. Additionally, a review by Umwelt of McDougall's (2008) assessment of the spatial occurrence of natural versus derived grasslands within the Riverina identified that the Project Area occurs further north than the northern limit of natural grasslands in the Riverina. On this basis Umwelt maintains its position that the TEC is not present within the Subject Land. As such, the Amended BDAR (August 2025) includes the justifications previously presented as well as further supporting data. The Amended BDAR has been revised, where required, to reflect this approach and the outcomes of consultation with Commonwealth DCCEEW and CPHR.	Section 4.3.1.2 of this report Section 4.5.5 of the Amended BDAR.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
	• Table 4.32 states that the assessment of the community at the patch scale moderately conforms with the TEC and a number of species typically indicative of high-quality remnants of the community were recorded. • Plots in the RTS data package were not completed during the optimal period so relevant species may not have been above ground or identifiable. CPHR notes that this TEC is not listed under the BC Act and is not covered by the bilateral agreement, so consultation with AG DCCEEW is recommended. *Recommendation:* • Consult with AG DCCEEW regarding the occurrence of Natural Grasslands of the *Murray Valley Plains and potential project impacts.* • *Pending consultation with AG DCCEEW, revise sections 4.5.5, 8.5, 10 and Appendix E of the Amended BDAR to include all patches of PCT 44 and 46 on the* subject land in the extent of Natural Grasslands of the Murray Valley Plains TEC, or provide patch-specific floristic and condition data demonstrating lack of alignment with TEC characteristics.		
24.3	**Impacts and potential offsets to Plains-wanderer habitat outside the important mapped areas requires clarification.** CPHR acknowledges the survey effort completed for Plains-wanderer and the large number of birds recorded during the surveys. CPHR is aware that the survey effort was completed following consultation with AG DCCEEW. However, CPHR's EIS response recommended that the proponent also consult with AG DCCEEW on requirements for any additional offsets for Plains-wanderer that AG DCCEEW may require. No record has been provided of consultation with AG DCCEEW regarding impacts to Plains-wanderer outside of important mapped areas, including the	Umwelt and BWF first consulted with Commonwealth DCCEEW regarding the proposed methods for assessing impacts to Plains-wanderer on the 12 October 2023. The consultation discussed survey requirements, offset requirements, and WTG impact buffers, with the following questions asked: • Under the BAM surveys are not required for Plains-wanderer, *however the SEARs require information about how the assessment meets relevant Commonwealth guidelines. Does DCCEEW require targeted surveys for Plains-wanderer beyond what is required under the BAM?*	Section 8.2.12 of this report, and Section 8.4.3, Section 10.2.2 of the Amended BDAR.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
	method to map supplementary habitat and the potential generation of species credits outside of important mapped habitat. CPHR consulted with AG DCCEEW about the mapping of supplementary habitat and the generation of species credits for Plains-wanderer. The generation of additional species credits and the approach to mapping supplementary habitat is not supported by CPHR or AG DCCEEW. The method used to map supplementary habitat lacks detail, and the mapped supplementary habitat appears to underrepresent the supplementary habitat available on site. In addition the generation of species credits is not consistent with other projects. *Recommendation:* *Consult with CPHR and AG DCCEEW to determine how to map supplementary habitat and how to record the impacts for the bilateral assessment.*	• *Does DCCEEW have any comment with regard to any requirement for additional surveys to inform the SAII assessment for Plains wanderer?* • *If additional surveys are required, would DCCEEW be open to deviations from the guidelines given the size of the Development Corridor and the area of potential habitat to be surveyed?* • *What is DCCEEW's view regarding offset requirements for Plains-wanderer? Are offsets required for primary/Important Habitat only?* • *If outside of mapped Important Habitat are required, would DCCEEW be open to generating these offsets via the BAMC rather than the EPBC offsets calculator?* • *Does DCCEEW have any further comment on the 300 m impact buffer around each turbine for Plains-wanderer? Is DCCEEW's view that impacts should be presumed within the full extent of the 300 m buffer, and* be offset accordingly? Commonwealth DCCEEW confirmed in that consultation meeting and within subsequent correspondence that: Additional surveys for the species would be required • Surveys should be carried out by spotlighting via vehicles across a grid-patten, with surveys replicated twice • Vegetation structure is important, namely that described within the Conservation Advice, as well as well-spaced chenopod shrubland. • Offsets would be required and should be calculated using the BAMC. Offsets would not necessarily need to encompass the full 300 m buffer around WTG. The recommendation to consult with Commonwealth DCCEEW regarding impacts and potential offsets to Plains-wanderer (outside Important Habitat Mapping), was noted and actioned	

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
		again by Umwelt/BWF on 18 June 2025 via a combined teleconference with Commonwealth DCCEEW,CPHR and DPHI. Within this meeting (and subsequent 20 June 2025 email), Umwelt acknowledged: 1. That the extent of detail provided within the main body of the BDAR, and the discussion of Supplementary Habitat with regard to SAII, requires clarification. 2. The technical feedback provided by Commonwealth DCCEEW and CPHR in relation to the generation of Supplementary Habitat, specifically the extent of buffers applied to records, use of non-associated PCT, consideration of soil type in relation to preferred habitat, and prioritisation of PCT 44 and 46 areas. 3. Commonwealth DCCEEW and CPHR's preference to now avoid offsets being generated for the species. In response to feedback provided in the June 2025 meeting, Umwelt has revised the Supplementary Habitat for Plains-wanderers to include the following components: • Incorporation of secondary habitat mapping (TBCD, 2025) • Buffering all records of the species within the Project Area by the equivalent of the maximum known home range of the species (41 ha), being a 362 m radius • Identification of patches of red or mottled soils utilising a high-resolution aerial image. • Exclusion of woody vegetation, infrastructure and waterbodies • Removal of overlap with areas of mapped Important Habitat A detailed description of the methods used to generate the Supplementary Habitat mapping is described in Section 8.4 of the Amended BDAR (August 2025). Umwelt has also avoided the use of offsets for the species, instead proposing a PWMP as detailed within Section 7.4.4 of the	

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
		Amended BDAR. BWF is also committing to species specific measures for Plains-wanderer as described in Section 10.2.2 of the Amended BDAR. As such, references to Plains-wanderer have been removed from Section 5.4.3, Section 8.1.2, Section 10.1.2, and Section 11.2 of the Amended BDAR.	
26	**Vegetation zone and species polygon impact areas need to be consistent with the figures in the spatial data.** Some of the vegetation zones to be impact and stage areas in Tables 8.1, 10.1 and 10.2 of the BDAR do not match the spatial data provided for the project. This comprises Stage 1 (linear) areas to impacted within vegetation zones 1, 7 and 9. There are several discrepancies with the spatial data provided for species polygons and the information provided in the BDAR and BAM-C. As a result, RD was unable to confirm whether the impacts to each species credit species have been accurately recorded and accounted for. For example, spatial data for *Swainsona murrayana* species polygon is over 600 hectares, however, Table 5.43 and 8.3 of the BDAR indicates the total area to be impacted is 123.09 hectares. This inconsistency must be addressed to ensure an accurate credit obligation is calculated for this species. Also, Figure 5.27.1 in the BDAR shows that the species polygon has been refined to a buffer surrounding records of the species, however Table 5.46 does not state the approach that was taken when finalising the species polygon. In addition, the Stage 1 (linear) BAMC case impact area does not align with the area in the BDAR.	Umwelt has reviewed calculations within the August 2025 update of the Amended BDAR, the BAMC and against spatial files supplied to CPHR for consistency. The threatened species polygon for *Swainsona murryana* has been revised, the threatened species polygon now incorporating all PCTs within a 500 m buffer of each individual *Swainsona murryana* record. Furthermore, inconsistencies with regard to Barking Owl calculations has been rectified.	Throughout the BDAR, BAMC, and spatial data.

Key Assessment Issue	CPHR Submission	Summary of approach	Reference to where it has been addressed
	Also, the spatial data provided for the Barking Owl species polygon includes areas identified as 'infrastructure', which does not align with the approach to the species polygon in Table 5.50. The area entered into the BAM-C differs from that identified in Table 5.50 and Table 8.3, while Table 10.3 of the BDAR aligns with the area entered into the BAM-C. This inconsistency must be addressed to ensure an accurate credit obligation is calculated for this species. *Recommendation:* • *Update the spatial data, BDAR and BAM-C to ensure all areas entered for each stage, vegetation zone and species polygon align and match the spatial data.* • *Provide the updated species polygon shapefiles that align with the impacts.*		
Attachment B	**ATTACHMENT B Serious and Irreversible Impacts – advice on SAII entities: SAII Entity: Plains-wanderer** *For brevity, not reproduced.* *Recommendation:* *DPHI consult with RD regarding SAII to Plains-wanderer.* If DPHI determine that the impact is a SAII, CPHR and AG DCCEEW do not support the use of additional species credits as Additional and Appropriate Measures (A&AM) as they are not likely to further mitigate site-based impacts of the project. Also, CPHR do not consider the measures proposed in section 10.2 of the BDAR to be A&AM as per section 5.1 of the BAM 2020 Operational Manual – Stage 2. The proposed measures to fund an existing landscape scale conservation program run by Local Land Services are considered mitigation measures or measures to mitigate prescribed impacts of the project. Instead, CPHR recommends that a Plains-wanderer Management Plan be required as a condition of approval that includes the implementation of an appropriate and rigorous monitoring program before, during and after construction. The plan should be developed in consultation with and to the satisfaction of CPHR.	The SAII assessment has been update to better detail the various land and impacts areas defined within the BDAR, and to allow for an accurate consideration of SAII for Plains-wanderer. Specifically, the SAII assessment: • Confirms that no mapped Important Habitat will be impacted by the Project • Details the impact to Supplementary Habitat mapped by Umwelt across the Project Area • Details the impact to associated PCTs which may constitute potential habitat for the species BWF has committed to prepare and implement a PWMP to minimise and mitigate unavoidable impacts to Plains-wanderer associated with the Project, and support the species within the Subject Land, as detailed in Section 7.4.4 of the Amended BDAR (August 2025).	Section 8.4.3 of the Amended BDAR.

2.0 The Project, Proposed Action

2.1 Overview of the EIS Project

The Proposed Action is a wind farm which includes the installation, operation, maintenance and decommissioning of up to 141 WTGs, battery storage, ancillary infrastructure and temporary facilities associated with construction of the Proposed Action. The Project design incorporates up to 141 wind turbines with an installed capacity of up to 803.7 megawatts (MW).

A detailed description of the Proposed Action can be found within Section 3.0 of the EIS, and the amended Project design, i.e. the Proposed Action (as amended), is described in detailed within Appendix F of Response to RFI#2 (Umwelt, 2025).

2.2 Project Location and Context

The Proposed Action is located on the Hay Plains of south western NSW, within the South West REZ. It is approximately 36 km south east of Hay, 66 km north east of Deniliquin and 100 km south west of Griffith. Smaller townships of Darlington Point, Coleambally and Jerilderie are located to the north east and south east of the Proposed Action. The location of the Proposed Action is shown in **Figure 2.1.**

The Project Area encompasses approximately 20,628 hectares (ha) of predominantly grazing land and adjoins the Oolambeyan National Park, which is located directly north. The Project Area is zoned as RU1 Primary Production within the Hay Local Environment Plan (LEP) 2011, the Murrumbidgee LEP 2013 and Edward River LEP 2013. The Disturbance Footprint considered in this Amended BDAR is 655.61 ha, comprising:

- 292.86 ha of disturbance associated with the construction and operation of the Project south of North Boundary Road (i.e. Stage 1 (South)), as well as the majority of proposed disturbance associated with offsite road works which form part of the Projects Local Transport Route.
- 362.75 ha of disturbance associated with the construction and operation of the Project north of North Boundary Road (i.e. Stage 2 (North)), including the associated site access points proposed as part of the Projects Local Transport Route.

Separate BDARs have been prepared to assess impacts resulting from off-site road works proposed along the Project's Port to Hay Transport Routes (Appendix J and Appendix K of the Amended BDAR). As such, these works are not discussed further in this report.

2.3 Key Project Features

The key components of the Proposed Action (as amended) include:

- Up to 141 (three blade) WTGs, with a maximum blade-tip height of 300 m above ground.
- A 359 MW / 718 MWh (two-hour) battery energy storage facility.

- Permanent ancillary infrastructure including internal roads, hardstands, main and collector substations, switchyards, operations and maintenance facilities, underground and overhead electricity transmission lines and poles, telecommunications facilities and utility services, permanent meteorological masts and water storage tanks.
- Temporary facilities including the temporary workforce accommodation (TWA), site offices, amenities, construction compounds and laydown areas, on-site borrow pits, rock crushing facilities, concrete or asphalt batching plants, minor 'work front' construction access roads, environmental management and monitoring and signage.
- Off-site road works, involving upgrades to the proposed local transport route and establishment of site access points to facilitate delivery of wind turbine components to the Project Area as required. This includes 14 site access points off Jerilderie Road, North Boundary Road and Bullewah Road. Of these, 13 site access points would be designed and constructed to accommodate oversize, overmass (OSOM) vehicle movements and one (1) would provide vehicle access to the TWA, via Bullewah Road.
- Peak construction workforce of approximately 380 Full FTE positions (estimated average 182 FTE positions over the duration of construction).
- Operational workforce of 40 FTE positions.
- Construction timeframe is approximately 35 months, indicatively commencing in Q4 of 2025 and concluding in Q4 of 2028.
- Construction and decommissioning activities will occur between 7:00 am to 6:00 pm Monday to Friday, and 8:00 am to 1:00 pm Saturday, except during specific circumstances.
- During the operational phase, the Project would operate 24 hours per day, seven days per week.

All impacts associated with Asset Protection Zones (APZs) and fencing requirements have been considered within the current Project layout and designed to occur within the Disturbance Footprint assessed within this report. The APZs were established as per the Bush Fire Hazard Assessment, and their scale and extent factored into the design. A detailed fencing design/layout would be prepared during the detailed design phase of the Project.

2.3.1 Staged Construction and Grid Connection

BWF is seeking approval to construct, operate and decommission the proposed Project under a single development consent. However, BWF is seeking flexibility to construct, operate, re power and/or decommission the Project in stages of various sizes or permutations within the limits of the development consent, should the Project be approved. Staging would be determined post development consent and subject to detailed design and procurement processes.

For the purposes of assessment in this MNES Report, it has been assumed that the Project will be constructed and operated in two (2) stages:

- Stage 1 (South) would involve the construction and operation of all Project infrastructure located south of North Boundary Road, including 58 WTGs (WTG 86 to WTG 143). Stage 1 (South) would connect to the existing Transgrid 220 kilovolt (kV) transmission line which runs through the Project Area in an east to west direction. Stage 1 (South) therefore includes all proposed 220 kV transmission infrastructure, including a small portion which extends north of North Boundary Road.

- Stage 2 (North) would involve the construction and operation of all other Project infrastructure located north of North Boundary Road, including 83 WTGs (WTG 1 to WTG 85). Stage 2 (North) will connect to the 330 kV Eastern Section of Project EnergyConnect, which is now under construction, which will also run through the Project Area in an east to west direction.

BWF has identified that construction of Stage 2 (North) is likely to commence sooner than was previously indicated in the Project EIS, and may commence prior to Stage 1 (South). In the event that Stage 2 (North) commences first, then Local Transport Route Off Site Road Works and the TWA facility (including associated access), would need to be established as part of Stage 2 (North). Final Project staging, and associated disturbance footprints, would be confirmed during detailed design.

The commencement of each stage will be dependent on BWF securing the necessary access rights for grid connection in each stage.

2.3.2 WTG Amendments (Turbine Dimensions)

As discussed in **Section 1.2**, the Proposed Action (as amended) includes consideration of alternative WTG dimensions to enable flexibility in the design of the Project. This flexibility will allow the final Project design to be optimised and the most appropriate and efficient infrastructure selected while still ensuring the Project's impacts remain generally in accordance with (or less than) those assessed in this Amended BDAR.

The Project EIS identified a maximum turbine size, being a tip height of up to 300 m, a hub height of up to 200 m and a blade length of up to 100 m. BWF has subsequently identified a maximum alternate turbine size (being a tip height of up to 233 m, a hub height of up to 148 m and a blade length of up to 80 m) for the purposes of identifying and assessing required road upgrades to the Port to Hay Transport Routes. These Port to Hay Transport Routes and associated off-site road works form part of the Amended Project.

However, due to the extent of renewable energy development proposed within the South West Renewable Energy Zone (REZ), it is possible that road upgrades to accommodate a larger turbine (with a blade length exceeding 80 m) will be undertaken along some or all of the proposed Port to Hay Routes either by the NSW Government or by a third party developer.

Should these upgrades be undertaken prior to the Project's construction period, BWF is seeking flexibility to transport and install a larger turbine, provided that the:

- The proposed WTG dimensions do not trigger the need for any additional off-site road works.
- The maximum WTG dimensions do not exceed a tip height of 300 m, a hub height of 200 m and a blade length of 100 m.

The final dimensions of the preferred WTG model would be confirmed during detailed design.

Table 2.1 below reflects the WTG dimensions already assessed in the Project EIS i.e. the maximum dimensions assessed for WTG installation and Local Transport Route off-site road works, and the alternate WTG dimensions adopted and assessed for the purposes of this Amendment Report i.e. maximum dimensions assessed for Port to Hay off-site road works.

Table 2.1 Maximum Proposed WTG Dimensions – Proposed Action (as amended)

Component	Maximum dimensions assessed for WTG installation and Local Transport Route off-site road works	Maximum dimensions assessed for Port to Hay off-site road works
WTG height	Up to 300 m	Up to 233 m
Blade length	Up to 100 m	Up to 80 m
Rotor diameter	Up to 200 m	Up to 163 m
Upper-most Blade Tip	Up to 300 m	Up to 233 m
Lower-most blade tip (i.e. clearance from ground level)	Up to 100 m above ground level	Up to 66.5 m above ground level
Tower (Hub) height	Up to 200 m	Up to 148 m

Relevant assessments in the Project EIS and subsequent Amendment Report have therefore considered the 'worst case' for each of the Project components (such as WTG height and blade length, etc). Accordingly, this Amended BDAR has adopted the following approach:

- The Disturbance Footprint and blade overhang areas are conservatively based on the maximum proposed turbine dimensions (being a tip height of 300 m).
- The Prescribed Impact Assessment (Appendix D) considers two (2) turbine dimension scenarios, based on tip heights of 300 m and 233 m.

With regard to this MNES report, key details on the alternate WTG dimensions are provided below.

- Type A (larger):
    - up to 141 wind turbine generators (WTGs)
    - maximum blade tip height of 300 m above ground level (AGL)
    - lowermost blade tip height of up to 100 m AGL up to 200 m rotor diameter
    - tower (hub) height of up to 200 m AGL.

The rotor swept area (RSA) – that is, the area swept by the rotating blades during turbine operation – using the maximum estimate of 200 m rotor diameter (or 100 m radius), equates to an area of approximately 23,235 m squared (m^2) per turbine or approximately 272 ha of total aerial space for the maximum number of wind turbines being proposed, being 141.

- Type B (smaller):
    - up to 141 wind turbine generators (WTGs)
    - maximum blade tip height of 233 m above ground level (AGL)
    - lowermost blade tip height of up to 66.5 m AGL up to 163 m rotor diameter
    - tower (hub) height of up to 148 m AGL.

The rotor swept area (RSA) – that is, the area swept by the rotating blades during turbine operation – using the maximum estimate of 163 m rotor diameter (or 81.5 m radius), equates to an area of approximately 20,867 m^2 per turbine or approximately 298 ha of total aerial space for the maximum number of wind turbines being proposed, being 141.

2.4 Project Assessment Areas

The following key assessment areas and boundaries used in the Amended BDAR and this associated MNES Report are detailed in **Table 2.2** and shown on **Figure 2.2.**

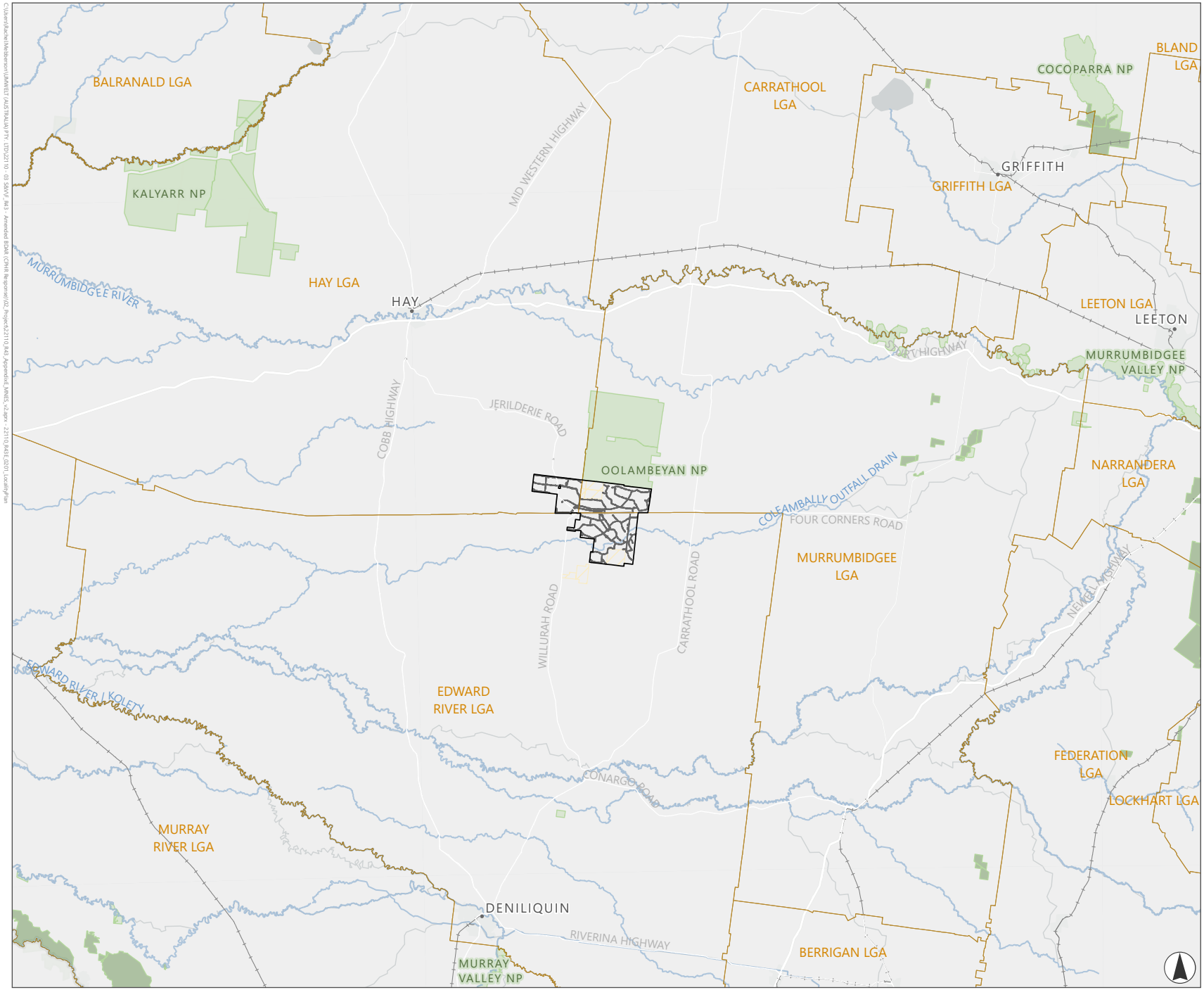
Table 2.2 Key Assessment Areas and Boundaries

Name	Details	Area (ha)	Figure reference (within Amended BDAR)
Project Area	The Project Area encompasses all land within and including the Project Boundary.	20,627.56	Figure 2.1
Project Boundary	The outer boundary of the Project Area. The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of the host landholder properties (i.e. all agreed lots owned by host landholders).	-	Figure 2.1
Subject Land	The land subject to the proposed development. For the purposes of this assessment, the Subject Land is the area within which all proposed Project infrastructure will be placed, and all Project-related ground disturbance will occur. The Subject Land is equivalent to the 'Development Corridor' described within the EIS. The Subject Land is of variable width (to avoid key site constraints) and has been designed to provide some flexibility for micro-siting.	4,292.95	Figure 2.1
Development Footprint	The area of land that is directly impacted by the proposed development. The Development Footprint is equivalent to the total area of impact for the Disturbance Footprint (~637 ha) and Local Transport Route (~19 ha) identified within the EIS (and subsequent Amendment Report). The Disturbance Footprint identified in the EIS is indicative. The actual location and extent of the Disturbance Footprint will be determined prior to construction, subject to the micro-siting provisions outlined in the EIS.	655.61	Figure 2.1
Stage 1 Development Footprint	Portions of the Development Footprint which will be directly impacted as part of Stage 1 of the Proposed Action. Stage 1 of the Proposed Action includes the construction and operation of the Proposed Action south of North Boundary Road, as well as the majority of proposed disturbance associated with offsite road works.	292.86	Figure 2.1
Stage 2 Development Footprint	Portions of the Development Footprint which will be directly impacted as part of Stage 2 of the Proposed Action. Stage 2 of the Proposed Action includes the construction and operation of the Proposed Action north of North Boundary Road, including the associated site access points.	362.75	Figure 2.1

Name	Details	Area (ha)	Figure reference (within Amended BDAR)
Operational Footprint	The Operational Footprint comprises portions of the Subject Land that will be subject to ongoing operational use as a result of the Project which may result in impacts that are direct, indirect, or prescribed in nature.	659.44	Figure 1.2.1 Figure 1.2.2 Figure 1.2.3 Figure 1.2.4
Blade Overhang Areas	Areas within the Project Area within which WTG blades fall outside with Subject Land. These areas will be subject to ongoing prescribed impacts from potential bird and bat strike and barotrauma during Project operation.	3.83	Figure 2.1
Landscape assessment area	The subject land and the area of land within a 500-m or 1500-m buffer of the Subject Land that is determined as per Subsection 3.1.2 of the BAM. For the purposes this assessment, a 1500-m buffer has been applied to the site based assessment areas within Stage 1 of the Proposed Action. A 500 m buffer has been applied to the linear assessment areas within Stage 1 and Stage 2 of the Proposed Action.	22,111.82	Figure 2.1
Locality	Land within a 30-kilometre radius of the Subject Land.	503,592.70	Figure 2.1

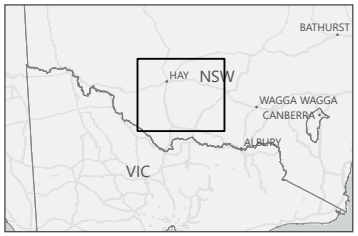
FIGURE 2.1

Locality Plan



Legend

- Project Boundary
- Development Footprint
- Local Government Area
- Conservation Agreement Area
- National Parks
- State Forest
- Road
- Railway Line
- Watercourse



0 10 20

Kilometres

Scale 1:1,000,000 at A4
GDA2020 MGA Zone 55

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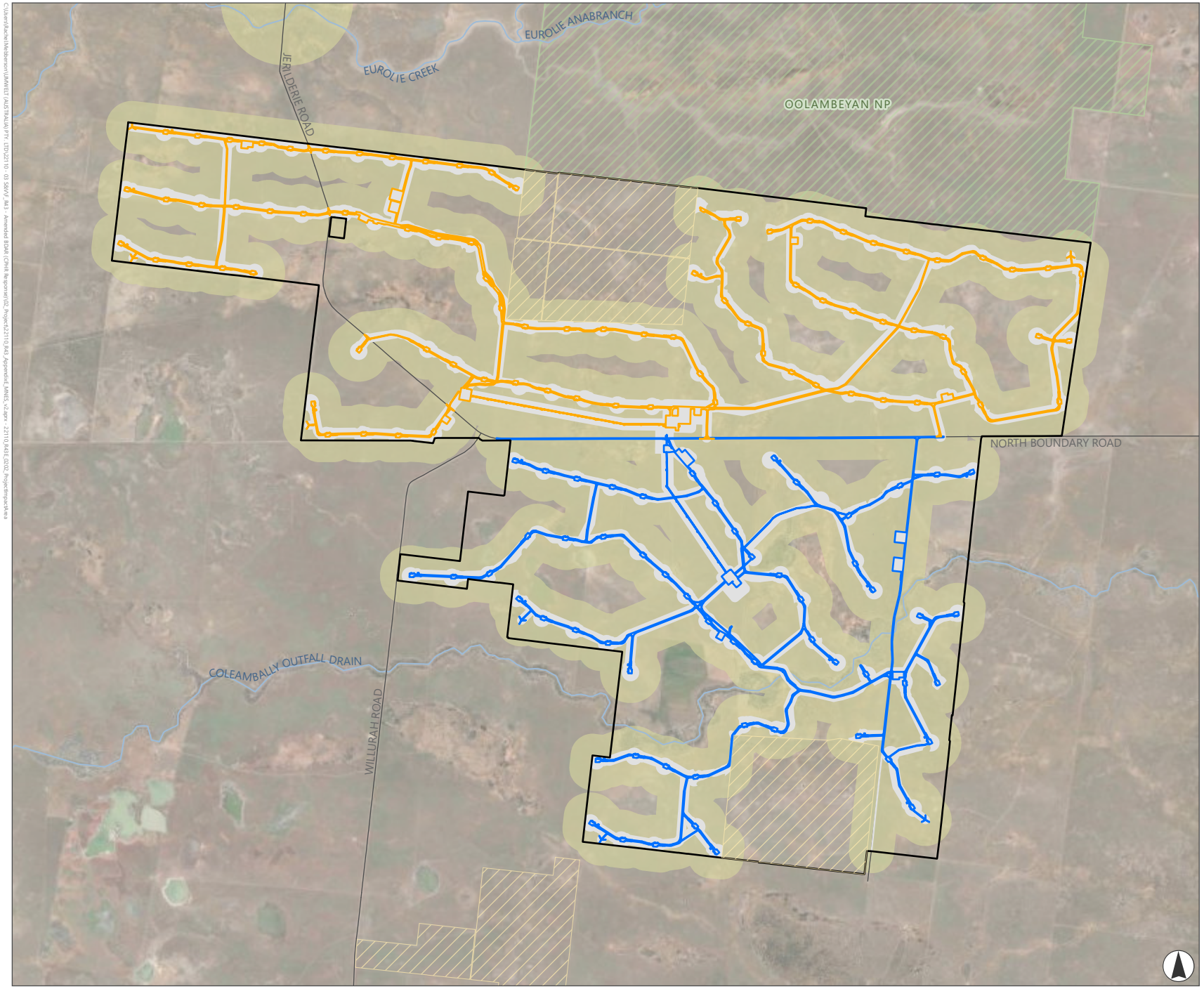
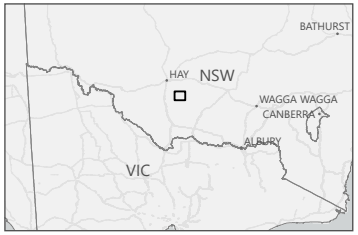


FIGURE 2.2

Project Impact Area

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Assessment Area
- Conservation Agreement Area
- NPWS Reserves
- Road
- Watercourse



0 1,400 2,800

Meters

Scale 1:122,000 at A4

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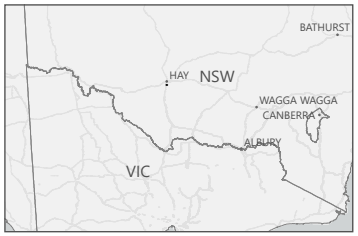
FIGURE 2.3

Project Impact Area

Legend

- Stage 1 (South) Development Footprint
- Assessment Area
- Road



0 20 40

Meters

Scale 1:2,000 at A4

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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

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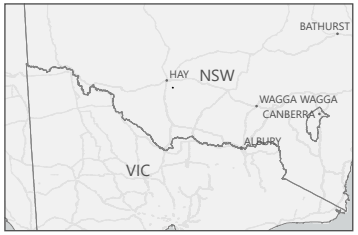
FIGURE 2.4

Project Impact Area

Legend

- Stage 1 (South) Development Footprint
- Assessment Area
- Road



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Meters

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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

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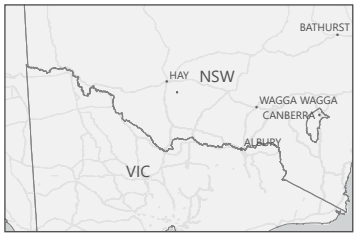
FIGURE 2.5

Project Impact Area

Legend

- Stage 1 (South) Development Footprint
- Assessment Area
- Road
- Watercourse



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Meters

Scale 1:2,000 at A4

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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

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Three separate BAM-C child cases, being Stage 1 – Linear, Stage 1 – Site Based and Stage 2 – Linear, have been prepared for the purpose of informing and completing the BAM assessment in accordance with BAM requirements. The reason for the three child cases are as follows:

- Within the Project Area, the Subject Land is comprised of a single ~230-m-wide corridor with an area of approximately 4,293 ha. All project related infrastructure, including WTG pads, access roads and ancillaries are located within the Subject Land. That corridor is comprised of multiple arms across an area of approximately 22.5 km from east to west, and 15 km from north to south. As this portion of the Subject Land is linear and fragmented in nature, this assessment has adopted the linear assessment method in accordance with the BAM.
- Outside the Project Area, the Subject Land is comprised of three discreet disturbance areas that will be used as laydowns and ancillary sites to support Stage 1 construction. The offsite disturbance areas vary in width and length but are not linear in shape or multiple fragmentation in nature. As this portion of the Subject Land is not linear and multiple fragmentation in nature, this assessment has adopted the site-based assessment method in accordance with the BAM.
- Project construction and grid connection will occur in two stages. Staging would be determined post-development consent and subject to detailed design and procurement processes. Details of the conceptual staging plan are details in **Section 2.2** above.

As such, impact on biodiversity values including MNES have been quantified across the three BAM-C child cases and replicated in this report. The relevant details for each case are provided in **Table 2.3**.

Table 2.3 BAM-C Cases Associated with the Project

Assessment Area	Case Number	Assessment Approach
Stage 1 – Linear	00047468/BAAS18032/24/00047469	Linear
Stage 1 – Site based	00047468/BAAS18032/24/00047471	Site based
Stage 2 – Linear	00047468/BAAS18032/24/00047470	Linear

2.5 Related Actions

The Proposed Action (as amended) and assessed in this MNES Report (and the associated Amended BDAR and Amendment Report) includes all activities or actions associated with the Proposed Action. There are therefore no related actions.

3.0 Method

The information provided in this report is based on the results of both a desktop-based literature and database review and comprehensive biodiversity field surveys undertaken over multiple years and seasons. The surveys were undertaken in accordance with the BAM and are documented in the Biodiversity Development Assessment Report (BDAR). While it is acknowledged that this methodology is endorsed by Commonwealth DCCEEW under the Bilateral Agreement, Umwelt has also made sure to apply relevant Commonwealth DCCEEW survey guidelines, as described in **Section 3.1.3**.

Detailed methods undertaken for the assessment of the Proposed Action (as amended) are provided in Section 2.0 of the Amended BDAR (Umwelt 2025)**.**

3.1 Desktop Literature and Database Review

The following key information sources contain existing ecological information relevant to the Project Area and have been reviewed as part of the preparation of this report. These reports and databases were reviewed to obtain information in relation to Plant Community Types (PCTs), habitat constraints, microhabitats and previous site records for threatened species in the Project Area.

3.1.1 Datasets

The NSW and Commonwealth datasets reviewed as part of preparation of this Amended BDAR are detailed in **Table 3.1.**

Table 3.1 NSW Guidance and Resources Reviewed

Resource	Source	Search parameter
NSW Datasets		
BioNet Vegetation Classification, vegetation information system (VIS)	NSW DCCEEW https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet – date accessed 10/02/2025	Plant Community Type (PCT) descriptions
BioNet Threatened Biodiversity Data Collection (TBDC)	NSW DCCEEW https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet - date accessed 27/07/2025	Threatened entities
BioNet Atlas	NSW DCCEEW https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet - date accessed 20/01/2025	30 km buffer around the Project Area All valid threatened flora, fauna, ecological community records
Important Area Maps	NSW DCCEEW https://customer.lmbc.nsw.gov.au/assessment/s/userlogin?startURL=%2Fassessment%2Fs%2F – date accessed 27/07/2025	Project Area
Biodiversity Assessment Method Calculator (BAM-C)	NSW DCCEEW (https://customer.lmbc.nsw.gov.au/assessment/s/userlogin?startURL=%2Fassessment%2Fs%2F –accessed August 2025.	Subject Land
Transitional Native Vegetation Regulatory (NVR) Map	NSW DCCEEW https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap – date accessed 15/02/2025	Project Area

Resource	Source	Search parameter
Draft NVR Map	NSW DDCCEW https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=DraftNVRmap – date accessed 15/02/2025	Project Area
Biodiversity Values Map	NSW DCCEEW https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap – date accessed 17/02/2025	Project Area
SEED - The Central Resource for Sharing and Enabling Environmental Data in NSW	NSW DCCEEW https://www.seed.nsw.gov.au/ - date accessed10/01/2025	Project Area
eSPADE v2.0	NSW DCCEEW https://www.environment.nsw.gov.au/eSpade2WebApp - date accessed 10/01/2025	Project Area
NSW WeedWise	DPI https://weeds.dpi.nsw.gov.au/ - date accessed 10/02/2025	Project Area
PlantNet - NSW Flora Online	The Royal Botanic Gardens (https://plantnet.rbgsyd.nsw.gov.au/ - date accessed 13/02/2025	Species descriptions
Register of Declared Areas of Outstanding Biodiversity Value (AOBV)	DPE https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/areas-of-outstanding-biodiversity-value/area-of-outstanding-biodiversity-value-register - date accessed 10/01/2025	Project Area
Commonwealth Datasets		
Protected Matters Search Tool (PMST)	Commonwealth DCCEEW https://www.awe.gov.au/environment/epbc/protected-matters-search-tool - date accessed 20/01/2025	30 km buffer around the Project Area
Register of Critical Habitat	Commonwealth DCCEEW https://www.environment.gov.au/cgi-bin/sprat/public/publicregisterofcriticalhabitat.pl - date accessed 20/01/2025	Project Area
Atlas of Groundwater Dependent Ecosystems (GDEs)	Bureau of Meteorology (BoM) http://www.bom.gov.au/water/groundwater/gde/ - date accessed 10/03/2025	Project Area
Climate Data Online	BoM http://www.bom.gov.au/climate/data/?ref=ftr – date accessed 20/01/2025	Hay (Bedarbidgal) (075173) Hay Airport AWS (075019)
Directory of Important Wetlands	Commonwealth DCCEEW https://www.awe.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands - date accessed 20/01/2025	30 km buffer around the Project Area
National Flying Fox Monitoring Viewer	National Flying Fox Monitoring Viewer DCCEEW https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf - date accessed 10/03/2025	LGA
Other		
Atlas of Living Australia Spatial Portal	Atlas of Living Australia https://www.ala.org.au/ - date accessed 20/01/2025	NA

3.1.2 BAM Guidance Documents

The guidance documents and resources specific to the BAM reviewed as part of preparation of this Amended BDAR are detailed in **Table 3.2**.

Table 3.2 Guidance Documents and Resources Relating to the NSW BOS

Resource	Source
Biodiversity Assessment Method (2020a)	NSW Department of Planning, Industry and the environment (DPIE) (superseded) https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020
Biodiversity Assessment Method 2020 Operational Manual – Stage 1 (2022a)	DPE https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-operational-manual-stage-1-220279.pdf
Biodiversity Assessment Method Operational Manual – Stage 2 (2023)	DPE https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2
Determining native vegetation land categorisation for application in the Biodiversity Offsets Scheme	DPE https://www.environment.nsw.gov.au/research-and-publications/publications-search/determining-native-vegetation-land-categorisation-for-application-in-the-biodiversity-offsets-scheme

3.1.3 Survey Guidelines

The NSW and Commonwealth surveys guidelines referred to as part of preparation of this Amended BDAR are detailed in **Table 3.3**.

Table 3.3 NSW and Commonwealth Survey Guidelines

Resource	Source
NSW Survey Guidelines	
Threatened reptiles biodiversity assessment method survey guide (2022)	DPE https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-reptiles-biodiversity-assessment-method-survey-guide
Koala Phascolarctos cinereus biodiversity assessment method survey guide (2022)	DPE https://www.environment.nsw.gov.au/research-and-publications/publications-search/koala-phascolarctos-cinereus-biodiversity-assessment-method-survey-guide
Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	DPIE https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method
Flora species with specific survey requirements (XLS)	NSW DCCEEW https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.lmbc.nsw.gov.au%2Fbamcalc%2Fapp%2Fassets%2FSurveyMonthsConditions_BAMC_Version1.1.xlsx&wdOrigin=BROWSELINK

Resource	Source
Species credit threatened bats and their habitats NSW guide for biodiversity assessment method (2018)	NSW Office of Environment and Heritage (OEH) (superseded) https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/species-credit-threatened-bats-survey-guide-180466.pdf
Species credit threatened bats and their habitats NSW guide for biodiversity assessment method (2021)	DPIE https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (2004 Working Draft)	NSW Department of Environment and Conservation (DEC) (superseded) https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-biodiversity-survey-and-assessment
Threatened species survey and assessment guidelines: field survey methods for fauna. Amphibians (2009).	NSW Department of Environment and Climate Change (DECC) (superseded) https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians
Commonwealth Survey Guidelines	
Commonwealth of Australia (2010a), Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the EPBC Act.	Commonwealth DCCEEW https://www.dcceew.gov.au/environment/epbc/publications/survey-guidelines-australias-threatened-bats
Commonwealth of Australia (2010b), Survey guidelines for Australia's threatened birds (awe.gov.au).	Commonwealth DCCEEW https://www.dcceew.gov.au/sites/default/files/documents/survey-guidelines-birds-april-2017.pdf
Commonwealth of Australia (2011a), Survey Guidelines for Australia's threatened frogs (awe.gov.au).	Commonwealth DCCEEW https://www.dcceew.gov.au/sites/default/files/documents/survey-guidelines-frogs.pdf
Commonwealth of Australia (2011b), Survey guidelines for Australia's threatened mammals (awe.gov.au).	Commonwealth DCCEEW https://www.dcceew.gov.au/environment/epbc/publications/survey-guidelines-australias-threatened-mammals
Commonwealth of Australia (2011c), Survey guidelines for Australia's threatened reptiles (awe.gov.au).	Commonwealth DCCEEW https://www.dcceew.gov.au/environment/epbc/publications/survey-guidelines-australias-threatened-reptiles
Commonwealth of Australia (2011d), Survey guidelines for Australia's threatened fish (awe.gov.au).	Commonwealth DCCEEW https://www.dcceew.gov.au/environment/epbc/publications/survey-guidelines-australias-threatened-fish
Commonwealth of Australia (2013b), Draft survey guidelines for Australia's threatened orchids (awe.gov.au).	Commonwealth DCCEEW https://www.dcceew.gov.au/resource/draft-survey-guidelines-australias-threatened-orchids

3.1.4 Threatened Entity Specific Guidelines and Policy Statements

Table 3.4 provides details of the relevant Commonwealth guidelines and policy statements that were reviewed to inform the assessments for the likely impacted entities. Relevant sections of the publications listed in **Table 3.4** are discussed in the Supplementary SEARS assessments provided in **Section 8.0**.

Table 3.4 Commonwealth Guidelines

EPBC Act listed entity	Commonwealth Guidelines and Policy Statements
Weeping Myall Woodlands	• TSSC (2009) Commonwealth Listing Advice on Weeping Myall Woodlands. Threatened Species Scientific Committee, Canberra. • Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for Weeping Myall Woodlands ecological community. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/98-conservation-advice.pdf. • Department of the Environment, Water, Heritage and the Arts (2009) Canberra, ACT. Weeping Myall Woodlands, National threatened species and ecological communities EPBC Act Policy Statement 3.17. Department of the Environment, Water, Heritage and the Arts. Available from: https://www.dcceew.gov.au/environment/epbc/publications/weeping-myall-woodlands
Natural Grasslands of the Murray Valley Plains	• TSSC (2012) Commonwealth Listing Advice on Natural Grasslands of the Murray Valley Plains. Threatened Species Scientific Committee, Canberra. Available from: https://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=117&status=Critically+Endangered • Department of Sustainability, Environment, Water, Population and Communities (2012a). Approved Conservation Advice for Natural Grasslands of the Murray Valley Plains ecological community. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/117-conservation-advice.pdf. • Department of Sustainability, Environment, Water, Population and Communities (2012b). Fact sheet - Farming and nationally protected Natural Grasslands of the Murray Valley Plains. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from: https://www.dcceew.gov.au/environment/biodiversity/threatened/publications/farming-and-nationally-protected-natural-grasslands-murray-valley-plains
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	• Department of the Environment, Water, Heritage and the Arts (2010). Approved Conservation Advice for the Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-east Australia. Canberra, ACT: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/86-conservation-advice.pdf. • Threatened Species Scientific Committee (2010). Commonwealth Listing Advice on Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. Department of the Environment, Water, Heritage and the Arts. Canberra, ACT: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/86-listing-advice.pdf.
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	• Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for the Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions. Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/3-conservation-advice.pdf

EPBC Act listed entity	Commonwealth Guidelines and Policy Statements
	• Endangered Species Scientific Subcommittee (2000). Commonwealth Listing Advice on Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/buloke-grassy-woodlands.html. • Cheal, D., A. Lucas & L. Macaulay (2011). National recovery plan for the Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions. Department of Sustainability and Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-buloke-woodlands-riverina-and-murray-darling-depression-bioregions. • Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016.
Plains mallee box woodlands of the Murray-Darling Depression, Riverina and Naracoorte Coastal Plain Bioregion	• Department of Agriculture, Water and the Environment (2021). Conservation Advice for the Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions. Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/150-conservation-advice.pdf.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	• Department of the Environment and Heritage (2006a) (DEH). EPBC Act policy statement 3.5 – White Box – yellow box – Blakely's red gum grassy woodland and derived native grasslands. • Department of the Environment and Heritage (2006b) (DEH). Species list for the EPBC Act policy statement 3.5 – White Box – yellow box – Blakely's red gum grassy woodland and derived native grasslands. • Threatened Species Scientific Committee (2006) (TSSC). Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/box-gum.html. In effect under the EPBC Act from 18-May-2006. • Department of Sustainability, Environment, Water, Population and Communities (2011). Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/resource/threat-abatement-plan-biological-effects-including-lethal-toxic-ingestion-caused-cane-toads. • Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017. • Department of the Environment and Energy (2018). Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*. Canberra: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/threat-abatement-plan-disease-natural-ecosystems-caused-phytophthora-cinnamomi-2018

EPBC Act listed entity	Commonwealth Guidelines and Policy Statements
A spear-grass	• Department of the Environment (2014). Approved Conservation Advice for *Austrostipa wakoolica* (a spear grass). Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/66623-conservation-advice.pdf. • Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016
A burr daisy	• Department of Environment, Climate Change and Water (NSW) (2009). *Calotis moorei* Approved Recovery Plan. Department of Environment, Climate Change and Water (NSW), Sydney. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-moores-burr-daisy-calotis-moorei.
Chariot Wheels	• Mavromihalis, J. (2010). National Recovery Plan for the Chariot Wheels *Maireana cheelii*. Department of Sustainability and Environment, Melbourne. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-chariot-wheels-maireana-cheelii.
Claypan Daisy	• Lucas, A. (2010). National Recovery Plan for the Mueller Daisy *Brachyscome muelleroides*. Department of Sustainability and Environment, Melbourne. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-mueller-daisy-brachyscome-muelleroides. In effect under the EPBC Act from 13-Aug-2010.
Mossgiel Daisy	• Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Brachyscome papillosa* (Mossgiel Daisy). Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/6625-conservation-advice.pdf.
Slender Darling Pea	• Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice *for Swainsona murrayana* (Slender Darling Pea). Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/6765-conservation-advice.pdf. • Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016 • Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017. • Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for competition and land degradation by unmanaged goats. DEWHA, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-unmanaged-goats.

EPBC Act listed entity	Commonwealth Guidelines and Policy Statements
Red Darling Pea	• Tonkinson, D. & G. Robertson (2010). National Recovery Plan for the Red Swainson-pea *Swainsona plagiotropis*. Department of Sustainability and Environment, Victoria. Available from: http://www.environment.gov.au/resource/national-recovery-plan-red-swainson-pea-swainsona-plagiotropis.
Winged Peppercress	• Mavromihalis, J. (2010). National Recovery Plan for the Winged Peppercress *Lepidium monoplocoides*. Department of Sustainability and Environment, Melbourne. Available from: http://www.environment.gov.au/resource/national-recovery-plan-winged-peppercress-lepidium-monoplocoides. • Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016 • Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017.
Spike-rush	• Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Eleocharis obicis*. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/15320-conservation-advice.pdf. • Threatened Species Scientific Committee (TSSC) (2012). Commonwealth Listing Advice on *Eleocharis obicis* (a spike rush). Department of Sustainability, Environment, Water, Population and Communities. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/15320-listing-advice.pdf. • Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016. • Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017.
Turnip Copperburr	• Mavromihalis, J (2010). National Recovery Plan for the Turnip Copperburr *Sclerolaena napiformis*. Department of Sustainability and Environment, Melbourne. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-turnip-copperburr-sclerolaena-napiformis.
Blue-winged Parrot	• Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Neophema chrysostoma* (blue-winged parrot). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/726-conservation-advice-31032023.pdf.

EPBC Act listed entity	Commonwealth Guidelines and Policy Statements
	• Recovery plan required, however, there is no adopted or made recovery plan for this species
Diamond Firetail	• Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Stagonopleura guttata* (diamond firetail). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/59398-conservation-advice-31032023.pdf. • Recovery plan required, however, there is no adopted or made recovery plan for this species
Grey Falcon	• Threatened Species Scientific Committee (2020). Conservation Advice *Falco hypoleucos* Grey Falcon. Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/929-conservation-advice-09072020.pdf.
Grey Snake	• Rowland, J. (2012) Targeted Species Survey Guidelines Grey Snake *Hemiaspis damelii*. Queensland Government, Brisbane. • Department of Climate Change, Energy, the Environment and Water (2022). Conservation Advice for *Hemiaspis damelii* (grey snake). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/1179-conservation-advice-05102022.pdf.
Painted Honeyeater	• Department of the Environment (2015). Conservation Advice *Grantiella picta* painted honeyeater. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/470-conservation-advice.pdf. • Department of Agriculture, Water and the Environment (2021). National Recovery Plan for the Painted Honeyeater (*Grantiella picta*). Department of Agriculture, Water and the Environment, Canberra. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/painted-honeyeater-2022.
Plains-wanderer	• Department of the Environment (2015). Conservation Advice *Pedionomus torquatus* plains-wanderer. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/906-conservation-advice.pdf. • Department of the Environment and the Government of South Australia Department of Environment, Water and Natural Resources (2016). National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/plains-wanderer-2016. • Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016

EPBC Act listed entity	Commonwealth Guidelines and Policy Statements
	• Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017. • Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox. DEWHA, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/predation-european-red-fox.
Superb Parrot	• Baker-Gabb D. (2011) National Recovery Plan for the Superb Parrot *Polytelis swainsonii*. Victorian Government Department of Sustainability and Environment, Melbourne. • Threatened Species Scientific Committee (2016). Conservation Advice *Polytelis swainsonii* superb parrot. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/738-conservation-advice-05052016.pdf. • Department of Agriculture, Water and the Environment (2021). National Recovery Plan for the Superb Parrot *Polytelis swainsonii*. Department of Agriculture, Water and the Environment, Canberra. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/superb-parrot-2022.
Southern Bell Frog	• Clemann, N. & G.R. Gillespie (2012). National Recovery Plan for the Southern Bell Frog *Litoria raniformis*. Department of Sustainability and Environment, Melbourne. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-southern-bell-frog-litoria-raniformis. • Department of the Environment and Energy (2016). Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (2016). Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/infection-amphibians-chytrid-fungus-resulting-chytridiomycosis-2016.
Southern Whiteface	• Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Aphelocephala leucopsis* (southern whiteface). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/529-conservation-advice-31032023.pdf. • Recovery plan required, however, there is no adopted or made recovery plan for this species

3.2 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment was carried out for all the threatened species, populations and ecological communities identified in the desktop assessment as potentially occurring in the study area. The likelihood of occurrence assessment was used to refine the results of the desktop assessment and to inform the requirement for targeted threatened species surveys. The likelihood of occurrence assessment was revisited after the commencement of field surveys as candidate species or TECs were recorded and once the habitat values in the study area were better understood.

The likelihood of threatened species, populations, TECs and migratory species occurring within the Subject Land was assessed against the criteria outlined in **Table 3.5**. Species listed as threatened under the EPBC and that have a likelihood of occurrence of moderate or higher are summarised in **Table 3.6**. The full list of threatened species is provided in Appendix B of the Amended BDAR.

Table 3.5 Likelihood of Occurrence Assessment Criteria

Category	Description
Recorded	The species was observed in the study area during the current survey.
High	It is highly likely that the species inhabits the study area and is dependent on identified suitable habitat (i.e., for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (within 30 km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent on habitat within the study area (i.e., for breeding or important life cycle periods such as winter flowering resources), or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area, and the species has not been recorded recently in the locality (within 30 km). It may be an occasional visitor, but habitat similar to that within the study area is widely distributed in the local area, meaning that the species is not dependent on available habitat (i.e., for breeding or important life cycle periods such as winter flowering resources). Specific habitat is not present in the study area, or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
Nil	Suitable habitat is absent from the study area.

Table 3.6 Summary of Likelihood of Occurrence Assessment

Common Name *Scientific Name*	BC Act	EPBC Act	Likelihood of Occurrence	Justification
Threatened Flora				
A spear grass *Austrostipa wakoolica*	E	E	Moderate (following field surveys the species is considered unlikely to occur)	Potential habitat is present on site and edaphic preferences are present within the Subject Land.
Claypan Daisy *Brachyscome muelleroides*	V	V	Moderate (following field surveys the species is considered unlikely to occur)	Potential habitat is present in the development area, with similar species existing within the Subject Land.
Chariot Wheels *Maireana cheelii*	V	V	Recorded	-

Common Name *Scientific Name*	BC Act	EPBC Act	Likelihood of Occurrence	Justification
Mossgiel Daisy *Brachyscome papillosa*	V	V	Moderate (following field surveys the species is considered unlikely to occur)	Appropriate edaphic habitat and flora composition occur in the Subject Land.
Red Darling Pea *Swainsona plagiotropis*	V	V	Moderate (following field surveys the species is considered unlikely to occur)	Appropriate habitat occurs within the development area; however it is a modified state due to grazing.
Slender Darling Pea *Swainsona murrayana*	V	V	Recorded	-
Turnip Copperburr *Sclerolaena napiformis*	E	E	Moderate (following field surveys the species is considered unlikely to occur)	Associated PCT's and suitable habitat occur within the Subject Land. The Subject Land is also located within the current geographical range for the species.
Winged Peppercress *Lepidium monoplocoides*	E	E	Recorded	-
A burr-daisy *Calotis moorei*	E	E	Moderate (following field surveys the species is considered unlikely to occur)	No associated PCT's within the Subject Land, however, the species is associated with similar floristic assemblages.
Spike-rush *Eleocharis obicis*	V	V	Recorded.	-
Threatened Fauna				
Amphibians				
Southern Bell Frog *Litoria raniformis*	E	V	Recorded	-
Aves				
Australian Painted Snipe *Rostratula australis*	E	E	Moderate	Moderate. There is a restricted area of suitable habitat present in the Project Area. This species may very occasionally occur in the Project Area.
Blue-winged Parrot *Neophema chrysostoma*	V	V	Recorded	-
Diamond Firetail *Stagonopleura guttata*	V	V	Recorded	-

Common Name *Scientific Name*	BC Act	EPBC Act	Likelihood of Occurrence	Justification
Gull-billed Tern *Gelochelidon nilotica*	-	M	Moderate	There is a restricted area of suitable habitat in the Project Area. The nearest public record is from Gum Creek 20 km north-east of the Project Area in 2012, however Umwelt recorded the species along Jerilderie Road, approximately 25 km north west from the Project Area while travelling back to Hay during the 2024 summer BBUS for the Project.
Grey Falcon *Falco hypoleucus*	V	V	Moderate	Suitable habitat occurs within the Subject Land; however the Grey Falcon has not been recorded within 30 km of the Project Boundary and the area is unlikely to be utilised for breeding.
Latham's Snipe *Gallinago hardwickii*	-	V	Moderate	There is suitable habitat in the Project Area. This species may very occasionally occur in the Project Area. The nearest records are from Wanganella.
Pacific Swift *Apus pacificus*	-	M	Moderate	This species may occasionally occur in the Project Area. The nearest records are from the Cobb Highway 35 km due west of the Project Area in 2023.
Painted Honeyeater *Grantiella picta*	V	V	High	High. There is suitable habitat present in the Project Area. The nearest record is from adjacent the site at Oolambeyan N.P in 2015. This species is likely to occasionally occur in the Project Area.
Pink Cockatoo *Lophochroa leadbeateri*	V	E	Moderate	Moderate. Suitable habitat and foraging areas are present in the Project Area. Pink cockatoo have been recorded on the properties immediately west of the Project Area. This species may occasionally occur in the Project Area.
Plains-wanderer *Pedionomus torquatus*	E	CE	Recorded	-
Southern Whiteface *Aphelocephala leucopsis*	V	V	Recorded	-
Superb Parrot *Polytelis swainsonii*	V	V	High	Moderate. There is suitable habitat in the Project Area. The nearest record is from 10 km north-east of the Project Area in 2021. This species may very occasionally occur in the Project Area.
White-throated Needletail *Hirundapus caudacutus*	-	V	Moderate	Moderate. This species may occasionally occur in the Project Area. The nearest records are from Hay, Mabins Well and Wanganella.

Common Name *Scientific Name*	BC Act	EPBC Act	Likelihood of Occurrence	Justification
Mammals				
Koala *Phascolarctos cinereus*	E	E	Moderate	Suitable habitat occurs within the Subject Land.
Reptiles				
Grey Snake *Hemiaspis damelii*	E	E	Moderate	Possible habitat occurs within the Coleambally Outfall Drain and Red Gum associated wetlands.
Threatened Ecological Communities				
Weeping Myall Woodlands	-	E	Recorded	-

3.3 Field Survey Effort

3.3.1 Native Vegetation Surveys

3.3.1.1 Plant Community Type Mapping

Surveys of the vegetation, including vegetation mapping and collection of BAM vegetation integrity (BAM VI) plots, within the Subject Land were conducted from 22 December 2022 over a period of approximately six non-consecutive weeks, concluding on 9 May 2024. The first round of survey was conducted to obtain an overview of the nature and extent of vegetation not just within the field survey area but also within adjacent lands. Another objective of the first round of surveys was to map the extent of vegetation communities within the field survey area and establish the number of floristic plots required for the assessment.

The native vegetation extent within the Development Footprint was determined during site surveys, through Geographic Information Systems (GIS) mapping and aerial photograph interpretation using recent aerial imagery. Native vegetation and PCT mapping was undertaken using best-practice techniques to delineate vegetation communities across the Development Footprint.

Vegetation mapping involved the following key steps:

- review of aerial imagery to assess vegetation distribution patterns as dictated by change in canopy texture, tone, and colour, as well as topography
- review of the modelled distribution of vegetation communities within broader scale regional based vegetation mapping, including:
    - NSW State Vegetation Type Map (SVTM) – Riverina v1.1.0, VIS_ID 4469 (DPE 2019)
    - Native Vegetation (Multi Attribute) (NVMP) Hay Vegetation Map. VIS_ID 4153 (DPE 2015).
- preparation of a draft PCT map based on interpretation of digital aerial imagery

- field-based ground-truthing of the draft plant community type mapping
- confirmation of vegetation community floristic delineations based on plot data.

PCTs were delineated through the identification of patterns of plant species assemblages in each of the identified strata. Slight variations in species composition are typical across the extent of a community and are often associated with microhabitats or ecotones with other communities.

3.3.1.2 Plant Community and Threatened Ecological Community Surveys

Comprehensive PCT surveys were undertaken to inform the Amended BDAR. A stratified plot-based floristic and vegetation integrity of the Development Footprint was undertaken in accordance with Table 3 and Section 4.2.1 of the BAM, in order to assess the expected environmental variation and address any gaps and verify the results of previous mapping and site information. These surveys were concentrated within the Subject Land and were undertaken during separate survey periods to accurately sample the vegetation communities and potentially occurring threatened flora species.

A total of 78 BAM plots were sampled by Umwelt ecologists between 18 January 2023 and 9 May 2024, as detailed in **Table 3.7**. The BAM plot survey stratification for each PCT is listed in **Table 3.8**.

Table 3.7 BAM Plots Completed Per Survey Period

Survey Periods	Plots Surveyed (Plot ID Number)
18–24 January 2023	P68, P69, P70, P71, P72, P73, P74, P75, P76, P77
21–23 March 2023	P48, P49, P50, P51, P52, P53, P54, P55, P56, P57, P58, P59, P60, P61, P62, P63, P64, P65, P66, P67, P78
21 April 2023	P51
6–8 June 2023	P32, P33, P34, P35, P36, P37, P38, P39, P40, P41, P42, P43, P44, P45, P46, P47
7 July 2023	P79
17–22 August 2023	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14,
6–9 May 2024	P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P25, P26, P27, P28, P29, P30, P31

Table 3.8 Plant Community Type Survey Plot Stratification Details

Veg. Zone	PCT ID	PCT Name	PCT Condition	Area (ha) within subject land	Area (ha) within Disturbance Footprint	No. of plots required	Plots Completed (plot IDs)
Zone 1	**PCT 10**	River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Moderate-good	19.96	2.23	3	5+
Zone 2	**PCT 13**	Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Moderate-good	2.45	0.08	2	4
Zone 3	**PCT 17**	Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion	Moderate-good	20.20	2.05	4	3
Zone 4	**PCT 24**	Canegrass swamp tall grassland wetland of drainage depressions: lakes and pans of the inland plains	Moderate-good	10.02	1.97	3	3
Zone 5	**PCT 26**	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Derived Native Grassland (DNG)	72.19	17.88	5	5
Zone 6			Moderate-good	42.56	4.92	4	4
Zone 7	**PCT 28**	White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	DNG	464.92	57.61	7	9
Zone 8			Moderate-good	0.01	0.00	1	2
Zone 9	**PCT 44**	Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Moderate-good	1,126.33	169.25	8	13
Zone 10	**PCT 46**	Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Moderate-good	2,174.37	333.15	8	18
Zone 11	**PCT 160**	Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Moderate-good	16.43	2.55	3	3

Veg. Zone	PCT ID	PCT Name	PCT Condition	Area (ha) within subject land	Area (ha) within Disturbance Footprint	No. of plots required	Plots Completed (plot IDs)
Zone 12	**PCT 164**	Cotton Bush open shrubland of the semi-arid (warm) zone	Moderate-good	296.43	40.97	7	9
Total				**4,245.86**	**632.67**	**55**	**78**
Non-native vegetation			-	22.60	3.73	-	-
Dams/waterbodies			-	0.45	0.06	-	-
Infrastructure			-	24.04	19.16	-	-

** The number of plots completed exceed the minimum number of plots required for the BAM-C credit calculations, which is based on the area of the development footprint.*

+ Plot 23 has not been included BAMC calculations as it was sampled in 2024 when WET benchmark thresholds were not met.

The PCTs mapped within the Subject Land were reviewed against the criteria for TECs listed under the EPBC Act using relevant EPBC Act listing criteria, conservation advice and/or policy statements.
The following approach was used:

- A list of nationally listed TECs potentially occurring within the Project Area was obtained through a Protected Matters Search Tool (PMST) search using a 10 km buffer and review of the EPBC Act List of TECs.
- Full-floristic plot assessment, rapid assessments and meandering surveys were completed to determine floristic composition and structure of each PCT.
- For TECs with a potential occurrence within the Project Area, the TEC diagnostic characteristics and condition thresholds were analysed, as identified in the listing advice provided by the Threatened Species Scientific Committee (TSSC) for the relevant candidate TEC.
- Comparison was undertaken with published species lists, including lists of 'important species' as identified on the listing advice provided by the TSSC for potentially occurring nationally listed TECs.
- Comparison with habitat descriptions and distributions for potentially occurring nationally listed TECs was made.

Assessments were completed for the nationally listed TECs with potential to occur in the Project Area, using any relevant guidelines and recovery plans published by Commonwealth DCCEEW.

3.3.2 Threatened Species Surveys

Biodiversity surveys were undertaken by Umwelt in the Subject Land, as detailed in **Table 3.9**.

Targeted threatened species surveys were carried out species credit species with a higher or moderate likelihood of occurring within the Subject Land. In accordance with the BAM, targeted species surveys were not carried out for EPBC Act listed 'ecosystem-credit' species. Further details of threatened species surveys undertaken by Umwelt, including the survey locations for all MNES species are provided in Section 5.3 of the Amended BDAR.

Targeted surveys were carried out for all 15 candidate threatened flora species over 76 days between September 2023 and January 2025. Targeted threatened flora surveys have been carried out in accordance with *Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method* (DPIE 2020c) with Stage 1 of the two-phase grid-based systematic survey approach carried out for species with areas of suitable habitat greater than 50 ha across the Subject Land. Stage 1 surveys for Cullen parvum were completed in spring 2024 / summer 2025 within areas which were not surveyed the previous year (spring 2023 / summer 2024).

Where areas of potential habitat did not meet the size threshold (greater than 50 ha) to use the two-phase grid-based survey system, parallel field traverses were conducted as described in DPIE (2020). Parallel field traverses for threatened flora have also been carried out within the three offsite areas as the size of these three discrete site-based assessment areas were better suited to parallel field traverses rather than survey grids.

Stage 2 of the two-phased grid-based approach was carried out during spring 2024 for three of the four threatened flora species (*Swainsona sericea*, *Lepidium monoplocoides*, and *Maireana cheelii*) recorded during the Stage 1 surveys in spring 2023. DPIE (2020c) states that for the second phase of the two-phase method for large areas, the extent of the area covered by the finer-scale grid should be refined by considering the habitat type, vegetation type and condition and landscape attributes surrounding the locations where the target species was first detected.

For the purposes of the Stage 2 surveys, the refinement of suitable habitat defined by the initial survey phase was complicated by the very large areas of the PCTs that species are associated with, and an apparent absence of a clear preference to condition and surrounding landscape attributes, for example, aspect, soils, topography. Furthermore, the three target species had been recorded within areas with low cover and abundance of exotic species and are often associated with open areas possessing lower native diversity and cover. The pattern of distribution of the three target species indicated that the species were relatively clustered within patches up to 100–200 m in width and were discrete and limited in extent. As such, the likely occurrence of unrecorded individuals was predicted to be strongly tied with the known occurrence localities of these species. Considering the maximum patch size of 100–200 m from these clustered occurrences, the area of 'suitable habitat' was defined as all native vegetation within 500 m of all known records of each of the three target species, including records both in and outside the Subject Land.

Targeted surveys were carried out in areas where the Subject Land intersected with 'suitable habitat' with surveys consisting of 10-metre-wide parallel field traverses, in line with Section 4.1 of DPIE 2020. The smaller scale grids as detailed within Table 4 of DPIE 2020 were considered impractical given the inherent accuracy of the GPS in mobile devices (3–4 m at best) when compared to size of the grid circles (being 4 m diameter). Given the grids circles are spaced at 10 m widths, parallel field traverses at 10 m-wide were considered to provide to adequate coverage. Given the relative abundance of individuals and suitable habitat present across the Subject Land, Stage 2 surveys were not carried out for *Swainsona murryana*.

The width of the traverses used for both the Stage 1 and Stage 2 grid-based surveys and parallel field traverses was consistent with the maximum search width for open vegetation as specified within Table 1 of DPIE (2020).

The following guidelines and resources listed in **Table 3.2**, **Table 3.1**, **Table 3.3** and **Table 3.4** were utilised for the completion of habitat assessments, including the presence of critical habitat (habitat constraints), and targeted surveys for candidate threatened and migratory listed species.

Table 3.9 Threatened Species Survey Effort

Species Name	BC Act	EPBC Act	Survey Dates	Survey Method in accordance with the BAM	Survey Method in accordance with Commonwealth survey guidelines	Relevant State and Commonwealth Guidelines and Resources	Survey Methodology Utilised	Survey Effort
Threatened Flora								
A Spear-grass *Austrostipa wakoolica*	E	E	16–25 October 2023 30 October – 8 November 2023 13–29 November 2023 30–31 October 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide Biodiversity Assessment Method (2020).	Two-phase grid-based systematic approach – Stage 1 Surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1,202.98 km over 1,510 hours
A Burr Daisy *Calotis Moorei*	E	E	16–25 October 2023 30 October – 8 November 2023 13–29 November 2023 17 September 2024 30–31 October 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 Surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1,202.98 km over 1,510 hours
Chariot Wheels *Maireana cheelii*	V	V	4–23 September 2023 17–20 September 2024 30 September – 3 October 2024 15–19 October 2024 29 October – 2 November 2024 26–30 November 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 and Stage 2 Surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1,226.79 km over 1,260 hours Stage 1 – 1,202.98 km 2,030 hours Stage 2 – 684.80 km 860 hours
Claypan Daisy *Brachyscome muelleroides*	V	V	4–23 September 2023 17 September 2024 30–31 October 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 Surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1,227.77 km 1,260 hours
Mossgiel Daisy *Brachyscome papillosa*	V	V	16–25 October 2023 30 October – 8 November 2023 13–29 November 2023 13–29 November 2023 17 September 2024 30–31 October 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 Surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1,202.98 km over 1,510 hours
Red Darling Pea *Swainsona plagiotropis*	V	V	4–23 September 2023 17 September 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	1,227.77 km 1,260 hours
Slender Darling Pea *Swainsona murrayana*	V	V	4–23 September 2023 17–20 September 2024 30 September 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide Biodiversity Assessment Method (2020)	Two-phase grid-based systematic approach – Stage 1 Surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1,227.77 km 1,360 hours

Species Name	BC Act	EPBC Act	Survey Dates	Survey Method in accordance with the BAM	Survey Method in accordance with Commonwealth survey guidelines	Relevant State and Commonwealth Guidelines and Resources	Survey Methodology Utilised	Survey Effort
Spike-Rush *Eleocharis obicis*	V	V	16–25 October 2023 30 October – 8 November 2023 13–29 November 2023 30–31 October 2024.	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed. Two-phase grid-based systematic approach – Stage 1 surveys. Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	1,202.98 km 1,510 hours
Turnip Copperburr *Sclerolaena napiformis*	E	E	4–23 September 2023 17 September 2024 30–31 October 2024.	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020	Two-phase grid-based systematic approach – Stage 1 Surveys Parallel field traverses carried out within the 3 offsite disturbance area surveyed.	10 m transect width. 1227.77 km 1,260 hours
Winged Peppercress *Lepidium monoplocoides*	E	E	16–25 October 2023 30 October – 8 November 2023 13–29 November 2023 17–20 September 2024 30 September – 3 October 2024 15–19 October 2024 29 October – 2 November 2024 26–30 November 2024	For a species with over 50 ha of suitable habitat the two-phase grid-based systematic survey approach is to be used.	Undertake surveys in accordance with NSW BAM guidelines.	NSW DPIE Surveying threatened plants and habitats NSW survey guide biodiversity assessment method (2020)	Two-phase grid-based systematic approach – Stage 1 and Stage 2 Surveys. Parallel field traverses carried out within the 1 offsite disturbance area surveyed.	10 m transect width. Stage 1 – 1,202.98 km 1,510 hours Stage 2 – 684.80 km 860 hours
Threatened Fauna								
Plains-wanderer *Pedionomus torquatus*	E	CE	5–13 and 19–16 November 2024 3–4 December 2024	As per Section 5.3(1)(c) of the BAM, no targeted surveys are required for species with important habitat mapping. Consultation with BCS confirmed that no additional survey and assessment was required for this species.	Commonwealth survey effort guide suggest identifying suitable habitat during the day. Return at night to perform transect spotlight surveys from slow-moving vehicle. Perform 12 hours of survey over 3 nights. Commonwealth DCCEEW confirmed that in order to assessment species under the EPBC Act, additional surveys in 'secondary' habitat for the species would be required. Additional recommendations from them were: Spotlight from the vehicle travelling at 6–7 km/hr across grid-based survey areas comprised of 10–11 transects that are 1 km long and set 50 m apart. Each grid should be surveyed twice, 2–3 night apart	Commonwealth DCCEEW Commonwealth of Australia (2010b), Survey guidelines for Australia's threatened birds (awe.gov.au). Department of Planning, Industry and Environment NSW Government (2020) Plains-wanderer Habitat Management Guide.	Important habitat mapping for the species occurs within the Project Boundary and adjacent to the Subject Land. The Project design has been changed to avoid areas of Important Habitat mapping for this species such that no Important Habitat is proposed to be impacted. Vehicle spotlighting transects were conducted across 24 grids where 10 x 1 km long transects were set 50 m apart. The spotlighting was completed by car travelling 6–7 km/hr with two spotters searching from the car covering 25 m outwards. Each grid site was surveyed twice, 2–3 nights apart from the initial survey.	Spotlighting: Undertaken at 24 sites over 19 nights by 2 people for a total of 524.85 km and 380 hours. Each site was surveyed twice.

Species Name	BC Act	EPBC Act	Survey Dates	Survey Method in accordance with the BAM	Survey Method in accordance with Commonwealth survey guidelines	Relevant State and Commonwealth Guidelines and Resources	Survey Methodology Utilised	Survey Effort
Superb Parrot *Polytelis swainsonii*	V	V	**BBUS vantage survey dates:** 23–29 March 2022 8–13 July 2022 19–24 September 2022 16–20 January 2023 21–25 March 2023 15–19 July 2023 23–26 September 2023 13–17 February 2024 **Area search dates:** 30 September 2024 1–2 October 2024 1–2 November 2024	Survey requirements not explicitly stated. Seasonal bird and bat utilisation surveys. • Habitat feature (trees with suitable hollows) mapping. • Nesting observations (traverse habitat looking for birds). • Presence of two or more birds (diurnal bird surveys).	Commonwealth survey effort guide suggests conducting either; • Area searches or transect surveys, for 12 hours per 50h over 4 days. Targeted Searches of hollow bearing- trees during breeding season for 12 hours over 4 days.	Commonwealth DCCEEW Commonwealth of Australia (2010b), Survey guidelines for Australia's threatened birds (awe.gov.au).	Seasonal bird and bat utilisation surveys carried out to detect presence of species within the Subject Land. Whilst utilisation surveys will be carried out all year, at least two rounds of surveys were carried out between September to December when the species breeds. 20 min/2 ha area searches at 12 survey locations, repeated four (4) times.	Each of the 10 vantage point survey locations were surveyed for 1 hour six (6) times per survey period (8 in total). This equates to 48 hours of survey per vantage point survey location. With 10 vantage point locations this is a total of 480 hours survey. Each of the 12 survey locations were surveyed for 20 min per survey, and surveyed four (4) times. With 12 survey locations this is a total of 960 min (40 hours).
Pink Cockatoo *Lophochroa leadbeateri*	V	E	**BBUS vantage survey dates:** 23–29 March 2022 8–13 July 2022 19–24 September 2022 17–21 January 2023 22–26 May 2023 15–19 July 2023 23–26 September 2023 13–17 February 2024 **Area search dates:** 30 September 2024 1–2 October 2024 1–2 November 2024	Survey requirements not explicitly stated. 20 min/2 ha area searches in accordance with Survey guidelines for Australia's threatened birds (DEWHA, 2010b) in areas containing suitable breeding habitat (hollows). Searches for hollows were carried out during habitat assessment surveys.	Commonwealth requirements not explicitly stated.	Commonwealth DCCEEW Commonwealth of Australia (2010b), Survey guidelines for Australia's threatened birds (awe.gov.au).	Seasonal bird and bat utilisation surveys. Whilst utilisation surveys will be carried out all year, at least two rounds of surveys were carried out between September to December when the species breeds. 20 min/2 ha area searches at 12 survey locations, repeated four (4) times.	Each of the 10 vantage point survey locations were surveyed for 1 hour six (6) times per survey period (8 in total). This equates to 48 hours of survey per vantage point survey location. With 10 vantage point locations this is a total of 480 hours survey. Each of the 12 survey locations were surveyed for 20 min per survey, and surveyed four (4) times. With 12 survey locations this is a total of 960 min / 40 hours).
Southern Bell Frog *Litoria raniformis*	E	V	5–12 December 2023	Aural-visual surveys. 500 m transect 480 minutes total, four (4) repeats in absence of species.	Combination of call detection, call playback and spotlight surveys taking place over 2+ nights, surveying for up to one hour for small wetlands, and longer for sections of larger wetlands.	NSW DPIE NSW survey guide for threatened frogs (2020) NSW DECC Threatened species survey and assessment guidelines: field survey methods for fauna. Amphibians (2009). Commonwealth DCCEEW Commonwealth of Australia (2011a), Survey Guidelines for Australia's threatened frogs (awe.gov.au).	Aural-visual surveys total 480 minutes per 500 m transect, repeated four (4) times.	Aural-visual surveys at all water bodies within the development corridor. This species was widely recorded. Repeat nights were only undertaken when the species was not recorded on the first night.

Species Name	BC Act	EPBC Act	Survey Dates	Survey Method in accordance with the BAM	Survey Method in accordance with Commonwealth survey guidelines	Relevant State and Commonwealth Guidelines and Resources	Survey Methodology Utilised	Survey Effort
Grey Snake *Hemiaspis damelii*	E	E	5–12 December 2023	Not stated. There are no survey guidelines for this species but survey advice from BCD (received 23 November 2023) for Grey Snake is as follows: nocturnal spotlighting on warm nights in spring-summer, adjacent to wetlands on cracking clay soils, particularly in river red gum/spike rush or lignum vegetation communities.	Commonwealth guidelines not explicitly stated. Survey advice from BCD adopted.	NSW DPE Threatened reptiles' biodiversity assessment method survey guide (2022)	Passive meandering nocturnal searches at three (3) sites within designated PCT.	Passive meandering nocturnal searches at three (3) sites within designated PCT. Two ecologists conducted about 30 minute surveys, repeated over four nights. Equating to 405 minutes of survey per ecologist, a total of 810 minutes (13.5 hours).
Koala *Phascolarctos cinereus*	E	E	**Acoustic recorders:** 25 November 2023 – 14 December 2023 **SAT Survey:** 13 May 2024 – 16 May 2024	Passive acoustic detection: 1 recording unit per 5 ha over 7 nights Koala Spot Assessment Technique (SAT) based on 150 m spacing, for suitable habitat ≤50 ha.	?	NSW DPE Koala Phascolarctos cinereus Biodiversity Assessment Method Survey Guide (2022)	Eight (8) acoustic recorders were deployed for a 9-night period (7 nights were required) within suitable habitat (approx. 23 ha). Koala Spot Assessment Technique (SAT) will be utilised to assess the presence of koala scat within the prescribed area. Effort consistent with that specified within Koala (Phascolarctos cinereus) Biodiversity Assessment Method Guideline (DPE 2022).	Eight (8) acoustic recorders were deployed for Koala detection for up to 11 nights. A total of 81 nights of recordings. Eleven (11) Koala SAT plots were selected using the Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Guideline (DPE 2022). The 11 plots were surveyed for scat, with each tree (larger than 10 cm DBH) surveyed for 2 person minutes and identified to species.

4.0 Existing Environment

4.1 Landscape Context

The north western extents of the Project Area fall within the Hay Local Government Area (LGA), whilst the eastern and southern extents of the Project Area fall within the Murrumbidgee LGA and Edward River LGA, respectively (**Figure 2.1**). The closest larger population centres are Griffith (88 km northeast of the Project Area, population 27,300), Deniliquin (66 km southwest of the Project Area, population 7,862), and Hay (28 km northwest of the Project Area, population 2,400). Smaller townships of Darlington Point, Jerilderie and Coleambally are nearer to the Project.

The Project Area is located mostly east of the Jerilderie Road, North Boundary Road and Willurah Road junction, either side of the Balranald to Darlington Point transmission line, and south of the Oolambeyan National Park. The Cobb Highway is situated ~20 km west of the Project Boundary (western most extent) and Conargo Road is ~8.5 km east of the Project Boundary (eastern most extent), while Jerilderie Road traverses the Project Area in a north to south direction until the intersection of North Boundary Road and Willurah Road. North Boundary Road crosses the middle section of Project Area in an east to west direction, whilst Willurah Road is adjacent to the western side of the southern extent of the Project Boundary, running parallel in a north to south direction. The Sturt Highway (which runs in an east to west direction, passing just south of Hay township) is located 20 km north of the Project.

The Project Area is zoned as RU1 Primary Production within the Hay Local Environment Plan (LEP) 2011, the Murrumbidgee LEP 2013 and Edward River LEP 2013. The majority of land that surrounds the Project is also zoned RU1 Primary Production, however the Oolambeyan National Park (directly north and adjacent to the Project Boundary) is primarily zoned as E1 National Parks and Nature Reserves.

The indicative Project Area encompasses an area of approximately 20,629 ha. The topography of the Project Area (all land within and including the Project Boundary) is relatively flat and homogenous ranging from between 94.4 m and 103.2 m Australian Height Datum (AHD), a difference of less than 10 m between the highest and lowest points of the Project area. The Project Area is dissected by a number of larger waterways namely Abercrombie and Eurolie Creek in the north and Coleambally Outfall Drain in the south.

The Subject Land is approximately 4,293 ha in size. The Subject Land is located within the Murrumbidgee Interim Biogeographic Regionalisation for Australia (IBRA)Subregion, in the Riverina Bioregion of NSW. The Riverina Bioregion is an ancient riverine plain and alluvial fan composed of unconsolidated sediments with evidence of former stream channels. Vegetation across the bioregion consists of River Red Gum and Black Box forests, box woodlands, saltbush shrublands, extensive grasslands and swamp communities.

The majority of the Subject Land is primarily comprised of native grassland and chenopod shrubland, with a smaller proportion of the vegetation consisting of a mosaic of freshwater wetlands and open woodland. River Red Gum – Black Box Woodland wetland of the semi-arid (warm) climatic zone, fringes the Coleambally Outfall Drain throughout the subject land. The vegetation within the Subject Land is subject to ongoing agricultural disturbance, primarily cattle and sheep grazing and low levels of pasture improvement. A small proportion of Subject Land is comprised of cleared and disturbed land, which is sown with exotic grasses.

No Important Wetlands occur within the Subject Land. The closest wetland areas of significance are the mid-Murrumbidgee Wetlands located approximately 25 km north of the Subject Land. Booligal Swamp is located approximately 130 km north of the Subject Land. One wetland of international importance, NSW Central Murray Forests, is located approximately 80 kms south west of the Project Area. The Coleambally Outfall Drain is an east to west connectivity irrigation drain that provides outflow to creeks south-west of Coleambally. It provides outflow to Eurolie Creek to the west, Carroonboon Creek and Werkenbergal Swap wetland areas to the south-west of the Project Area and traverses through South West Woodland Nature Reserve. It also provides connectivity to Blind Creek to the east of the Project Area and Bowna Swamp, then connecting to Bublebundie Creek.

Oolambeyan National Park is located along the north-eastern boundary of the Project Area, approximately 200 m north of the Subject Land. The vegetation along the boundary of the national park is consistent with that within the Subject Land, consisting of native grassland and chenopod shrubland. Two conservation agreements have been established within the bounds of the Project Area with the purpose of conserving and maintaining primary habitat for the Plains-wanderer. These include:

- A conservation agreement (CA0465) made under the *Biodiversity Conservation Act 2016* (NSW BC Act).
- Land management agreements made by Murray Local Land Services (LLS) under the Regional Land Partnerships Program.

There are no areas of karst, caves, crevices, cliffs, rocks or other geological features of significance in the Project Area. Soils found within the Project Area are Chromosols and Rudosols, forming scattered patches within the Subject Land of areas with very severe wind erosion capabilities and moderate to severe acidification hazard capabilities.

The landscape context which describes attributes that are potentially relevant to the biodiversity occurring in the Project Area is outlined in **Table 4.1**.

Table 4.1 Landscape Features of the Project Area

Landscape Features	Landscape Context
IBRA region	Riverina IBRA Region
IBRA subregion	Murrumbidgee IBRA Sub-region
NSW (Mitchell) Landscapes	• Murrumbidgee Channels and Floodplains • Murrumbidgee Depression Plains • Murrumbidgee Scalded Plains • Murrumbidgee Source-bordering Dunes.
Land tenure, parks and reserves	• Oolambeyan National Park • Private freehold • Crown land • Public roads and infrastructure.
Cleared areas	Within the Subject Land, there are minor areas of cleared land associated with residential dwellings, access tracks, farm dams, and isolated paddocks where exotic grasses are sown, presumably for livestock feed.

Landscape Features	Landscape Context
Rivers, stream and estuaries	• Coleambally Outfall Drain occurs within the Subject Land. • Eurolie Creek, Nyangay Creek and Abercrombie Creek another three named waterways that occur in the Project Area. • A number of ephemeral first order streams are present within the Subject Land and Project Area.
Wetlands (within, adjacent to and downstream)	One wetland of international importance, NSW Central Murray Forests, is located approximately 80 kms south west of the Project Area. The Murrumbidgee catchment includes several floodplains and wetlands, including the mid-Murrumbidgee River Wetlands. The mid-Murrumbidgee Wetlands are of national importance, located along the Murrumbidgee River between Narrandera and Carrathool, approximately 25 km north of the Project Area. Wetlands occur ephemerally onsite as woodland, shrubland and grassland forms, in the following PCTs: • PCT 13 - River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone fringing the Coleambally Outfall Drain. • PCT17 - Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion). • PCT24 - Canegrass swamp tall grassland wetland of drainage depressions: lakes and pans of the inland plains. • PCT160 - Nitre Goosefoot shrubland wetland on clays of the inland floodplains. The woodland form occurs primarily along the edges of the Coleambally Outfall Drain, while the shrubland and grassland forms occur throughout the subject land in areas of small depressions. In periods of high rainfall, it is likely that water would hold across much of the landscape for a short amount of time, due to the very small differences in elevation.
Areas of geological significance or soil hazard features	The Murrumbidgee IBRA Sub-region is characterised by an alluvial fan with distributary channels and floodplains, undulating plains with depressions. Source-bordering dunes are common. Soils are prone to wind erosion. Land capability generally has moderate-severe limitations with scattered small areas with very severe limitations. No areas of acid sulfate soil risk occur within the Project Area. No karsts, caves, crevices, cliffs, rocks present within the Subject Land.
Connectivity features	The subject land primarily contains agricultural land with grazed grasslands and small patches of shrubland. Opportunities for wildlife movement across these landscapes would be limited to more mobile species such as large sized birds. During periods of high rainfall, it is likely that much of the subject land would be conducive to the movement of threatened amphibian species between more permanent water sources such as farm dams. The only significant source of habitat connectivity occurs in the treed vegetation along the Coleambally Outfall Drain, and the drain itself. The area provides east-west connectivity in the southern part of the Project Area, potentially for a variety of threatened species such as woodland birds, amphibians, reptiles, and mammals. The canopy is grazed underneath, and the drain itself is a highly managed, constructed watercourse with minimal potential to provide connectivity to medium or large fish species.
Critical habitat	There are no areas of Critical Habitat listed under the EPBC Act for MNES present within the Subject Land or Project Area.

4.2 Native Vegetation

Identification of the PCTs occurring with the Subject Land was guided by the results of the review of existing data and surveys of the Subject Land. The data collected during surveys of the Subject Land was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification Database and previously published regional vegetation mapping, namely the SVTM C2.0M2.0 (December 2023). Consideration was given to the following:

- Occurrence within the Riverina IBRA bioregion.
- Vegetation formation.
- Vegetation class.
- Dominant upper, mid and ground strata species.
- Landscape position, soil types and edaphics.

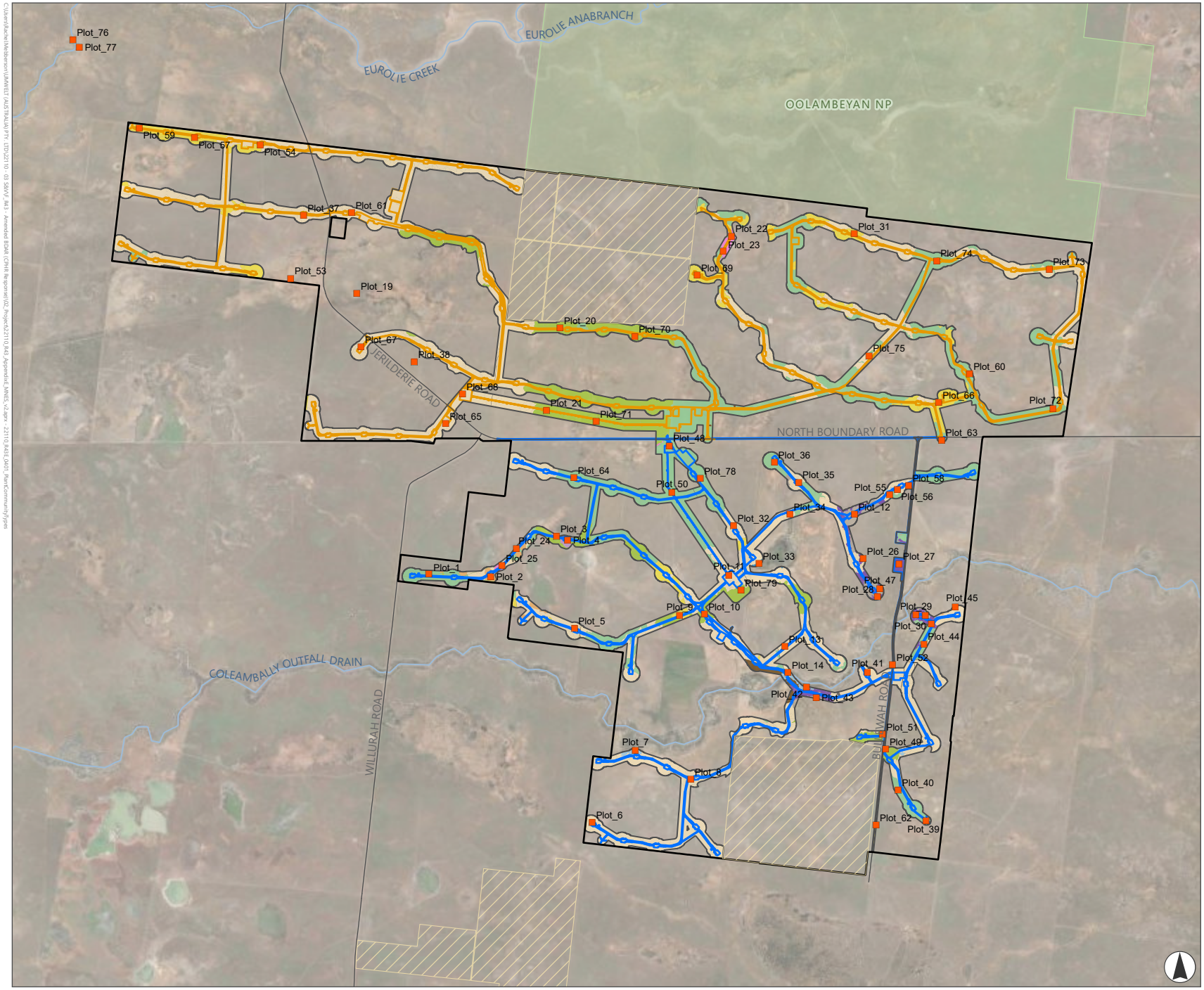
A total of 10 PCTs comprising 12 vegetation zones were recorded across the Subject Land as described within **Table 4.2** and shown in **Figure 4.1.**

Table 4.2 Plant Community Types Occurring in the Project Area

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	BioNet Percentage Cleared Estimate	Condition	BC Act	EPBC Act	Area within Subject Land (ha)			Area within Development Footprint (ha)			Total Area within Subject Land (ha)	Total Area within Development Footprint (ha)
								Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear	Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear		
10	River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Riverine Forests	Forested Wetlands	43.00	Moderate-good	-	-	19.96	0.00	0.00	2.23	0.00	0.00	19.96	2.23
13	Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Woodlands	Semi-arid Woodlands (Grassy sub-formation)	57.00	Moderate-good	-	-	2.45	0.00	0.00	0.08	0.00	0.00	2.45	0.08
17	Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Shrublands	Freshwater Wetlands	63.00	Moderate-good	-	-	20.20	0.00	0.00	2.05	0.00	0.00	20.20	2.05
24	Canegrass swamp tall grassland wetland of drainage depressions: lakes and pans of the inland plains	Inland Floodplain Shrublands	Freshwater Wetlands	20.00	Moderate-good	-	-	10.02	0.00	0.00	1.97	0.00	0.00	10.02	1.97
26	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Riverine Plain Woodlands	Semi-arid Woodlands (Grassy sub-formation)	90.00	Moderate-good DNG	E	E -	114.74	0.00	0.00	22.80	0.00	0.00	114.74	22.80
28	White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Riverine Sandhill Woodlands	Semi-arid Woodlands (Shrubby sub-formation)	73.00	Moderate-good DNG	E	-	151.25	0.53	313.15	20.44	0.53	36.64	464.93	57.61
44	Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Riverine Plain Grasslands	Grasslands	73.00	Moderate-good	-	-	525.83	0.00	600.50	76.46	0.00	92.79	1,126.33	169.25
46	Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Riverine Plain Grasslands	Grasslands	20.00	Moderate-good	-	-	931.16	0.00	1,243.21	138.83	0.00	194.32	2,174.37	333.15
160	Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Inland Floodplain Shrublands	Freshwater Wetlands	28.00	Moderate-good	-	-	4.49	0.00	11.94	0.91	0.00	1.63	16.43	2.55
164	Cotton Bush open shrubland of the semi-arid (warm) zone	Riverine Chenopod Shrublands	Arid Shrublands (Chenopod sub-formation)	8.00	Moderate-good	-	-	40.76	0.41	255.26	3.91	0.41	36.65	296.43	40.97

FIGURE 4.1.1

Plant Community Types Present within the Subject Land

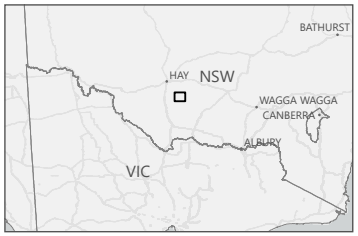


Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Conservation Agreement Area
- NPWS Reserves
- Road
- Watercourse
- BAM Plot

Plant Community Type

- PCT 10 Moderate-Good
- PCT 13 Moderate-Good
- PCT 17 Moderate-Good
- PCT 24 Moderate-Good
- PCT 26 Derived Native Grassland
- PCT 28 Derived Native Grassland
- PCT 28 Moderate-Good
- PCT 44 Moderate-Good
- PCT 46 Moderate-Good
- PCT 160 Moderate-Good
- PCT 164 Moderate-Good
- Non-native vegetation
- Water
- Infrastructure



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Meters

Scale 1:122,000 at A4

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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023)

FIGURE 4.1.2

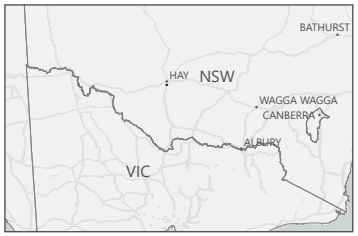
Plant Community Types Present within the Subject Land

Legend

- Stage 1 (South) Development Footprint
- Road
- BAM Plot

Plant Community Type

- PCT 164 Moderate-Good



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Meters

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FIGURE 4.1.3

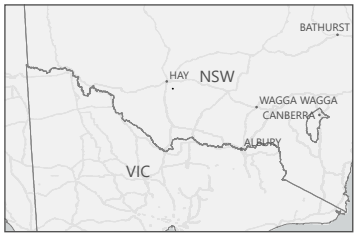
Plant Community Types Present within the Subject Land

Legend

- Stage 1 (South) Development Footprint
- Road
- BAM Plot

Plant Community Type

- PCT 28 Derived Native Grassland



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Meters

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FIGURE 4.1.4

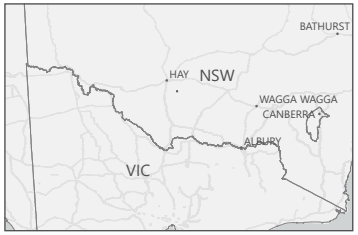
Plant Community Types Present within the Subject Land

Legend

- Stage 1 (South) Development Footprint
- Road
- Watercourse
- BAM Plot

Plant Community Type

- PCT 28 Derived Native Grassland



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4.3 EPBC Act listed Entities

4.3.1 EPBC Act Listed Threatened Ecological Communities

One EPBC Act listed TEC, Weeping Myall Woodlands, has been recorded within the Subject Land. A brief description of the TEC and its occurrence within the Subject Land is provided in **Table 4.3.** The extent of the TEC within the Development Footprint is shown on **Figure 4.2.**

Within BioNet Vegetation Classification, PCT 44 and PCT 46 are associated with Natural Grasslands of the Murray Valley Plains, a TEC listed as critically endangered under the EPBC Act. Although both PCTs were recorded within the Subject Land, this TEC was not found to be present.

An assessment of these the PCTs recorded with the Subject Land against the Listing Advice for Weeping Myall Woodland and Natural Grassland of the Murray Valley Plains is provided in **Section 4.3.1.1** and **Figure 4.2.**

Other TECs listed under the EPBC Act that we predicted to occur from database searches were not recorded within the Subject Land during field surveys. Furthermore, no associated PCTs for these TECs were recorded within the Subject Land. A justification for why these TECs do not occur onsite and require further consideration is contained within **Section 8.1.1.**

Table 4.3 Summary of EPBC Act Listed TECs within the Subject Land

TEC	PCT	Vegetation Zone	Condition	EPBC Act	Area (ha) within Subject Land	Area (ha) in Development Footprint
Weeping Myall Woodlands	PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Zone 6	Moderate – good	E	42.56	4.92
				Total area	**42.56**	**4.92**

4.3.1.1 Weeping Myall Woodlands – Assessment Against Listing Advice

Weeping Myall Woodlands is listed as an Endangered Ecological Community (EEC) under the EPBC Act.

Weeping Myall Woodlands range from open woodlands to woodlands, generally 4 m to 12 m high. The overstorey is dominated by Weeping Myall (*Acacia pendula*) trees and in some cases this species may be the only tree canopy species. Other woodland species may also form part of the overstorey of the ecological community. These include: *Alectryon oleifolius* subsp. *Elongatus*, *Eucalyptus populnea*, or *Eucalyptus largiflorens. Amyema quandang* commonly occurs on the branches of Weeping Myall trees throughout the ecological community's range.

Weeping Myall Woodlands EEC can naturally occur either as a grassy or a shrubby woodland. The understorey often includes an open layer of shrubs over a ground layer which includes a diversity of grasses and forbs. The ground layers can vary in species composition and cover depending on past and current grazing regimes, and the occurrence of recent rain.

Weeping Myall Woodlands has a number of diagnostic features that a patch must meet as condition thresholds to be the EEC:

- the tree canopy is dominated (at least 50% of trees present) by living, dead or defoliated Weeping Myall trees; and
- the overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha; and
- the area is at least 0.5 ha in size; and
- the patch has either:
    - more than two layers of regeneration of Weeping Myall present; or
    - the tallest layer of living, dead or defoliated Weeping Myall trees is at least 4 m tall and of the vegetative cover present, 50% is comprised of native species.

An assessment of the Conservation Advice, Listing Advice and Policy Statement has found that the Vegetation Zone 6 (Moderate - Good) of PCT 26 conforms with Weeping Myall Woodlands, while Vegetation Zone 5 (DNG) does not. A Total of nine patches of Vegetation Zone 6 were recorded within the Subject Land as shown on **Figure 4.2**. **Table 4.4** compares the characteristic attributes of both vegetation zones against Weeping Myall Woodlands EEC.

Table 4.4 Justification of the Presence of Weeping Myall Woodlands in the subject land

Key diagnostic Characteristics as per the Conservation Advice, Listing Advice and Policy Statement	VZ 5 PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion –Derived Native Grassland		VZ 6 PCT26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion - Moderate -Good	
Geographic	The Subject Land falls within the Riverina IBRA bioregion, which is one of the bioregions defined as the particular area that the TEC occupies in the Approved Conservation Advice. Attribute across all patches of VZ 5 conforms with TEC.		The Subject Land falls within the Riverina IBRA bioregion, which is one of the bioregions defined as the particular area that the TEC occupies in the Approved Conservation Advice. Attribute across all patches of VZ 6 conforms with TEC.	
Landscape position	As per the listing advice, VZ 5 occurs in flat areas, shallow depressions. These areas are not associated with active drainage channels, and are rarely if ever flooded. Attribute across all patches of VZ 5 conforms with TEC.		As per the listing advice, VZ 6 occurs in Flat areas, shallow depressions. These areas are not associated with active drainage channels, and are rarely if ever flooded. Attribute across all patches of VZ 6 conforms with TEC.	
Edaphic	As per the listing advice, VZ 5 occurs on black, brown, red-brown or grey clay or clay loam soils. Attribute across all patches of VZ 5 conforms with TEC.		As per the listing advice, VZ 6 occurs on black, brown, red-brown or grey clay or clay loam soils. Attribute across all patches of VZ 6 conform with TEC.	
Structural	VZ 5 occurs as grassland with rare trees which does not conform to structural descriptions of the condition threshold (inadequate tree canopy cover/trees per hectare). Details of structural condition class criteria required by Conservation Advice, Listing Advice and Policy Statement are given below.		VZ 6 occurs as an open woodland with intact understorey including regenerating suckers of Acacia pendula. Details of structural condition class criteria required by Conservation Advice, Listing Advice and Policy Statements are given below.	
Structural	VZ 5 occurs as grassland with rare trees which does not conform to structural descriptions of the condition threshold (inadequate tree canopy cover/trees per hectare). Details of structural condition class criteria required by Conservation Advice, Listing Advice and Policy Statement are given below.		VZ 6 occurs as an open woodland with intact understorey including regenerating suckers of Acacia pendula. Details of structural condition class criteria required by Conservation Advice, Listing Advice and Policy Statements are given below.	
	Structural condition class criteria required by Conservation Advice, Listing Advice and Policy Statement:	**Structural condition class criteria details on site**	**Structural condition class criteria required by Conservation Advice, Listing Advice and Policy Statement:**	**Structural condition class criteria details on site:**
	A tree canopy is dominated (at least 50% of trees present) by	Tree cover across patches of VZ 5, while typically Acacia	A tree canopy is dominated (at least 50% of trees present) by	A tree canopy dominated by Acacia pendula occurs across all patches of VZ 6.

Key diagnostic Characteristics as per the Conservation Advice, Listing Advice and Policy Statement	VZ 5 PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion –Derived Native Grassland		VZ 6 PCT26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion - Moderate -Good	
	living, dead or defoliated Weeping Myall trees.	pendula, is <0.1% cover across all patches. **Attribute across all patches of VZ 5 does not conform with TEC.**	living, dead or defoliated Weeping Myall trees; and	
	An overstorey of at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha	Tree cover is <0.1 % across all patches of VZ 5 **Attribute across all patches of VZ 5 does not conform with TEC.**	The overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha.	Tree cover is greater than 5% across all patches of VZ 6 Attribute across all patches of VZ 6 conforms with TEC.
	An area (patch) is at least 0.5 ha in size	All patches within the subject land are over 0.5 ha in size. Attribute across all patches of VZ 5 conforms with TEC.	The area is at least 0.5 ha in size.	All patches within the subject land are over 0.5 ha in size. Attribute across all patches of VZ 6 conforms with TEC.
	The patch has either:		**The patch has either:**	
	More than two layers of regeneration of Weeping Myall present; or	Most larger patches have two layers of regenerating Acacia pendula present as very rare adults and rare low-growing grazed suckers. Attribute across most patches of VZ 5 marginally conforms with TEC.	More than two layers of regeneration of Weeping Myall present; or	All patches have two layers of regenerating Acacia pendula present as dominant adults and common low-growing grazed suckers. Attribute across all patches of VZ 6 conforms with TEC.
	The tallest layer of living, dead or defoliated Weeping Myall trees is at least 4 m tall and of the vegetative cover present, 50% is comprised of native species.	Acacia pendula present as very rare individuals. More than 50% of vegetation cover present - in most months where growth favours native species – is comprised of native species.	The tallest layer of living, dead or defoliated Weeping Myall trees is at least 4 m tall and of the vegetative cover present, 50% is comprised of native species.	All patches have living, dead or defoliated Acacia pendula trees of at least 4 m tall. More than 50% of vegetation cover present in most months where growth favours native species, is comprised of native species.

Key diagnostic Characteristics as per the Conservation Advice, Listing Advice and Policy Statement	VZ 5 PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion –Derived Native Grassland		VZ 6 PCT26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion - Moderate -Good	
		Attribute across most patches of VZ 5 marginally conforms with TEC.		Attribute across most patches of VZ 6 conforms with TEC.
Characteristic assemblage of species	The Listing Advice does not give detail as to the assemblage of plant species that make up the TEC, but as the Listing Advice notes that the community is listed in NSW, it is assumed that a similar assemblage would locally describe the TEC. Recorded upper stratum: Very rare and isolated adult trees of *Acacia pendula*, with rare suckering small plants of *Acacia pendula.* Recorded middle stratum: *Maireana aphylla and Sclerolaena muricata, Maireana aphylla.* Recorded ground stratum: *Atriplex semibaccata, Rytidosperma caespitosa, Austrostipa aristiglumis, Alternanthera denticulata, Calotis scabiosifolia, Convolvulus clementii, Einadia nutans, Enchylaena tomentosa, Enteropogon acicularis, Sclerolaena brachyptera, Sporobolus caroli, Sida corrugata, Solanum esuriale, Vittadinia cuneata.* This attribute across all patches of VZ 5 broadly conforms with TEC, although noting the relative rarity of Acacia pendula as adult trees.		The Listing Advice does not give detail as to the assemblage of plant species that make up the TEC, but as the Listing Advice notes that the community is listed in NSW, it is assumed that a similar assemblage would locally describe the TEC. Recorded upper stratum: *Acacia pendula* common and from low suckers to adults, with *Eucalyptus largiflorens* as a rare component. Recorded middle stratum: *Maireana aphylla and Sclerolaena muricata, Maireana aphylla.* Recorded ground stratum: *Atriplex semibaccata, Rytidosperma caespitosa, Austrostipa aristiglumis, Alternanthera denticulata, Calotis scabiosifolia, Convolvulus clementii, Einadia nutans, Enchylaena tomentosa, Enteropogon acicularis, Sclerolaena brachyptera, Sporobolus caroli, Sida corrugata, Solanum esuriale, Vittadinia cuneata.* This attribute across all patches of VZ 6 conforms with TEC.	
Summary of TEC attributes of vegetation zone relative to the Listing Advice and Conservation Advice	No patches of the vegetation zone conform to all the required condition class criteria for the TEC.		All patches of the vegetation zone conform to all the required condition class criteria for the TEC.	

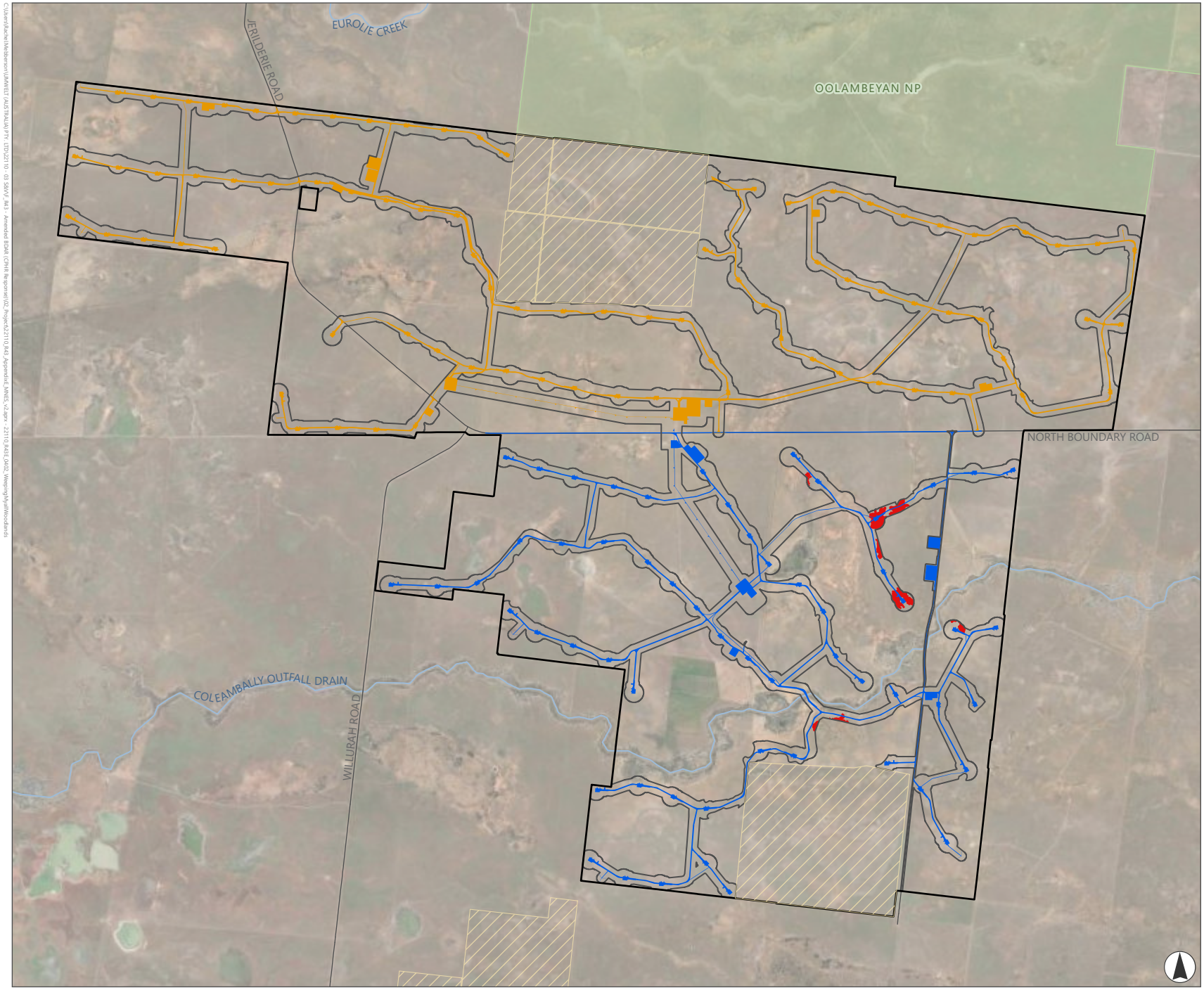


FIGURE 4.2

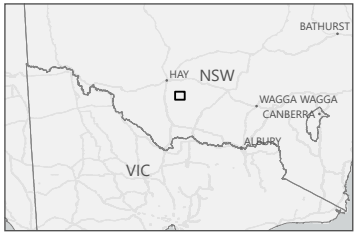
Location of Weeping Myall Woodland within the Subject Land

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Disturbance Footprint
- Stage 2 (North) Disturbance Footprint
- Conservation Agreement Area
- NPWS Reserves
- Road
- Watercourse

Threatened Ecological Communities - EPBC Act

- Weeping Myall Woodland



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4.3.1.2 Natural Grasslands of the Murray Valley Plains

The Natural Grasslands of the Murray Valley Plains are listed as a Critically Endangered Ecological Community (CEEC) under the EPBC Act.

Two PCTs within the study area, PCT 44 Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion and PCT 46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain - Riverina Bioregion are listed in BioNet Vegetation Classification as associated with the Natural Grasslands of the Murray Valley Plains.

The CEEC is dominated by grasses such as: *Rytidosperma* spp., *Austrostipa* spp., *Chloris* spp. and *Enteropogon* spp. Forbs and herbs commonly present include: *Arthropodium* spp., *Bulbine* spp., *Calotis* spp., *Chrysocephalum* spp., *Leptorhynchos* spp., Minnuria spp., *Ptilotus* spp., *Rhodanthe* spp., *Sida* spp., and *Swainsona* spp. Small shrubs may include occasional *Atriplex* spp. and *Maireana* spp.

The Listing Advice describes the assemblage in more detail with characteristic species that may be present in this part of the Riverina. These are described growth form below.

Trees and large shrubs are generally absent to sparse, amounting to less than 10% projective foliage cover for emergent trees or shrubs. Tree and large shrub species include:

- *Eucalyptus* spp
- *Nitraria billardierei*
- *Acacia oswaldii*
- *Acacia pendula*.

The ecological community is usually dominated by a range of species, typically perennial grasses, forbs or small shrubs (generally <1 m tall).

- *Rytidosperma*
- *Austrostipa*
- *Chloris*
- *Enteropogon*
- *Arthropodium* spp
- *Bulbine* spp
- *Calocephalus sonderi*
- *Chrysocephalum apiculatum*
- *Leptorhynchos squamatus*
- *Minuria leptophylla*
- *Oxalis perennans*
- *Ptilotus nobilis*
- *Rhodanthe corymbiflora*
- *Sida corrugata.*

Perennial herbs that are less widespread but are characteristic of the community include

- *Calotis scabiosifolia*
- *Convolvulus angustissimus*
- *Plantago gaudichaudii*
- *Swainsona plagiotropis*
- *Wurmbea latifolia.*

Other important groups of native species in the ecological community include small annual forbs and small shrubs. The most common annuals are

- *Eriochlamys behrii*
- *Goodenia pusilliflora*
- *Isoetopsis graminifolia*
- *Levenhookia dubia*
- *Triptilodiscus pygmaeus.*

The most common small shrubs present are chenopods. Chenopods that characteristically occur in the ecological community include:

- *Atriplex semibaccata*
- *M. enchylaenoides*
- *M. humillima*
- *Maireana decalvans*
- *M. excavate*
- *M. pentagona.*

The CEEC typically occurs on a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays.

The Natural Grasslands of the Murray Valley Plains is limited to a particular kind of grassland that is naturally treeless or almost so, with sparse tree cover. Such grasslands do not naturally occur in many areas. The policy statement for the CEEC, for example, notes that the extensive grasslands on the Hay Plains are not part of the listed grassland community, as they are not natural grasslands, but are derived from clearing past saltbush or woodland vegetation. BioNet Vegetation Classification classifies the vegetation class for both PCT 44 and PCT 46 as Riverina Plain Grasslands. It notes that it is likely that over 1,000,000 ha of grassland of various types occurs on the Riverina Plain and are derived largely from Myall woodland and Saltbush shrubland since European settlement. The BioNet profile for Riverine Plain Grasslands notes that the Riverine Grasslands were apparently derived from Riverine Plains Woodlands, which were eliminated by heavy grazing. Porteners MJ (1993) states that the shrubland and grassland communities on the Hay Plain may be regarded as various stages in a succession after grazing disturbance, indicating that the grasslands of Hay are not natural grasslands but disclimax communities with various degrees of degeneration.

In the northern part of the distribution of the ecological community, the Listing Advice details a method to help distinguish the listed natural grasslands from grasslands derived from clearing past saltbush or woodland vegetation. This method looks at native plant species characteristic of grassland ecological communities in south-western NSW. Species more frequent in the Natural Grasslands of the Murray Valley Plains ecological community and species more frequent in grassland vegetation not considered to be the ecological community are listed in the method. A comparison was made for both PCT 44 and PCT 46 between the species in the Listing Advice noted as common in the CEEC and species noted as common in grasslands that are not the CEEC. It was found, for both PCT 44 and PCT 46 on site, that there are approximately twice as many species that listed as common in grasslands derived from former *Acacia pendula* woodlands or chenopod shrublands, compared to species listed as common in natural grasslands of the CEEC.

The Listing Advice defines a patch for this CEEC as a discrete and continuous area of the ecological community. However, a patch may include small-scale disturbances, such as tracks or breaks (including exposed soil, leaf and other plant litter, cryptogams) or small-scale variations in vegetation that do not significantly alter its overall functionality (for instance the movement of wildlife or dispersal of plant propagules).

The Listing Advice states that the ecological community is limited to patches that meet the following key diagnostic characteristics and condition thresholds.

The key diagnostic characteristics of this ecological community are:

- Distribution is primarily in the Riverina Bioregion and the Wimmera plains of the Murray Darling Depression Bioregion. Other outlying occurrences are also in the Murray Darling Depression Bioregion and the NSW South Western Slopes Bioregion.
- The approximate northern limit of the ecological community is in the Murrumbidgee subregion (IBRA RIV2), approximately near the northern boundary of the Murray Catchment Management Authority (CMA) in NSW.
- It typically occurs on a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays.
- The ecological community is typically dominated by a range of perennial grasses and/or forbs or co-dominated by small shrubs. Sites are not necessarily dominated by any particular plant species. Characteristic genera present typically include:
    - For grasses – *Rytidosperma, Austrostipa, Chloris* and *Enteropogon.*
    - For forbs – *Arthropodium, Bulbine, Calotis, Chrysocephalum, Leptorhynchos, Minuria, Ptilotus, Rhodanthe, Sida* and *Swainsona.*
    - For small shrubs – *Atriplex* and *Maireana.*
- Trees and large shrubs (>1 m tall) are generally absent to sparse, amounting to less than 10% projective foliage cover for emergent trees or shrubs. Where tree and large shrub species are present, they may often include *Acacia oswaldii* (umbrella wattle), *A. pendula* (weeping myall, boree), *Allocasuarina luehmannii* (buloke) and *Eucalyptus* spp. from intergrading communities. Where woodlands overlap or adjoin with the ecological community, they are not included as part of the Natural Grasslands of the Murray Valley Plains. The outer boundary for these adjacent ecological communities should be defined as two times the canopy width of the dominant tree species.
- In addition to the vegetation and other characteristics, above, presence of the ecological community may also be indicated by the presence or past records of 'diagnostic' indicator fauna species in the patch, such as the plains-wanderer, striped legless lizard, hooded scaly-foot or curl snake.

<u>Condition Thresholds</u>

In addition to the diagnostic characteristics above, the following condition thresholds for the community apply.

- For all patches of the ecological community:
    - the percentage cover of native vascular plants (annual and perennial) in the patch is greater than the percentage cover of perennial exotic species
    - either category A or category B thresholds are met as below
- Category A. For patches with high diversity or that are relatively undisturbed
- 15 or more native vascular plant species are present in the patch

- The patch contains one or more indicator species in Table 2 of the Listing Advice, characteristic of sites that are relatively undisturbed (e.g. have little to no history of cultivation)
- The size of the grassland patch is at least 0.04 ha or more in size
- Category B. For larger patches that have good ground layer diversity:
    - 10 or more native vascular plant species are present in the patch
    - The size of the grassland patch is at least 1 ha or more in size.

Grasslands of the Project Area

For the current report, PCT and vegetation zone ground truthing was limited to the Subject Land, but the majority of the Project Boundary was broadly assessed through extensive rapid data points and aerial photograph interpretation (API). This vegetation mapping in those parts of the Project Area outside the Subject Land gives a high confidence for mapping of vegetation formation (grasslands), a high confidence for vegetation class (Riverine Plain Grasslands), and a moderate confidence to PCT.

PCT 44 and PCT 46 are mapped by SVTM outside the Project Area. In order to determine patch sizes of grasslands of PCT 44 and PCT 46 that intersect the Subject Land, allowance was precautionarily made for small gaps between small-scale disturbances, such as tracks or breaks of at least 15 m, which is a typical width in the SVTM of roads and unsealed tracks between mapped polygons of PCT 44 and PCT 46. Applying this allowance of small gaps within a patch, using SVTM and the current study's PCT mapping in the Subject Land, the extent of grassland occurring as PCT 44 and PCT 46 (Riverine Plain Grasslands) forms one large patch of at least 175,000 ha.

Vegetation surveys for the BWF were carried out across a two-year period and consisted of the collection of detailed data as part of BAM VI plots, and RMPs. Data was captured across all four seasons in order to capture the seasonal variation of native vegetation composition. Furthermore, data was collected following durations of good rainfall and not during time of drought. An assessment against the Conservation Advice found that patches of PCT 44 and PCT 46, both as patches of each vegetation zone (PCT) and as patches of the vegetation class Riverine Plain Grasslands, do not conform with Natural Grasslands of the Murray Valley Plains CEEC. **Table 4.5** compares the characteristic attributes of vegetation zone (PCT) patches and Riverine Plain Grasslands patches in the Subject Land.

McDougall (2008) supplied evidence which supports the hypothesis that the existing grassland remnants in the north of the Riverina, including the locality of the Project Area, are floristically similar to, and likely derived from *Acacia pendula* woodland. As these grasslands are probably derived and not natural, they would not form part of the Natural Grasslands of the Murray Valley Plains TEC. McDougall reviewed 1665 floristic quadrats and identified two groups through refining quadrat data and cluster analysis. One of the two groups of plots (Group 1) located in the north of the Riverina, which the Project Area is within, shows strong similarity to plots containing *Acacia pendula*. The other group of plots (Group 2) found in the south and east of the Riverina, shows floristic distinction from plots containing *Acacia pendula*. This supports the theory that grassland plots of similar floristic composition to plots containing *Acacia pendula* in the region, are likely derived from *Acacia pendula* woodland and are not natural grasslands. The location of the Project Area relative to the distribution of the two quadrat groups of McDougall is show in **Figure 4.3.**

Table 4.5 Justification of the Presence of Natural Grasslands of the Murray Valley Plains in the Subject Land

Key diagnostic characteristics and condition thresholds as per the Conservation Advice, Listing Advice and Policy Advice	Key diagnostic characteristics relative to VZ – 9. PCT44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Key diagnostic characteristics relative to VZ – 10. PCT46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Key diagnostic characteristics relative to the patch of Riverine Plain Grasslands contiguous extent of PCT44 and PCT46.
Diagnostic characteristic: Distribution	While as per the Listing Advice, the Subject Land is in the Riverina Bioregion, as per the policy advice, the Subject Land lies generally north of those parts of the Murray Valley Plains supporting the CEEC, specifically the Hay Plain which are not considered natural grasslands. McDougall (2008) has identified that grasslands in the northern part of the Riverina, including the Project Area, are derived from *Acacia pendula* woodland, and not natural grasslands **Attribute across all patches of PCT 44 (VZ 9) in the subject land does not conform to the CEEC.**	While as per the Listing Advice, the Subject Land is in the Riverina Bioregion, as per the policy advice, the Subject Land lies generally north of those parts of the Murray Valley Plains supporting the CEEC, specifically the Hay Plain which are not considered natural grasslands. McDougall (2008) has identified that grasslands in the northern part of the Riverina, including the Project Area, are derived from *Acacia pendula* woodland, and not natural grasslands **Attribute across all patches of PCT 46 (VZ 10) in the subject land does not conform to the CEEC.**	While as per the Listing Advice, the Subject Land is in the Riverina Bioregion, as per the policy advice, the Subject Land lies generally north of those parts of the Murray Valley Plains supporting the CEEC, specifically the Hay Plain which are not considered natural grasslands. McDougall (2008) has identified that grasslands in the northern part of the Riverina, including the Project Area, are derived from *Acacia pendula* woodland, and not natural grasslands. **Attribute across all grassland patches in the subject land does not conform to the CEEC.**
Diagnostic characteristic: Landscape position	The Subject Land occurs on the alluvial plain of the Murray River and its tributaries. Attribute across all areas of PCT 44 (VZ 9) in the Subject Land conforms with the CEEC.	The Subject Land occurs on the alluvial plain of the Murray River and its tributaries. Attribute across all areas of PCT 46 (VZ 10) in the Subject Land conforms with the CEEC.	The Subject Land occurs on the alluvial plain of the Murray River and its tributaries. Attribute across the patch of Riverine Plain Grasslands in the Subject Land conforms with the CEEC.
Diagnostic characteristic: Edaphic	The Listing Advice notes that the CEEC typically occurs on a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays. The areas of PCT 44 (VZ 9) in the Subject Land occur on red-brown clay loams. Attribute across the areas of PCT 44 (VZ 9) in the Subject Land conforms with the CEEC.	The Listing Advice notes that the CEEC typically occurs on a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays. The areas of PCT 46 (VZ 10) in the subject land occur on grey to red-brown clay loams. Attribute across all areas of PCT 46 (VZ 10) in the Subject Land conforms with the CEEC.	The Listing Advice notes that the CEEC typically occurs on a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays. The patch of Riverine Plain Grasslands in the Subject Land occur on grey to red-brown clay loams.

Key diagnostic characteristics and condition thresholds as per the Conservation Advice, Listing Advice and Policy Advice	Key diagnostic characteristics relative to VZ – 9. PCT44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Key diagnostic characteristics relative to VZ – 10. PCT46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Key diagnostic characteristics relative to the patch of Riverine Plain Grasslands contiguous extent of PCT44 and PCT46.
			Attribute across the patch of Riverine Plain Grasslands in the Subject Land conforms with the CEEC.
Diagnostic characteristic: Natural grassland structure	As identified by McDougall (2008), grasslands in the locality are from clearing past saltbush or Acacia woodland, rather than the CEEC's requirement to be a natural grassland. **Attribute across the patch containing PCT 44 (VZ 9) in the Subject Land does not conform to the CEEC. As this attribute of the grassland being natural is determinative, then the failure of this attribute to conform to the CEEC means the CEEC does not exist in the Subject Land, irrespective of the status of other attributes.**	As identified by McDougall (2008), grasslands in the locality are derived from clearing past Acacia woodland, rather than the CEEC's requirement to be a natural grassland.. **Attribute across the patch containing PCT 46 (VZ 10) in the Subject Land does not conform to the CEEC. As this attribute of the grassland being natural is determinative, then the failure of this attribute to conform to the CEEC means the CEEC does not exist in the Subject Land, irrespective of the status of other attributes.**	As identified by McDougall (2008), grasslands in the locality are derived from clearing past Acacia woodland, rather than the CEEC's requirement to be a natural grassland. **Attribute across patch of Riverine Plain Grasslands in the Subject Land does not conform to the CEEC. As this attribute of the grassland being natural is determinative, then the failure of this attribute to conform to the CEEC means the CEEC does not exist in the Subject Land, irrespective of the status of other attributes.**
Diagnostic characteristic: Characteristic vascular plant species present	25 of the 78 characteristic species identified in Appendix A of the listing advice occur in areas of PCT 44 within the grassland patch.. This is 32% of the characteristic species. These species include: *Atriplex semibaccata, Austrostipa nodosa, Austrostipa scabra, Calocephalus sonderi, Calotis scabiosifolia, Chenopodium desertorum, Euphorbia drummondii, Goodenia fascicularis, Leucochrysum molle, Maireana decalvans Maireana excavata, Maireana pentagona, Rhodanthe corymbiflora, Rhodanthe pygmaea, Rumex dumosus, Rytidosperma*	32 of the 78 number of characteristic species identified in Appendix A of the listing advice occur in areas of PCT 44 (VZ 9). This is 41% of the characteristic species. These species include: *Alternanthera sp.* A, *Asperula conferta, Atriplex semibaccata, Austrostipa aristiglumis, Austrostipa nodosa, Austrostipa scabra,* *Bulbine bulbosa, Calocephalus citreus, Calocephalus sonderi, Calotis scabiosifolia, Chenopodium desertorum, Chloris truncata, Euphorbia drummondii, Goodenia fascicularis, Goodenia pusilliflora, Hypoxis*	At least 34 of the 78 characteristic species identified in Appendix A of the listing advice occur across the patch of Riverine Plain Grasslands. This is 44% of the characteristic species. *Alternanthera sp*. A, *Asperula conferta, Atriplex semibaccata, Austrostipa aristiglumis, Austrostipa nodosa, Austrostipa scabra, Bulbine bulbosa, Calocephalus citreus, Calocephalus sonderi, Calotis scabiosifolia, Chenopodium desertorum, Chloris truncata, Euphorbia drummondii, Goodenia fascicularis, Goodenia pusilliflora,*

Key diagnostic characteristics and condition thresholds as per the Conservation Advice, Listing Advice and Policy Advice	Key diagnostic characteristics relative to VZ – 9. PCT44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Key diagnostic characteristics relative to VZ – 10. PCT46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Key diagnostic characteristics relative to the patch of Riverine Plain Grasslands contiguous extent of PCT44 and PCT46.
	caespitosum, Rytidosperma duttonianum, Sida corrugata, Swainsona murrayana, Swainsona procumbens, Swainsona sericea, Triptilodiscus pygmaeus, Wurmbea dioica. Attribute across all areas of PCT 44 (VZ 9) in the Subject Land poorly conform with the CEEC.	*glabella, Leiocarpa panaetioides, Maireana cheelii, Maireana decalvans, Maireana excavate, Maireana pentagona. Oxalis perennans, Plantago drummondii, Rhodanthe corymbiflora, Rhodanthe pygmaea, Rytidosperma caespitosum, Rytidosperma duttonianum, Rytidosperma setaceum, Sida corrugata, Swainsona murrayana, Swainsona procumbens, Swainsona sericea, Wurmbea dioica.* Attribute across all areas of PCT 46 (VZ 10) in the Subject Land moderately conforms with the CEEC.	*Hypoxis glabella, Leiocarpa panaetioides, Leucochrysum molle, Maireana cheelii, Maireana decalvans, Maireana excavata, Maireana pentagona. Oxalis perennans, Plantago drummondii, Rhodanthe corymbiflora, Rhodanthe pygmaea, Rumex dumosus, Rytidosperma caespitosum, Rytidosperma duttonianum, Rytidosperma setaceum, Sida corrugata, Swainsona murrayana, Swainsona procumbens, Swainsona sericea, Triptilodiscus pygmaeus, Wurmbea dioica.* Of the 68 species listed in Table 2 of the Listing Advice, 16 (24%) were noted across the grassland patch. These species are: *Asperula conferta, Calocephalus citreus, Calotis scabiosifolia, Chenopodium desertorum, Goodenia pusilliflora, Leiocarpa panaetioides, Leucochrysum molle, Maireana aphylla, Maireana cheelii, Maireana excavata, Maireana pentagona, Plantago drummondii, Rhodanthe pygmaea, Swainsona murrayana, Swainsona procumbens, Swainsona sericea* *Triptilodiscus pygmaeus, Wurmbea dioica.* Attribute across the patch of Riverine Plain Grasslands in the Subject Land moderately conforms with the CEEC.

Key diagnostic characteristics and condition thresholds as per the Conservation Advice, Listing Advice and Policy Advice	Key diagnostic characteristics relative to VZ – 9. PCT44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Key diagnostic characteristics relative to VZ – 10. PCT46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Key diagnostic characteristics relative to the patch of Riverine Plain Grasslands contiguous extent of PCT44 and PCT46.
Diagnostic characteristic: Indicator fauna species	The Listing Advice notes that the CEEC may also be indicated by the presence or past records of 'diagnostic' indicator fauna species in the patch, such as the Plains-wanderer, striped legless lizard, hooded scaly-foot or curl snake. Plains-Wanderer was observed by the current survey in PCT 44 (V9). The Listing Advice does not define a 'diagnostic' indicator' species, but it is noted that Plains-wanderer is not listed as associated only with PCTs listed as also associated with the CEEC. PCT 44 and PCT 46 are the only two PCTs noted as occurring within the Murrumbidgee IBRA sub-region listed as also associated with Plains-wanderer, however as described above, the Grasslands on the Subject Land are not natural and as such are not the CEEC.	The Listing Advice notes that the CEEC may also be indicated by the presence or past records of 'diagnostic' indicator fauna species in the patch, such as the Plains-wanderer, striped legless lizard, hooded scaly-foot or curl snake. Plains-Wanderer was observed by the current survey in PCT 46 (V10). The Listing Advice does not define a 'diagnostic' indicator' species, but it is noted that Plains-wanderer is not listed as associated only with PCTs listed as also associated with the CEEC. PCT 44 and PCT 46 are the only two PCTs noted as occurring within the Murrumbidgee IBRA sub-region listed as also associated with Plains-wanderer, however as described above, the Grasslands on the Subject Land are not natural and as such are not the CEEC.	The Listing Advice notes that the CEEC may also be indicated by the presence or past records of 'diagnostic' indicator fauna species in the patch, such as the Plains-wanderer, striped legless lizard, hooded scaly-foot or curl snake. Plains-Wanderer was observed by the current survey in both large patches of Riverine Plain Grassland. The Listing Advice does not define a 'diagnostic' indicator' species, but it is noted that Plains-wanderer is not listed as associated only with PCTs listed as also associated with the CEEC. PCT 44 and PCT 46 are the only two PCTs noted as occurring within the Murrumbidgee IBRA sub-region listed as also associated with Plains-wanderer, however as described above, the Grasslands on the Subject Land are not natural and as such are not the CEEC.
Condition threshold: **Percentage cover of native vascular plants is greater than the percentage cover of perennial exotic species.**	Of the exotic species across the Subject Land's grasslands, three annual grasses are by far dominant: *Lolium rigidum, Avena fatua*, and *Hordeum leporinum*. The principal perennial exotic in PCT 44 is *Lycium ferocissimum* which is present at very low densities of <0.01% across all areas of VZ 9 in the Subject Land. Attribute across all areas of PCT 44 (VZ 9) in the Subject Land conform with the CEEC.	Of the exotic species across the Subject Land's grasslands, three annual grasses are by far dominant: *Lolium rigidum, Avena fatua*, and *Hordeum leporinum*. The principal perennial exotic in PCT 46 is *Lycium ferocissimum* which is present at very low densities of <0.01% across most areas of VZ 10 in the Subject Land. Attribute across all areas of PCT 46 (VZ 9) in the Subject Land conform with the CEEC.	Of the exotic species across the Subject Land's grasslands, three annual grasses are by far dominant: *Lolium rigidum, Avena fatua*, and *Hordeum leporinum*. The principal perennial exotic in both PCT 44 and PCT 46 is *Lycium ferocissimum* which is present at very low densities of <0.01% across the patch of Riverine Plain Grasslands in the Subject Land.

Key diagnostic characteristics and condition thresholds as per the Conservation Advice, Listing Advice and Policy Advice	Key diagnostic characteristics relative to VZ – 9. PCT44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Key diagnostic characteristics relative to VZ – 10. PCT46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Key diagnostic characteristics relative to the patch of Riverine Plain Grasslands contiguous extent of PCT44 and PCT46.
			Attribute across the patch of Riverine Plain Grasslands in the subject land conforms with the CEEC.
Condition threshold: **comparison of species characteristic of Natural Grasslands of the Murray Valley Plains versus species not considered to be the CEEC (Listing Advice Table 1)**	The combined areas of VZ 9 PCT44 support more characteristic species not considered part of the CEEC than those noted to be more frequently associated with the CEEC. The combined areas support 9 of the listed 28 species (32%) as described in Listing Advice as more frequent in the CEEC compared to 13 of the listed 35 species (37%) that are more frequent in grassland vegetation not considered to be the CEEC. The species recorded that are more frequent in the CEEC are: *Austrostipa aristiglumis, Austrostipa nodosa, Leiocarpa panaetioides, Maireana excavata, Rytidosperma duttonianum, Swainsona murrayana, Swainsona procumbens, Triptilodiscus pygmaeus, Wurmbea dioica.* The species recorded that are more frequent in grasslands that are not the CEEC are: *Austrostipa scabra, Boerhavia domini, Einadia nutans, Enchylaena tomentosa, Eragrostis australasica, Leiocarpa leptolepis, Marsilea drummondii, Roepera glauca* (syn. *Zygophyllum glaucum*), *Sclerolaena brachyptera, Sclerolaena muricata* (sens. lat.), *Sclerolaena stelligera, Sida trichopoda, Sporobolus caroli.*	The combines areas of VZ 10 PCT 46 show more species not considered part of the CEEC than those noted to be more frequent within the CEEC. The combined areas of PCT 46 support 11 of the listed 28 species (39%) as described in Listing Advice as more frequent in the CEEC compared to 15 of the listed 35 species (45%) more frequent in grassland vegetation not considered to be the CEEC . The species recorded that are more frequent in the TEC are: *Alternanthera sp. A, Asperula conferta, Austrostipa aristiglumis, Austrostipa nodosa, Calocephalus citreus , Leiocarpa panaetioides, Maireana excavata, Rytidosperma duttonianum, Swainsona murrayana, Swainsona procumbens, Wurmbea dioica.* The species recorded that are more frequent in grasslands that are not the CEEC are: *Austrostipa scabra, Boerhavia domini, Crassula sieberiana, Einadia nutans, Enchylaena tomentosa, Eragrostis australasica, Marsilea drummondii, Minuria cunninghamii, Nitraria billardierei, Rhagodia spinescens, Roepera glauca* (syn.	The patch of Riverine Plain Grasslands shows more species not considered part of the CEEC than those noted to be more frequent within the CEEC. The patch supports 24 of the listed 28 species (43%) occurring as described in Listing Advice as more frequent in the CEEC compared to 17 of the 35 species (49%) more frequent in grassland vegetation not considered to be the CEEC. The species recorded that are more frequent in the TEC are: *Alternanthera sp.* A, *Asperula conferta, Austrostipa aristiglumis, Austrostipa nodosa, Calocephalus citreus , Leiocarpa panaetioides, Maireana excavata, Rytidosperma duttonianum, Swainsona murrayana, Swainsona procumbens, Triptilodiscus pygmaeus, Wurmbea dioica*. The species recorded that are more frequent in grasslands that are not the CEEC are: *Austrostipa scabra, Boerhavia domini, Crassula sieberiana, Einadia nutans, Enchylaena tomentosa, Eragrostis australasica, Leiocarpa leptolepis, Marsilea drummondii, Minuria cunninghamii, Nitraria billardierei, Rhagodia spinescens, Roepera*

Key diagnostic characteristics and condition thresholds as per the Conservation Advice, Listing Advice and Policy Advice	Key diagnostic characteristics relative to VZ – 9. PCT44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Key diagnostic characteristics relative to VZ – 10. PCT46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain: Riverina Bioregion	Key diagnostic characteristics relative to the patch of Riverine Plain Grasslands contiguous extent of PCT44 and PCT46.
	Attribute across all areas of PCT 44 (VZ 9) in the Subject Land does not conform with the CEEC.	Zygophyllum glaucum), *Sclerolaena muricata* (sens. lat.), *Sclerolaena stelligera, Sida trichopoda, Sporobolus caroli*. Attribute across all areas of PCT 46 (VZ 10) in the Subject Land does not conform with the CEEC.	*glauca* (syn. *Zygophyllum glaucum*), *Sclerolaena brachyptera, Sclerolaena muricata* (sens. lat.), *Sclerolaena stelligera, Sida trichopoda, Sporobolus caroli*. Attribute across all patches of Riverine Plain Grasslands in the subject land does not conform with the CEEC.
Condition threshold: **Patch size and species within patch** **Condition A:** • **15 or more native vascular plant species are present,**	The combined areas of VZ 9 PCT44 that intersect the Subject Land meet the attributes of Condition A in that they support more than 15 native vascular species, including indicator species, and are greater than 0.04 ha. The most common indicator species present in areas of PCT 44 is *Mairerana aphylla*, although 14 of the 68 listed indicator species (21%) are present across PCT 44.	The combined areas of VZ 10 PCT 46 that intersect the Subject Land likely meet the attributes of Condition A in that they support more than 15 native vascular species, including indicator species, and are greater than 0.04 ha. The most common indicator species present in all areas of PCT 44 is *Mairerana aphylla*, although 16 of the 68 listed indicator species (24%) are present in across PCT 46.	The patch of Riverine Plain Grassland that intersects the Subject Land meet the attributes of Condition A in that it supports more than 15 native vascular species, including indicator species, and is greater than 0.04 ha. The most common indicator species present in the patch of Riverine Plain Grassland is *Mairerana aphylla*, although at least 18 of the 68 listed indicator species (24%) are present in the patch.
Summary of CEEC attributes of patches relative to the Listing Advice and Conservation Advice	No areas or patches of the vegetation zone conform to all the required condition class criteria for the CEEC.	No areas or patches of the vegetation zone conform to all the required condition class criteria for the CEEC.	The patch of Riverine Plain Grasslands does not conform to all the required condition class criteria for the CEEC.

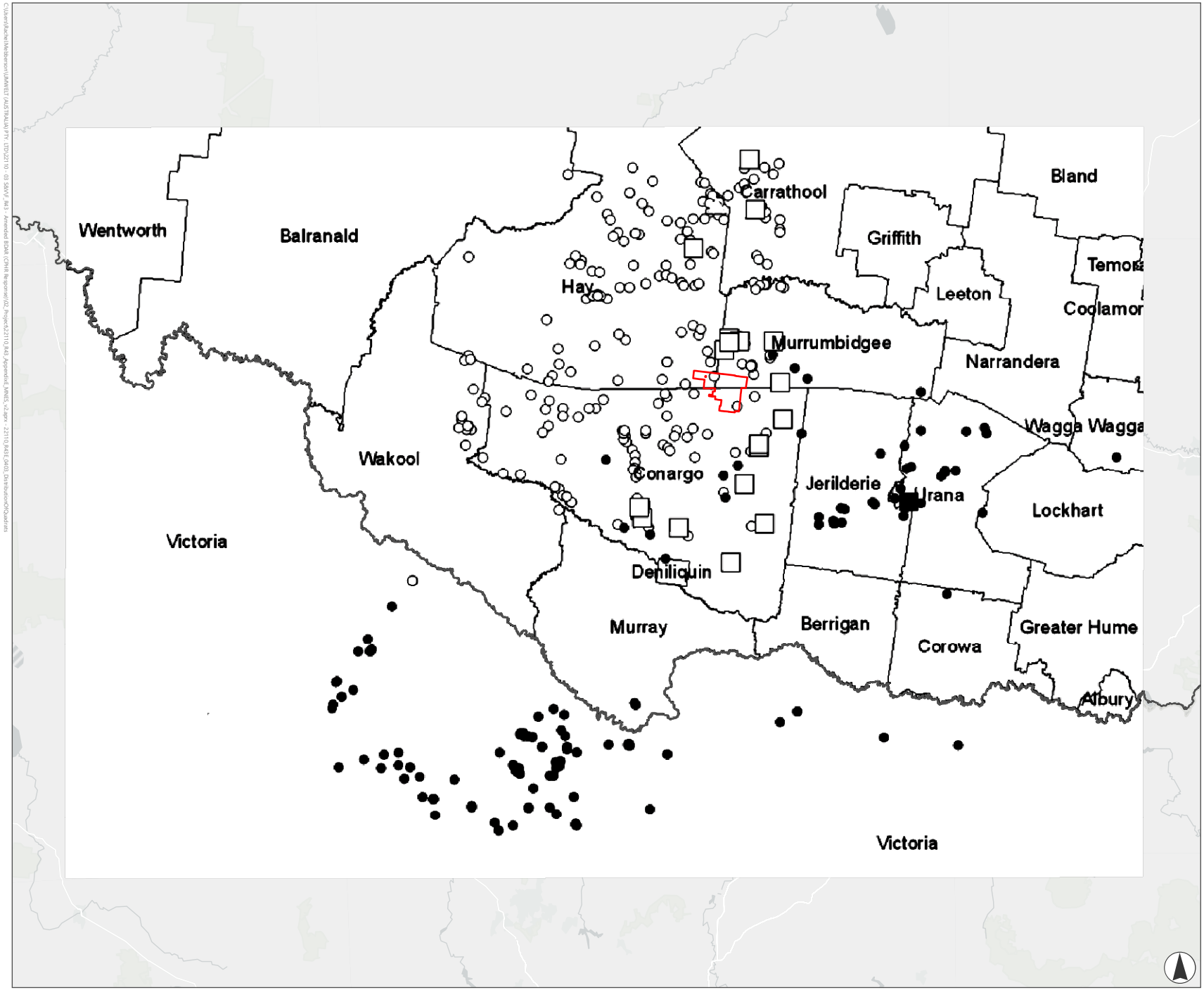

FIGURE 4.3

Distribution of quadrats in the two floristic groups identified in the cluster analysis of McDougall (2008)

Legend

- Project Boundary

Quadrats

- Group 1 quadrat containing *Acacia pendula*
- Group 1 quadrat containing *Atriplex nummularia*
- Group 2 quadrat containing *Acacia pendula*
- Other Group 1 quadrat
- Other Group 2 quadrat

McDougall Keith L. (2008) Evidence for the natural occurrence of treeless grasslands in the Riverina region of south-eastern Australia. Australian Journal of Botany 56, 461-468)

0 50 100

Kilometres

Scale 1:2,200,000 at A4

GDA2020 MGA Zone 55

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Image Source: ESRI Basemap (2023) | **Data Source:** NSW DFSI (2023) | **Original Figure Source:** Australian Journal of Botany, 2008, 56, 465

4.3.2 EPBC Act Listed Threated Flora and Fauna

Nine threatened species listed under the EPBC Act were recorded within the Subject Land or Project Area during field surveys. Of these, four are threatened flora species and five are threatened fauna species. No EPBC Act listed migratory species were observed by Umwelt.

Details of observations are provided in **Table 4.6** and locations of observations are provided in **Figure 4.4** and **Figure 4.5**.

In addition, four MNES determined to be ecosystem credits species within the BAM are assessed as having either Moderate or High potential to occur within the Subject Land based on the presence of associated PCTs (i.e. habitat surrogates) and known records of the species' in the general locality. These species are:

- Australian Painted Snipe
- Pink Cockatoo (foraging habitat only)
- Painted Honeyeater
- Superb Parrot (foraging habitat only).

Table 4.6 Summary of EPBC Act Listed Species Credit Species Recorded Within the Subject Land

MNES	EPBC Act Listing Status	Observation Details
Flora		
Chariot Wheels *Maireana cheelii*	V	The species was recorded during both the Stage 1 and Stage 2 grid-based surveys carried out in 2023 and 2024, respectively. A total of 1,207 *Maireana cheelii* were recorded within the Project Area during targeted surveys. The species was recorded within four discreet locations north of North Boundary Road, and within two discreet locations south of North Boundary Road within Stage 1 area. The species was recorded within PCT 28, PCT 44, PCT 46, PCT 160.
Slender Darling Pea *Swainsona murrayana*	V	The species was recorded during targeted surveys. *Swainsona murryana* was recorded extensively across both Stage 1 and Stage 2 of the Project Area, with approximately 3,807 individuals recorded over spring 2023 and spring 2024. The species was recorded within PCT 164, PCT 26, PCT 28, PCT 44, PCT 46.
Spike-rush *Eleocharis obcis*	V	*Eleocharis obicis* was incidentally recorded during late December 2024. It is likely that the species responded to the ~40 mm of rain which fell across the locality in late November 2024, which resulted in a flush of growth outside its BAM survey period (October-November). Approximately 110 individuals of the species recorded in two locations north of North Boundary Road: • 100 individuals were found within a swale running a long side an access track within the Stage 2 – linear assessment area • 10 individuals were found in a shallow depression north of the Subject Land within the Stage 2 – linear assessment area.

MNES	EPBC Act Listing Status	Observation Details
		It is noted that the record within the Survey Corridor is located between two 40 m Stage 1 survey grids, which accounts for why these individuals were not recorded during the 2023 threatened flora surveys. Specimens collected were identified as the threatened entity by a herbarium (Refer to Appendix L of the Amended BDAR).
Winged Peppercress *Lepidium monoplocoides*	E	The species was recorded during targeted surveys. A total of 1,355 individuals of *Lepidium monoplocoides* were recorded within the Stage 1 – linear assessment area and Stage 2 – linear assessment area. The species was recorded within PCT 28, PCT 44, PCT 46, and PCT 26.
Fauna		
Blue-winged Parrot *Neophema chrysostoma*	V	A pair of this species was observed opportunistically driving between bird and bat utilisation survey (BBUS) sites. They were observed on 22 September 2022 in grassland habitat of the Subject Land and within the Project Area.
Diamond Firetail *Stagonopleura guttata*	V	This species was observed foraging within the Project Area and Subject Land during field surveys, including BBUS surveys, vegetation assessment and targeted threatened species surveys. The species was recorded foraging within woodland adjacent to riparian vegetation within the Subject Land.
Plains-wanderer *Pedionomus torquatus*	CE	This species was initially incidentally recorded whilst leaving site following targeted threatened species surveys. The species was then recorded during field surveys for the Project. A total of 23 individuals recorded across areas of Important Habitat and new areas of associated PCTs. Individuals as well as evidence of breeding were recorded.
Southern Bell Frog *Litoria raniformis*	V	Southern Bell Frog was extensively recorded in the Subject Land and wider Project Area between 5 and 12 December 2023. Breeding associated behaviour such as calling and amplexus were observed in the Coleambally Outfall Drain and most farm dams. The species has since been recorded incidentally during Plains-wanderer surveys in a farm dam.
Southern Whiteface *Aphelocephala leucopsis*	V	This species was observed frequently observed foraging within the Project Area and Subject Land during field surveys including BBUS surveys, vegetation assessments and targeted threatened species surveys. The species was frequently observed within *Lycium ferocissimum* and *Lycium australe* shrubs and within saltbush dominated shrublands and on fence lines. The species was also observed within riparian shrublands along the Coleambally Outfall Drain.

4.3.3 Migratory Species

No species listed as migratory under the EPBC Act were recorded during field surveys.

The following migratory species have been assessed due to a likelihood of moderate or above and likelihood of wind turbine strike:

- Gull-billed Tern
- Latham's Snipe
- Pacific Swift
- Sharp-tailed Sandpiper
- White-throated Needletail.

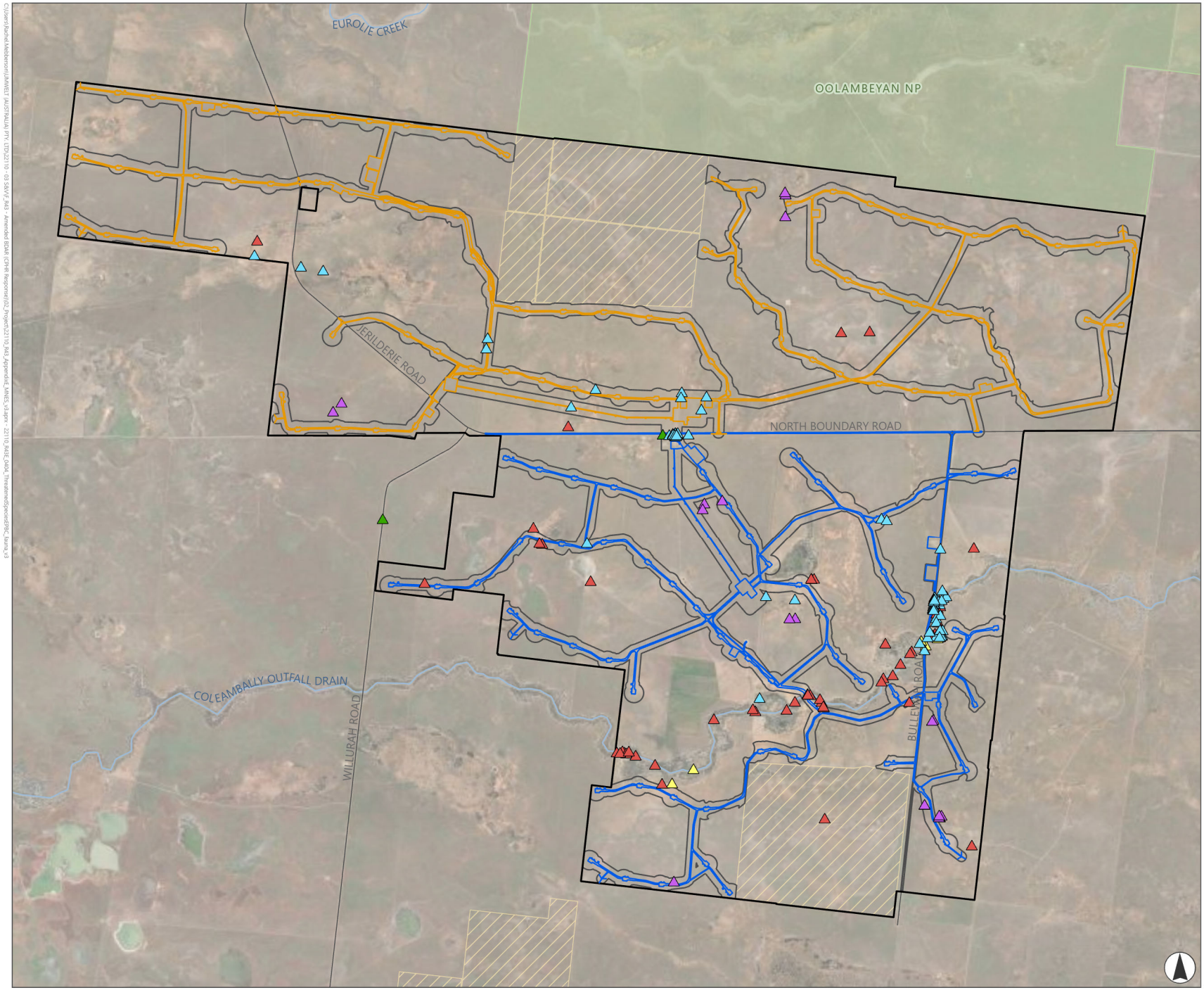


FIGURE 4.4

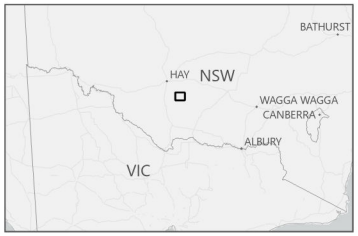
Location of Threatened Fauna Species Listed Under the EPBC Act Recorded During Current Surveys

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Conservation Agreement Area
- NPWS Reserves
- Road
- Watercourse

EPBC Act Listed Fauna Species

- Blue-winged Parrot
- Diamond Firetail
- Plains-Wanderer
- Southern Bell Frog
- Southern Whiteface



0 1,250 2,500

Meters

Scale 1:110,000 at A4

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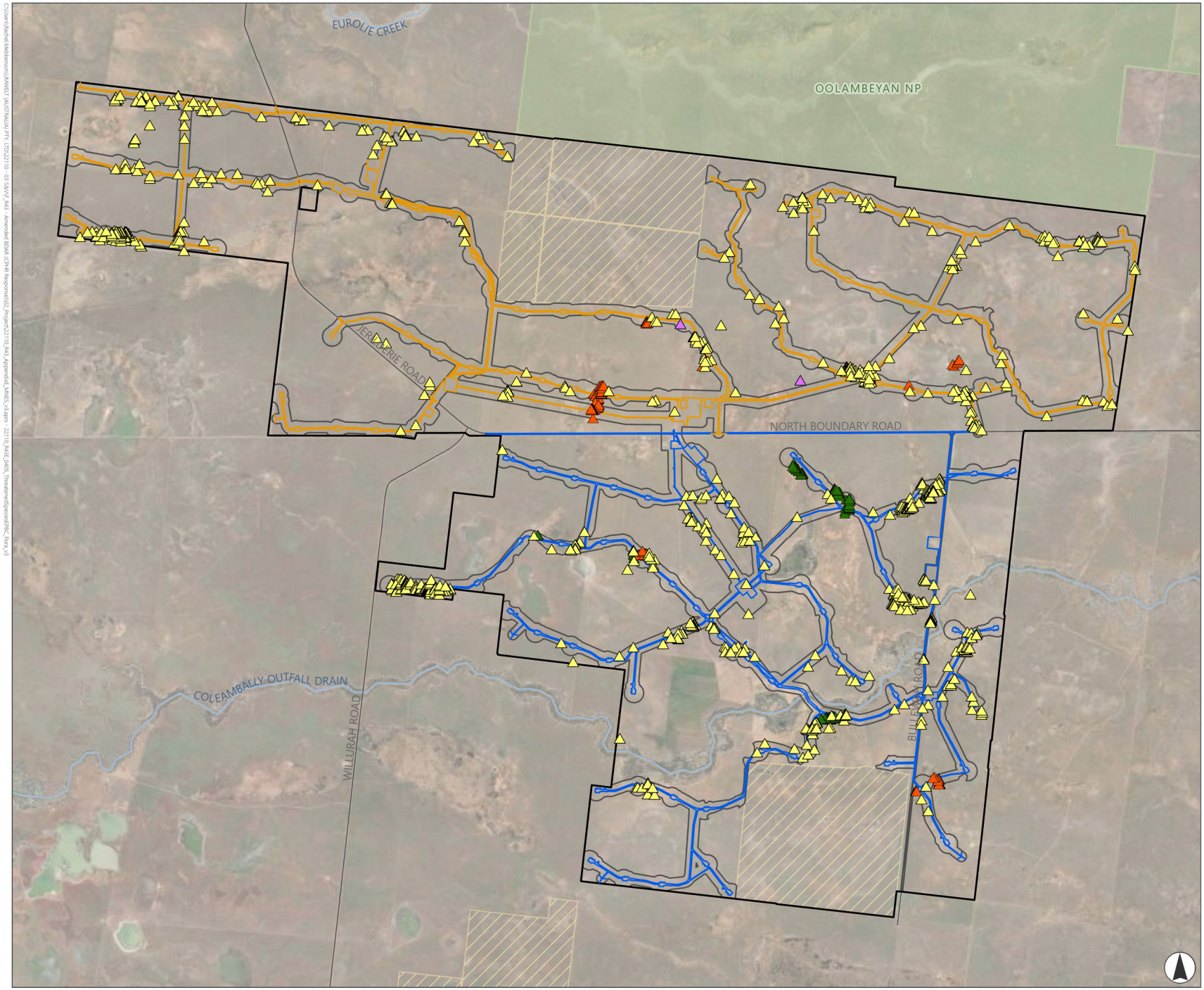


FIGURE 4.5

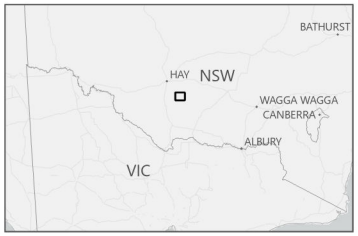
Location of Threatened Flora Species Listed Under the EPBC Act Recorded During Current Surveys

Legend

- Project Boundary
- Subject Land
- Stage 1 (South) Development Footprint
- Stage 2 (North) Development Footprint
- Conservation Agreement Area
- NPWS Reserves
- Road
- Watercourse

EPBC Act Listed Flora Species

- *Eleocharis obicis* Record
- *Lepidium monoplocoides* Record
- *Maireana cheelii* Record
- *Swainsona murrayana* Record



0 1,250 2,500

Meters

Scale 1:110,000 at A4

GDA2020 MGA Zone 55

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5.0 Avoidance, Minimisation, Mitigation and Management

5.1 Avoidance and Minimisation of Impacts Through Project Design

5.1.1 Preliminary Design Stage

Umwelt was engaged early in the design process which has allowed initial ecological survey works to inform the design and layout of the Proposed Action. The key impact avoidance and minimisation strategies implemented by BWF during the early stages of design development included establishing a 'buildable area'. This was an area defined by BWF beyond which Project WTG and ancillary infrastructure would not occur. It was established based on:

- a variable buffer (minimum 500 m) to all host landholder dwellings
- a 50 m buffer to all waterbodies, and a 100 m buffer to Coleambally Creek
- a 300 m buffer to the Oolambeyan National Park
- a 300 m buffer either side of the existing 220 kV transmission line alignment (600 m total)
- a 100 m buffer to road reserves
- an 80 m buffer from the Project Boundary to any part of a WTG
- a 500 m buffer to the existing airstrip situated within the Project Boundary
- avoidance of any land with 15 degree or greater gradient
- avoidance of any land that is used for irrigation cropping
- WTG locations being placed in locations that are compatible with Host landholders' existing land uses.

Furthermore, a hierarchical approach to avoidance was adopted as follows:

a. avoidance of Plains-wander Important Habitat

b. seeking to avoid large patches of TEC or patches of TEC which are contiguous with large tracts of non-threatened woody vegetation prioritised for retention over smaller, fragmented patches or scattered trees

c. avoidance of threatened species and their habitat

d. avoidance and minimisation of design within biodiversity corridors / biodiverse riparian land

e. minimisation of design within areas considered to be additional habitat that may be suitable for Plains-wanderer

f. avoidance and minimisation of design within non-threatened native woody vegetation

g. minimisation of design non-threatened native grassy vegetation stratification.

BWF has adopted this avoidance hierarchy as part of project design, as such the Subject Land and Development Footprint were developed such that impacts to native vegetation, and particularly impacts to threatened ecological communities were reduced as far as reasonably practicable.

Lastly, BWF has achieved avoidance of all mapped Important Habitat for the Plains-wanderer. The species is identified as an entity with the potential for Serious and Irreversible Impact (SAII) under the BC Act, and the conservation of the species (and enhancement of existing primary habitat) is of vital importance to the local community and BWF. As such, BWF has designed the Project's Development Corridor specifically to avoid all mapped Important Habitat for Plains-wanderer. Accordingly, the Project's Development Footprint avoids all mapped Important Habitat and provides a substantial buffer to this habitat across the vast majority of the Project Area.

5.1.2 Scoping Stage

The key strategies implemented by BWF during the Scoping stage for the Project to avoid and minimise impacts includes revising the indicative Project layout to:

- Remove WTG (and associated ancillary infrastructure) in the northwest section of the Project Area to assist maximise distance offsets to neighbouring dwellings in that area and minimise potential visual and noise impacts. More broadly, this assisted to avoid and minimise potential negative community impacts (for people in that area) and to reduce potential effects on sensitive receivers.
- Relocate WTG (and associated ancillary infrastructure) to avoid native vegetation clearing and high integrity ecological endangered communities, where possible. Avoidance of Important Habitat associated with serious and irreversible impact (SAII) species and associated existing conservation areas within the Project Boundary also occurred. This was based on the outcomes of the Biodiversity Constraints Assessment (refer to Appendix 5 of the Scoping Report) and subsequent design workshops led by Umwelt to assist BWF to situate Project infrastructure away from sensitive areas.
- Relocate WTG (and associated ancillary infrastructure) to avoid sensitive archaeological areas (including variable buffers from watercourses based on stream order) established via preliminary predictive modelling of archaeological potential within the Project Area. This was based on the outcomes of the desk-based Heritage Constraints Assessment (refer to Appendix 6 of the Scoping Report) and again informed by subsequent design workshops led by Umwelt to assist BWF to situate Project infrastructure sensitive areas.

5.1.3 EIS Stage

Table 5.1 outlines specific design refinements made by BWF during the development of the BDAR and EIS to avoid and minimise impacts to biodiversity.

Changes to WTG ID

As a result of these design refinements, and other changes implemented by BWF, the unique numeric identifiers (ID) for most WTG were updated between the Scoping and EIS phases; these changes (current and Scoping phase ID) are clearly noted in **Table 5.1**.

Furthermore:

- Three (3) WTG were removed from the Project design in accordance with the hierarchy and specific principles outlined in the Amended BDAR, and the ID nominated at that Scoping phase is reproduced below i.e. previous WTG 17, 38 and 112. These Scoping phase WTG have been removed from the Project (as assessed in this BDAR) and do not correlate to those with the same ID shown in the current design. This is because WTG were renumbered sequentially for the EIS phase, and following these avoidance measures being implemented.
- There has been no sequential renumbering of WTG following the removal of WTG 37 and 38 during the preparation of the Amendment Report and Amended BDAR.

These matters are specifically addressed for each of the avoidance measures identified in **Table 5.1.**

Table 5.1 Refinement of Project Design-EIS Phase

Design Change	Summary
1	**WTG 23** (Scoping phase ID: WTG 24) moved 31.8 m south-south-west of its original position but within the Development Corridor to maximise distance offsets to nearby stick nests, and minimise disturbance in potential southern bell frog habitat.
2	**WTG 28** (Scoping phase ID: WTG 29) moved 88.9 m north-east of its original position but within the Development Corridor to maximise distance offsets to nearby stick nest, whilst continuing to avoid potential southern bell frog habitat.
3	**WTG 17** and **WTG 38** (as they were identified in the Scoping phase) removed to avoid three (3) stick nests. *Note: WTG identified as 17 and 38 remain in the Project design but do not correlate to those identified as being removed from the Scoping phase design, this is because WTG were renumbered sequentially for the EIS phase, and following these avoidance measures.*
4	**WTG 38** (Scoping phase ID: WTG 40) moved 81.6 m south east of its original position but within the Development Corridor to maximise distance offsets to nearby stick nests. *Note: WTG 38 (current design ID) has been subsequently removed from the Project design and hence avoids impact to the nearby stick nests.*
5	**WTG 34** (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to maximise distance offset to nearby stick nest, and avoid threatened species records.
6	**WTG 35** (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records.
7	**WTG 71** (Scoping phase ID: WTG 73) moved 90.0 m south west of its original position but within the Development Corridor to maximise distance offset to nearby Plains-wanderer primary habitat and potential southern bell frog habitat.
8	**WTG 79** (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records.
9	**WTG 112** (as identified in the Scoping phase) removed to avoids three (3) nearby stick nests. *Note: a WTG identified as 112 remains in the Project design but does not correlate to that identified as being removed from the Scoping phase design, this is because WTG were renumbered sequentially for the EIS phase, and following this avoidance measure.*

Design Change	Summary
10	**WTG 115** (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby stick nests, Plains-wanderer primary habitat, nearby threatened species records and potential southern bell frog habitat.
11	**WTG 119** (Scoping phase ID: WTG 121) moved 108.8 m north of its original position but within the Development Corridor to maximise distance to nearby primary Plains-wanderer habitat.
12	**WTG 107** (Scoping phase ID: WTG 109) moved 404.9 m north west of its original position but within the Development Corridor to maximise distance to nearby stick nests and primary Plains-wanderer habitat.
13	**WTG 132** (Scoping phase ID: WTG 133) moved 119.1 m south west of its original position but within the Development Corridor to maximise distance to nearby stick nest and potential southern bell frog habitat.

5.1.4 Summary of Avoidance/Minimisation of Biodiversity Impacts

From the Scoping Report (October 2022) to the present, the Project Area, Subject Land and Development Footprint have reduced in size to respond to the emerging understanding of site-specific biodiversity constraints and to prioritise the avoidance of impacts on potential serious and irreversible impact entities. In summary:

- The Project Area has been reduced by 9,976 ha from the Scoping Report (~30,603 ha) to present day (20,627.56 ha). This represents a 32% reduction in total Project Area.
- The Development Corridor has been reduced by 1,509.9 ha from the Scoping Report (where it covered 5,802.8 ha of the Project Area) to present day (4,274.4 ha). This represents a ~26% reduction in the total area considered for the placement of WTG and associated infrastructure.
- Importantly, the Development Footprint has been reduced by 357 ha from the Scoping Report (where it covered 1,012.6 ha of the Project Area) to present day (655.61 ha). This represents a 42% reduction in developable area to prioritise retention of ecological values.
- BWF has designed the Project's Development Corridor specifically to avoid all mapped Important Habitat for Plains-wanderer. Accordingly, the Project's Development Footprint avoids all mapped Important Habitat and provides a substantial buffer to this habitat across the vast majority of the Project Area.

Table 5.2 shows how avoidance to high priority MNES has occurred across design iterations. **Figure 5.1** provides a summary view of the evolution of the Project layout over time. The biodiversity which has been avoided as a result of changes to design between the Scoping and EIS are shown in Figure 5.2, Figure 5.3, Figure 5.4 and Figure 5.5 of the Amended BDAR.

Table 5.2 Changes in Impacts to MNES Constraints as a Result of Project Design Changes

High Priority Constraint	Total Area Impacted (ha) – Early Scoping		Total Area Impacted (ha) – Scoping		Total Area Impacted (ha) – Early EIS		EIS/Amendment Report		Amended BDAR (August 2025)	
	Development Corridor	Disturbance Footprint	Development Corridor	Disturbance Footprint	Development Corridor	Disturbance Footprint	Development Corridor	Disturbance Footprint	Development Corridor	Disturbance Footprint
Important Habitat										
Plains-wanderer Important Habitat	68.62	0.01	4.24	0.01	5.76	0.62	0.00	0.00	0.00	0.00
Plains-wanderer Supplementary Habitat[1]	n/a[2]	n/a[2]	n/a[2]	n/a[2]	n/a[2]	n/a[2]	94.99	20.89 (22%)[3]	1,148.44	170.86 (15%)[3]
TECs listed under the EPBC Act										
Weeping Myall Woodland	51.41	6.78	51.31	6.78	42.56	4.92	42.56	4.92	42.56	4.92
Other										
Native vegetation	6,020.40	998.93	4,279.63	998.93	4,279.63	638.14	4273.87	638.01	4,245.86	632.67

1 Impacts presented for Plains-wanderer are based on the assessment of Supplementary Habitat, it does not include any impacts to NSW identified Important Habitat Mapping as all of that critical species habitat mapping was avoided by the Project.

2 An analysis of Plains-wanderer Supplementary Habitat did not occur until the Amendment Report phase of the Project (incl. the Amended BDAR), as such a comparison of these impact areas across various Project designs cannot occur.

3 With regard to the Plains-wanderer Supplementary Habitat, a change in mapping process was discussed and agreed with CPHR as part of engagement that occurred in response to RFI 2. As such, the area of Supplementary Habitat potentially impacted by the Project (i.e. Disturbance Footprint) has increased, however the extent of this habitat has proportional increased across both the Project Area and Subject Land. Accordingly, a percentage value is presented to provide context and to confirm that the Project is impacting proportionally less Supplementary Habitat.

Following lodgement of the Scoping Report and EPBC Act referral, further environmental and social impact assessments and community consultation activities occurred. The design of the Project was revised through an iterative process incorporating outcomes of environmental and social assessment. A summary of the design revision to support the avoidance of impacts to biodiversity values is presented in **Table 5.3** below.

Table 5.3 Design Refinements that have Avoided and/or Minimised Impacts

Design Aspect	Options Implemented	Rationale for Design Refinement
WTG and associated ancillary infrastructure	Avoidance of major constraints, including the existence of conservation agreements	A hierarchical approach to avoidance was adopted as follows: a) avoidance of Plains-wander Important Habitat, b) seeking to avoid large patches of TEC or patches of TEC which are contiguous with large tracts of non-threatened woody vegetation prioritised for retention over smaller, fragmented patches or scattered trees, c) avoidance of threatened species and their habitat, d) avoidance and minimisation of design within biodiversity corridors / biodiverse riparian land, e) minimisation of design within areas considered to be additional habitat that may be suitable for Plains-wanderer, f) avoidance and minimisation of design within non-threatened native woody vegetation and g) minimisation of design non-threatened native grassy vegetation stratification. BFW has adopted this avoidance hierarchy as part of project design, as such the Subject Land and Development Footprint were developed such that impacts to native vegetation, and particularly impacts to threatened ecological communities were reduced as far as reasonably practicable. Conservation and management agreements have been established in respect of the Project Area. The purpose of each of these agreements is to conserve and maintain existing primary habitat for the Plains-wanderer which is present in patches across the Project Area. These agreements comprise of • A conservation agreement (CA0465) made under the BC Act, noting that no Project activities or infrastructure are proposed within land subject to this agreement. The proposed Project design avoids this conservation area in its entirety. • Land management agreements made by Murray LLS under the Regional Land Partnerships Program. While these land management agreements apply generally to the identified areas, the management obligations under these agreements relate to the areas of mapped primary habitat. These obligations include maintaining sustainable grazing practices and weed management to maintain 'ideal' conditions within Plains-wanderer primary habitat. The 'Ideal' condition refers to 50% bare ground, 10% fallen litter and 40% herbs and grasses. The Development Corridor has been specifically designed to avoid all areas of mapped Plains-wanderer primary habitat, and existing land management practices within the areas of primary habitat would be maintained over the life of the Project, consistent with the obligations of those agreements. BWF has designed the Project's Development Corridor specifically to avoid all parts of the Project Area within which conservation and land management agreements have been established. Where feasible, the design has allowed for substantial buffer from these agreement areas.

Design Aspect	Options Implemented	Rationale for Design Refinement
WTG and associated ancillary infrastructure	Avoidance of all primary habitat for the Plains-wanderer	The species is identified as an entity with the potential for Serious and Irreversible Impact (SAII) under the BC Act, and the conservation of the species (and enhancement of existing primary habitat) is of vital importance to the local community and BWF. As such, BWF has designed the Project's Development Corridor specifically to avoid all mapped Important Habitat for Plains-wanderer. Accordingly, the Project's Development Footprint avoids all mapped Important Habitat and provides a substantial buffer to this habitat across the vast majority of the Project Area.
WTG and associated ancillary infrastructure	Avoiding and minimising impacts to native vegetation, particularly threatened ecological communities	From Project inception, regional vegetation mapping was integrated into BWF's model for wind turbine placement to focus on avoiding high and medium value vegetation and areas of threatened ecological communities. As biodiversity fieldwork progressed and a more detailed understanding of the biodiversity values of the Project Area became available, the Development Corridor was progressively refined and the Development Footprint were developed such that impacts to native vegetation, and particularly impacts to threatened ecological communities were reduced as far as reasonably practicable.
WTG and associated ancillary infrastructure	Avoiding and minimising impacts to raptors and their potential breeding habitat	BWF has sought to avoid in the first instance and then minimise impacts to raptors and their potential breeding habitat through the placement of WTGs. A 300 m buffer was placed around all recorded stick nest and each nest stick given a risk rating based on the known or likely species utilising the nests. The highest risk rating was given to nests known or likely to be used by threatened raptors such as Black Falcon and Little Eagles, as well as Wedge-tail Eagle and these were avoided as a priority. • Seven (7) WTG (being WTG 23, WTG 28, WTG 38, WTG 34, WTG 115, WTG 107 and WTG 132) were relocated within the Development Corridor to maximise distance offsets to nearby stick nests, and minimise impacts to these raptor species. • Between the Scoping phase and EIS WTG 17, WTG 38 and WTG 112 (as they were identified in the Scoping phase) were removed to avoid stick nests. Noting that WTG identified as 17, 38 and 112 exist in the current Project design but do not correlate to those identified as being removed from the Scoping phase design, this is because WTG were renumbered sequentially for the EIS phase, and following these avoidance measures. • WTG 38 (current design ID) has been subsequently removed from the Project design as noted in Section 1.2.3 of the Amended BDAR and hence avoids impact to the nearby stick nests and these raptor species.

Design Aspect	Options Implemented	Rationale for Design Refinement
Access roads	Minimising interactions with Biodiverse Riparian Land	BWF has sought to avoid placement of WTGs and other key infrastructure (primarily access roads) within Biodiverse Riparian Land, as identified on the NSW Biodiversity Values Map. A number of stream crossings are still required; however, these have been minimised as far as reasonably practicable.
WTG and associated ancillary infrastructure (northern area of the Development Footprint)	Increasing distance from Oolambeyan National Park	The Scoping Report Project Area also incorporated spatial extents adjacent to both the southern and western boundaries of Oolambeyan National Park. The reduced Project Area (the subject of this Amended BDAR) saw all infrastructure adjacent to the western boundary of the Oolambeyan National Park being removed, resulting in the remaining Project infrastructure only being situated south of the Oolambeyan National Park. This refinement also removed infrastructure from the Project layout that had the potential to impact waterways which traversed both the Scoping Report Project Area and Oolambeyan National Park boundaries.
WTG and associated ancillary infrastructure (northern area of the Development Footprint)	Increasing distance from Oolambeyan National Park	The Development Footprint (present day) maintains a variable buffer between the northern-most WTGs and Oolambeyan National Park. This buffer was established for the Scoping Report, and then increased during the EIS phase to a minimum distance of 450 m, but generally in excess of 600 m.
WTG and associated ancillary infrastructure	Removal of WTG 37 and WTG 38	The removal of WTG 37 and WTG 38 (as a result of the blade throw assessment) has reduced impacts to biodiversity values in that area. This reduction is associated with the removal of the WTG themselves along with the associated ancillary infrastructure (i.e. access roads, hardstands etc) that has resulted in a slight reduction of the Development Corridor and Disturbance Footprint.

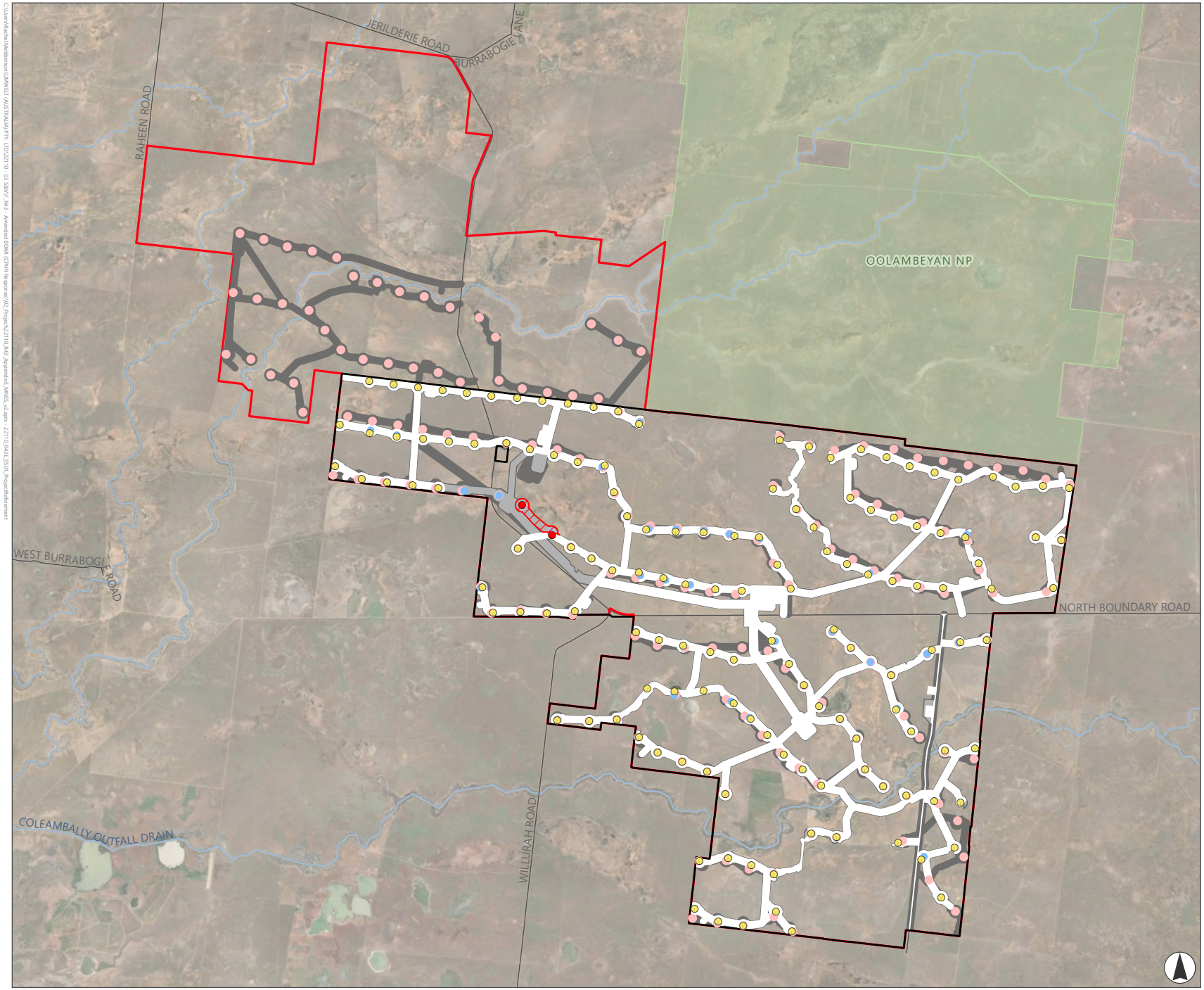
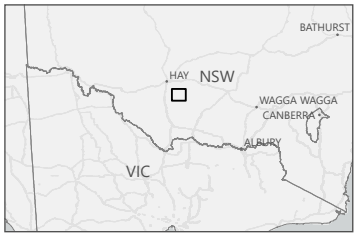


FIGURE 5.1

Project Refinement

Legend

- Project Boundary
- Scoping Report Project Boundary
- Development Corridor
- EIS Development Corridor
- Early EIS Development Corridor
- Scoping Report Development Corridor
- Wind Turbine Generators
- EIS Wind Turbine Generators
- Early EIS Wind Turbine Generators
- Scoping Report Turbine Locations
- NPWS Reserves
- Road
- Hydroline



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Kilometres

Scale 1:160,000 at A4

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5.2 Mitigation and Management Measures

BWF has committed to the design and implementation of a comprehensive biodiversity mitigation strategy to minimise the unavoidable impacts of the Proposed Action. The following management plans will be prepared post approval as part of the biodiversity management strategy:

- Bird and Bat Adaptive Management Plan (BBAMP).
- Construction Environmental Management Plan (CEMP).
- Biodiversity Management Plan (BMP), which will include the following subplans:
    - Threatened Species Sub-plan
    - Rehabilitation Management Sub-plan
    - Weed Management Sub-plan
    - Pest Management Sub-plan.
- Plains-wanderer Management Plan (PWMP)

The CEMP will include mitigation measures for the following:

- salvage of biodiversity features, including habitat resources (e.g., hollow logs, tree hollows, fallen timber and rocks/boulders)
- pre-clearance and tree-felling procedures
- traffic control
- water management
- weed management
- fencing and access control
- bushfire management
- erosion and sediment control
- workforce education and training.

A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The development and implementation of the BBAMP is an integral part of managing impacts on bat and bird species and a key mitigation measure to address the prescribed impacts associated with turbine strike outlined in Section 8.3.4 of the Amended BDAR and Appendix D of the Amended BDAR. Data collected from the two years of BBUS programs on the Project will form the baseline monitoring dataset and will underpin the adaptive management strategy prepared as part of the BBAMP. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with CPHR. The BBAMP will provide guidance to develop a framework for monitoring impacts and will include baseline and ongoing monitoring. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Table 7.5 of the Amended BDAR with consideration of feedback from CPHR detailing their expectations of BBAMP content within BDARs.

A stand-alone PWMP would be prepared prior to construction with the aim of minimising and mitigating unavoidable impacts to Plains-wanderer associated with the Project and support the species within a defined area. The PWMP would be prepared by a suitably qualified ecologist to the satisfaction CPHR. Details of the PWMP including specific triggers as part of Trigger Action Response Plan (TARP) would be determined through further consultation with relevant agencies. A summary of the measures to be included within the PWMP are as follows:

- Pre-clearance and vegetation clearing protocols to ensure no individual birds are harmed during construction.
- Protocols/processes for habitat management, and habitat monitoring during construction and for the first five (5 years) of operation across the Subject Land.
- Provision for a host landholder training and awareness program to assist in retaining suitable habitat beyond the Projects disturbance footprint and within the Subject Land. This would include consideration of grazing regimes designed for the species, with adjustments in dryer/wetter years. The host landholder training and awareness program will specifically address:
- Pest Management, with reference to the proposed Pest Management Sub-plan and with specific measures to assist reduce target pest species across the Subject Land e.g. baiting and shooting multiple times a year. BWF would work with landholder to support feral animal control across the Project Area (where required) as part of the landholder training and awareness program.
- Weed Management across the Subject Land, prepared with reference to the proposed Weed Management Sub-plan. Feedback regarding status of weed threats within the Subject Land would be provided to landholders as part of the landholder training and awareness program.
- Pest and weed management practices will be implemented during Project construction and for the first five (5) years of operations, and will be (at a minimum) reviewed annually to confirm their effectiveness.
- Rigorous population monitoring across the Subject Land and Project Area to monitor outputs and outcomes, being acoustic and spotlight (three (3) times per year during autumn, winter, late spring/ early summer) monitoring during preconstruction, construction and for the first five (5) years of operation, or until deemed necessary under the adaptive management process (see below).
- For acoustic monitoring during the first five (5) years of operations, this frequency and seasonal-based monitoring is the minimum that will occur, with potential increase in monitoring frequency to be considered during development of the PWMP, in consultation with agencies. The potential for alternative monitoring methods (i.e. GPS tracking) in lieu of or in combination with the aforementioned methods would be discussed with agencies during the preparation of the PWMP.
- Adaptive management process including a TARP informed by clear KPIs, and rigorous monitoring and reporting e.g. additional mitigation and management actions implemented where outputs and/or outcomes are not achieved.
- A commitment to provide a suitable offset, in consultation with CPHR and Commonwealth DCCEEW, in the event that the KPIs are not met through the implementation of the TARP.

Section 7.4 of the Amended BDAR provides further details of key biodiversity management controls that BWF would include in these management plans to minimise and manage biodiversity impacts.

6.0 Summary of the Impacts on Biodiversity

6.1 Direct and Indirect Impacts

The development of the Proposed Action would result in direct and indirect impacts on biodiversity values. Direct impacts include the loss of native vegetation and fauna habitats as a result of clearance works. The Proposed Action is not expected to result in any substantial indirect impacts on the biodiversity values of surrounding lands. However, some minor indirect impacts associated with habitat connectivity, hydrological impacts, air quality impacts, dust, noise and vibration, weed and pest species encroachment may occur.

One TEC, Weeping Myall Woodland EEC, was found to be present within the Development Footprint. While avoidance and minimisation measures have reduced the scale of the impact, 4.92 ha of the EEC would be removed as part of the Proposed Action works.

The Proposed Action would also impact nine threatened flora and fauna species listed under the EPBC Act recorded within the Development Footprint, including:

- Chariot wheels (*Maireana cheelii*)
- Plains-wanderer (*Pedionomus torquatus*)
- Slender Darling-pea (*Swainsona murrayana*)
- Southern Bell Frog (*Litoria raniformis*)
- Spike-rush (*Eleocharis obcis*)
- Winged peppercress (*Lepidium monoplocoides*).
- Blue-winged Parrot (*Neophema chrysostoma*)
- Diamond Firetail (*Stagonopleura guttata*)
- Southern Whiteface (*Aphelocephala leucopsis*).

Five threatened fauna species assumed to be present onsite, have a moderate or higher likelihood of occurrence or were recorded within the wider Subject Area may also be impacted by the Proposed Action as follows:

- Latham's Snipe (*Gallinago hardwickii*)
- Painted Honeyeater (*Grantiella picta*)
- Pink Cockatoo (foraging habitat only) (*Lophochroa leadbeateri*)
- Sharp-tailed Sandpiper (*Calidris acuminata*)
- Superb Parrot (foraging habitat only) (*Polytelis swainsonii*).

A summary of the impacts of the Proposed Action on the EPBC Act listed threatened species identified as being impacted by the Project is provided in **Table 6.1**.

Further information is provided in Section 8.0 of the Amended BDAR for the species and communities identified within the SEARs as likely or potentially significantly impacted by the Proposed Action.

Detailed assessments of significance are provided in **Section 8.0** of this report and further details on prescribed impacts are provided in Section 8.3.4 and Appendix D of the Amended BDAR.

Indirect impacts associated with lighting are difficult to quantify, however in developing the Project Obstacle Lighting Plan (OLP) (item 4 identified in **Table 1.1** of this report) BWF has considered the requirements of Australian Government – Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) - National Light Pollution Guidelines for Wildlife (May 2023, V2.0) with respect to best practice design principles and risk assessment, as documented in **Appendix 3**.

Table 6.1 Summary of impacts on EPBC Act Entities

Name of EPBC Act listed entity	Nature and consequence of impact (direct and indirect)	Duration of impact (construction, operation, life of project)	Quantum of impact (area)			Total quantum of impact (ha)	Consequence of impact (local, state and national)	Impact requires offsetting? (significant or not)
			Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear			
Threatened Ecological Communities								
Weeping Myall Woodland	Direct	Life of Proposed Action, permanent	4.92	0.00	0.00	4.92	Local	Impacts will be offset
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Weeping Myall Woodland within Zone 6 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Flora								
Spike Rush *Eleocharis obicis*	Direct	Life of Proposed Action, permanent	0.00	0.00	7.31	7.31	Local	Impacts will be offset
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to *Eleocharis obicis* habitat within Zones 1-4 and 10-13 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated				Local	Offsets not proposed for indirect impacts
Winged Peppercress *Lepidium monoplocoides*	Direct – Clearing	Life of Proposed Action, permanent	3.52	0.00	0.00	3.52	Local	Impacts will be offset
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to *Lepidium monoplocoides* habitat within Zones 7-11 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts

Name of EPBC Act listed entity	Nature and consequence of impact (direct and indirect)	Duration of impact (construction, operation, life of project)	Quantum of impact (area)			Total quantum of impact (ha)	Consequence of impact (local, state and national)	Impact requires offsetting? (significant or not)
			Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear			
Chariot Wheels *Maireana cheelii*	Direct	Life of Proposed Action-permanent	2.01	0.00	2.66	4.67	Local	Impacts will be offset
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to *Maireana cheelii* habitat within Zones 7-11 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantity, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Slender Darling Pea *Swainsona murrayana*	Direct	Construction phase (short – term, permanent) Operation	166.13	0.00	279.08	445.21	Local	Impacts will be offset
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to *Swainsona murrayana* habitat within Zones 7-10 and Zone 12 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Fauna								
Australian Painted Snipe *Rostratula australis*	Direct	Life of Proposed Action-permanent	7.25	0.00	1.63	8.88	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Australian Pained Snipe habitat within Zones 1-4 and Zone 11 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts

Name of EPBC Act listed entity	Nature and consequence of impact (direct and indirect)	Duration of impact (construction, operation, life of project)	Quantum of impact (area)			Total quantum of impact (ha)	Consequence of impact (local, state and national)	Impact requires offsetting? (significant or not)
			Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear			
Blue-winged Parrot *Neophema chrysostoma*	Direct	Life of Proposed Action-permanent	273.42	0.94	362.04	636.40	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Blue-winged Parrot habitat across all Zones during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Diamond Firetail *Stagonopleura guttata*	Direct	Life of Proposed Action-permanent	273.42	0.94	362.04	636.40	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Diamond Firetail habitat across all Zones during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated..				Local	Offsets not proposed for indirect impacts
Latham's Snipe *Gallinago hardwickii*	Direct	Life of Proposed Action-permanent	7.25	0.00	1.63	8.88	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Latham's Snipe habitat within Zones 1-4 and Zone 11 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts

Name of EPBC Act listed entity	Nature and consequence of impact (direct and indirect)	Duration of impact (construction, operation, life of project)	Quantum of impact (area)			Total quantum of impact (ha)	Consequence of impact (local, state and national)	Impact requires offsetting? (significant or not)
			Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear			
Pink Cockatoo (foraging habitat only)	Direct	Life of Proposed Action-permanent	273.42	0.94	362.04	636.40	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Pink Cockatoo habitat across all Zones during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Painted Honeyeater	Direct	Life of Proposed Action-permanent	7.23	0.00	0.00	7.23	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Painted Honeyeater habitat within Zones 1, 2, 5, 6, 7 and 8 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Sharp-tailed Sandpiper *Calidris acuminata*	Direct	Life of Proposed Action-permanent	7.25	0.00	1.63	8.88	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Sharp-tailed Sandpiper habitat within Zones 1-4 and Zone 11 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts

Name of EPBC Act listed entity	Nature and consequence of impact (direct and indirect)	Duration of impact (construction, operation, life of project)	Quantum of impact (area)			Total quantum of impact (ha)	Consequence of impact (local, state and national)	Impact requires offsetting? (significant or not)
			Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear			
Superb Parrot (foraging habitat only)	Direct	Life of Proposed Action-permanent	273.42	0.94	362.304	636.40	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Superb Parrot habitat across all Zones during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Southern Bell Frog *Litoria raniformis*	Direct	Life of Proposed Action-permanent	34.87	0.00	17.29	52.16	Local	Impacts will be offset
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Southern Bell Frog habitat during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Southern Whiteface *Aphelocephala leucopsis*	Direct	Life of Proposed Action-permanent	273.42	0.94	362.04	636.40	Local	Impacts to the species will be offset through ecosystem credits
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Southern Whiteface habitat across all Zones during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
White-throated Needletail	Direct	Life of Proposed Action-permanent	273.42	0.94	362.04	636.40	Local	Impacts to the species will be offset through ecosystem credits

Name of EPBC Act listed entity	Nature and consequence of impact (direct and indirect)	Duration of impact (construction, operation, life of project)	Quantum of impact (area)			Total quantum of impact (ha)	Consequence of impact (local, state and national)	Impact requires offsetting? (significant or not)
			Stage 1 – Linear	Stage 1 – Site based	Stage 2 – Linear			
Hirundapus caudacutus	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to White-throated Needletail habitat across all Zones during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				Local	Offsets not proposed for indirect impacts
Plains-wanderer *Pedionomus torquatus*	Direct (mapped Important Habitat)	Life of Proposed Action	0.00	0.00	0.00	0.00	National	Offset not required
	Direct (Supplementary Habitat)	Life of Proposed Action	81.44	0.00	89.42	170.86	National	Offset not proposed
	Indirect	Construction phase (short – term, permanent) Operation	There may be an indirect impact to Plains-wanderer habitat within Zones 44 and 46 during construction, and potentially ongoing through operation. The indirect impacts are difficult to quantify, as such their quantum has not been estimated.				National	Offsets not proposed for indirect impacts

6.2 Prescribed Impacts

Umwelt has prepared a detailed Prescribed Impact Assessment to consider the potential impacts from blade strike and barotrauma on bird and bat species. These assessments have been prepared to address Section 6.1.5 and Section 8.3.5 of the BAM (DPE 2020). A detailed assessment of prescribed impacts is provided in Appendix D of the Amended BDAR.

To assess the likelihood and consequence of impacts on aerial species, a qualitative risk-based assessment based on an assessment methodology developed by the Arthur Rylah Institute (Lumsden *et al*. 2019) has been conducted. The assessment approach comprises consideration of the likelihood of blade strike based on a species' recorded flight behaviour and status in the Project Area, as well as consideration of existing turbine strike data from Australia. The relative consequence of potential collisions and/or barotrauma is assessed with consideration of a species' total population size and degree of concentration in certain areas, conservation status and demographic resilience.

The results of the risk assessment for species recorded in the Project Area are provided in **Table 6.2**, with two species having a moderate risk and the remaining two considered a negligible risk of being impacted by wind blade strike by the Proposed Action. The interpretation and justification for these results is provided in Section 8.2 of the Prescribed Impact Assessment (Appendix D of the Amended BDAR).

Table 6.2 Turbine Strike Risk Assessment for species recorded in the Project Area

Common Name	Species Name	Likelihood	Consequence	Risk Rating
Birds				
blue-winged parrot	*Neophema chrysostoma*	Moderate	Moderate	Moderate
diamond firetail	*Stagonopleura guttata*	Low	Low	Negligible
plains-wanderer	*Pedionomus torquatus*	Low	High	Moderate
southern whiteface	*Aphelocephala leucopsis*	Low	Low	Negligible

6.3 Cumulative Impacts

NSW Government – EnergyCo seeks to maximise opportunities created by the transformation of the NSW electricity system by coordinating investment in REZs across NSW. A REZ is the equivalent of modern-day power stations, combing new renewable energy infrastructure, including generators (such as solar and wind farms), storage (such as batteries and pumped hydro) and then high-voltage transmission infrastructure. Five (5) dedicated REZs have already been identified in NSW. As discussed in **Section 2.0**, the Proposed Action is located wholly within the South West REZ.

Because of this, and the REZ benefits anticipated by NSW Government – EnergyCo, the South West REZ has the potential to see strong interest for renewable energy development. Cumulative impacts occur when the impacts from multiple projects or developments combine and the compounding effects are larger than any one of the projects itself has quantified and assessed.

The Proposed Action will contribute to cumulative impacts on biodiversity during construction and operation from all clean energy projects (operational, under construction, approved and proposed) in the vicinity within the South West REZ. It is considered likely that cumulative impacts will increase the loss of similar native vegetation and threatened species habitat to the projects in the region.

A review of publicly available relevant clean energy projects known at the time of finalisation of this Amended BDAR and within the South West REZ has been undertaken. Potential cumulative biodiversity impacts are provided **Table 6.3**.

The final composition of renewable energy development in the South West REZ will largely be determined by the NSW Government allocation of access rights to the limited transmission infrastructure present. The intended capacity of the South West REZ is 2.5 gigawatts with registered interest well in excess of this. It is therefore expected that there will be more proposed projects than the intended capacity and cumulative impacts required to build the South West REZ to its maximum capacity will potentially be less than that predicted for the full extent of all projects currently proposed.

Impact information compiled from projects in initial planning stages are not accurate and the final impacts may be more or less than the data presented.

Table 6.3 Past, Present and Future Projects

Project (Status as of Amended BDAR (August 2025)	Distance	Biodiversity value impacted (as of original BDAR (July 2024)			Construction impacts	Operational impacts
		PCTs and TECs	Threatened Flora	Threatened Fauna		
Bullawah Wind Farm (RtS stage)- this Proposed Action	0 km	Ten PCTs identified in the Subject Land with estimated impacts to 632.67 ha of native vegetation. Impacts to one EPBC Act listed TEC: • Weeping Myall Woodlands.	Three EPBC Act listed threatened flora species were recorded within the Project Area: • *Maireana cheelii* • *Swainsona murrayana* • *Lepidium monoplocoides.* One EPBC Act listed threatened flora species has been assumed present within the Subject Land: • *Austrostipa wakoolica.*	Five EPBC Act listed threatened fauna species were recorded within the Subject Land: • Plains-wanderer • Blue-winged Parrot • Diamond Firetail • Southern Whiteface • Southern Bell Frog.	Construction of up to 141 wind turbines and approximately 803.7 MW capacity.	Includes up to 141wind turbines and approximately 803.7 MW capacity.
Pottinger Wind Farm (Approved project)	<1 km	Estimated impacts to 1,004.60 ha of native vegetation comprised of 19 PCTs. Direct impacts to one EPBC Act listed TEC: • Weeping Myall Woodland (0.32 ha).	Four threatened flora species were recorded or assumed present, including: • *Maireana cheelii* (131 ha of confirmed/assumed habitat to be impacted) • *Swainsona murrayana* (261.6 ha of potential habitat to be impacted) • *Brachyscome papillosa* (297.7 ha of potential habitat to be impacted).	Fifteen threatened fauna species were recorded or assumed present, including: • Southern Bell Frog (6.42 ha of potential habitat to be impacted) • Plains-wanderer (5.16 ha of potential habitat to be impacted).	Construction of up to 247 wind turbines with approximately 1.3 GW capacity. Up to six substations and 13 transformers One BESS and an internal electrical reticulation network. Construction impact area of 379 ha.	Operation of 247 wind turbines impact area of 688 ha.

Project (Status as of Amended BDAR (August 2025)	Distance	Biodiversity value impacted (as of original BDAR (July 2024)			Construction impacts	Operational impacts
		PCTs and TECs	Threatened Flora	Threatened Fauna		
Pottinger Solar Farm (EIS stage)	<1 km	Impacts to approximately 600 ha of native vegetation, including potential impacts to approximately 5.05 ha of Weeping Myall Woodland.	Impacts expected to a similar suite of species as Pottinger Wind Farm.	Impacts expected to potential Plains-wanderer habitat.	Construction of 300 MW solar farm and 500 MW BESS, across approximately 1,600 ha.	Operation of 300 MW solar farm and 500 MW BESS, across approximately 1,600 ha.
Project EnergyConnect (Approved project)	<1 km	Direct impacts to 1,615.20 ha of native vegetation comprised of 38 PCTs, including: • Weeping Myall Woodlands (101.21 ha directly impacted) • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (35.45 ha directly impacted) • Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (15.41 ha directly impacted) • Natural Grasslands of the Murray Valley Plains (72.51 ha directly impacted).	Impacts to eight threatened flora species, including: • *Lepidium monoplocoides* (7.0 ha of potential habitat directly impacted) • *Brachyscome papillosa* (71.17 ha of potential habitat directly impacted) • *Swainsona murrayana* (232.35 ha of potential habitat directly impacted) • *Maireana cheelii* (109.68 ha of potential habitat directly impacted).	Impacts to six threatened fauna species including four EPBC Act listed threatened species: • Plains-wanderer (0.41 ha of potential habitat directly impacted) • Superb Parrot (36.57 ha of potential habitat directly impacted) • Regent Parrot (eastern subspecies) (32.36 ha of potential habitat directly impacted).	Construction of 330 kV and 500 kV transmission line and Dinawan Substation.	Operation of 330 kV and 500 kV transmission line and Dinawan Substation.

Project (Status as of Amended BDAR (August 2025)	Distance	Biodiversity value impacted (as of original BDAR (July 2024)			Construction impacts	Operational impacts
		PCTs and TECs	Threatened Flora	Threatened Fauna		
		• Plains mallee box woodland of the Murray Darling Depression, Riverina and Naracoorte Coastal Plains bioregions (5.98 ha directly impacted) • Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (2.93 ha directly impacted).				
The Plains Solar Farm (RtS stage)	<1 km	Impacts to ~1,000 ha of native vegetation comprised of six PCTs. No TECs were recorded in the Subject Land.	Impacts to eight threatened flora species including: • *Lepidium monoplocoides* • *Brachyscome papillosa* • *Maireana cheelii.*	Impacts to Plains-wanderer	Includes 900,900 PV panels, 500 MW capacity and BESS.	Includes 900,900 PV panels, 500 MW capacity and BESS
The Plains Wind Farm (RtS stage)	<1 km	Impacts to 1,997.03 ha of native vegetation comprised of 10 PCTs. No impacts to EPBC listed TECs.	Impacts to eight threatened flora species, including: • *Maireana cheelii* • *Swainsona murrayana* • *Lepidium monoplocoides* • *Austrostipa wakoolica* • *Brachyscome papillosa* • *Calotis moorei.*	Impacts to seven threatened fauna species, including: • Plains-wanderer • Southern Whiteface.	Includes up to 188 wind turbines and approximately 1,350 MW capacity.	Includes up to 188 wind turbines and approximately 1,350 MW capacity.

Project (Status as of Amended BDAR (August 2025)	Distance	Biodiversity value impacted (as of original BDAR (July 2024)			Construction impacts	Operational impacts
		PCTs and TECs	Threatened Flora	Threatened Fauna		
Romani Solar Farm (EIS stage)	Nearest boundary is approximately 44 km away	Potential impacts to an estimated 900 ha, however an estimated 60% occur on Category 1 Exempt land. Nine PCTs noted a potentially present.	Suitable habitat potentially present for 12 threatened flora species, including: • *Austrostipa wakoolica* • *Brachyscome papillosa* • *Lepidium monoplocoides* • *Maireana cheelii* • *Swainsona murrayana.*	Suitable habitat potentially present for 10 threatened fauna species, including: • Southern Bell Frog • Superb Parrot.	Construction of a 250 MW solar farm with 150 MW/ 300 MWh BESS.	Operation of a 250 MW solar farm with 150 MW/ 300 MWh BESS.
Dinawan Wind Farm (EIS stage)	Nearest boundary is approximately 9 km away	Estimated impacts to 780 ha of native vegetation, including nine PCTs and three TECs. Weeping Myall and Natural Grasslands impacts are anticipated.	Suitable habitat potentially present for 11 threatened flora species, including: • *Maireana cheelii* • *Lepidium monoplocoides* • *Swainsona murrayana* • *Austrostipa wakoolica.*	Suitable habitat potentially present for 16 threatened fauna species, including: • Superb Parrot • Plains-wanderer • Southern Bell Frog.	Construction of 1.5 GW wind farm, comprising of up to 250 WTGs, on approximately 22,000 ha.	Construction of 1.5 GW wind farm, comprising of up to 250 WTGs, on approximately 22,000 ha.
Dinawan Solar Farm (RtS stage)	Nearest boundary is approximately 9 km away	Impacts to 2,477 ha of native vegetation, including: • Weeping Myall Woodland (137 ha) • Natural Grassland of the Murray Valley Plains (11.5 ha).	Impacts to four threatened flora species recorded or assumed present, including: • *Swainsona* murrayana (5.5 ha of potential habitat impacted) • *Austrostipa wakoolica* (220.5 ha of potential habitat impacted).	Impacts to 13 threatened fauna species recorded or assumed present, including: • Painted Honeyeater • Southern Whiteface • Southern Bell Frog (332.3 ha of potential habitat directly impacted)	Construction of 800 MW solar farm, 300 MW BESS on approximately 2,500 ha.	Operation of 800 MW solar farm, 300 MW BESS on approximately 2,500 ha.

Project (Status as of Amended BDAR (August 2025)	Distance	Biodiversity value impacted (as of original BDAR (July 2024)			Construction impacts	Operational impacts
		PCTs and TECs	Threatened Flora	Threatened Fauna		
				• Plains-wanderer (0.94 ha of potential habitat indirectly impacted).		
Argoon Wind Farm (EIS Stage)	Nearest boundary is approximately 30 km away	Potential impacts to up to native vegetation comprised of 19 PCTs. Up to nine TECs listed under both the BC Act and EPBC Act may be present within the Project Area.	Suitable habitat potentially present for 18 threatened flora species.	Suitable habitat potentially present for 55 threatened fauna species.	Construction of 901 MW wind farm, 460 MW/ 2,300 MWh BESS with a Project Area of approximately 10,885 ha.	Operation of 901 MW solar farm, 460 MW/ 2,300 MWh BESS with a Project Area of approximately 10,885 ha.
Yanco Delta Wind Farm (Approved project)	Nearest boundary is approximately 17.7 km away	Impacts to 173.39 ha of native vegetation, including: • Weeping Myall Woodlands (29.69 ha impacted) • Natural Grasslands of the Murray Valley Plains (88.33 ha impacted).	Impacts to 14 threatened flora species recorded and/or assumed present, including: • *Swainsona murrayana* (32.12 ha of potential habitat to be removed) • *Austrostipa wakoolica* (19.57 ha of potential habitat to be impacted) • *Lepidium monoplocoides* (12.92 ha of potential habitat to be impacted) • *Maireana cheelii* (25.75 ha of potential habitat to be removed)	Impacts to 14 threatened fauna species recorded and/or assumed present, including: • Superb Parrot • Diamond Firetail • Plains-wanderer (1.78 ha of confirmed habitat to be impacted).	Construction of 208 WTGs, 800 MW/800 MWh BESS with a disturbance of approximately 238 ha.	Operation of 208 WTGs, 800 MW/800 MWh BESS with a disturbance of approximately 238 ha.

Project (Status as of Amended BDAR (August 2025)	Distance	Biodiversity value impacted (as of original BDAR (July 2024)			Construction impacts	Operational impacts
		PCTs and TECs	Threatened Flora	Threatened Fauna		
			• *Brachyscome papillosa* (23.60 ha of potential habitat to be removed).			
Tchelery Wind Farm (RtS Stage)	Nearest boundary is approximately 60 km away	Potential impacts to up to native vegetation comprised of 16 PCTs. Four BC Act listed TECs are potentially within the project site.	Potential impacts to seven threatened flora species identified within the Project Area, including: • *Swainsona murrayana* • *Brachyscome papillosa* • *Maireana cheelii* • *Lepidium monoplocoides.*	Potential impacts to seven threatened fauna species identified within the Project Area, including: • Southern Bell Frog • Plains-wanderer • Superb Parrot.	Construction of 120 WTGs with a total capacity of 800 MW across a 27,400 ha Project Area.	Operation of 120 WTGs with a total capacity of 800 MW across a 27,400 ha Project Area.

7.0 Offsets

The NSW and Australian governments agree that endorsement of the NSW BOS to avoid, minimise and offset biodiversity impacts on both NSW and Commonwealth listed entities provides for the best and most effective biodiversity and regulatory outcomes. The Australian Government supports the use of the BAM as the underpinning methodology for calculating biodiversity credit requirements.

On 22 November 2019, NSW passed an amendment to the NSW Biodiversity Conservation Regulation 2017. The amendment aligns the BOS offset rules to Australian Government requirements. The NSW BOS has requirements for retiring like-for-like credits or funding conservation actions that directly benefit the species or community impacted, and these meet the Australian Government's offsetting requirements. The NSW BOS also allows for variation rules to be used after reasonable steps have been taken to source like-for-like credits. NSW amended the Biodiversity Conservation Regulation 2017, so the variation rules do not apply to offsets required for Commonwealth listed entities for controlled actions. If the NSW approval requires biodiversity offsets for NSW only listed entities, proponents will still be able to use the variation rules for these.

To meet offsets required for Commonwealth listed entities for controlled actions under the NSW BOS, BWF will retire the credits required to offset the impacts of the Proposed Action. BWF is seeking flexibility to retire the required in credits on a staged basis, with the relevant credits retired prior to commencing vegetation clearing in each stage. BWF is also seeking flexibility to utilise one or more of the including:

- Land based offsets through the establishment of new Stewardship Sites (and subsequent retirement of credits) or by retiring credits from existing Stewardship Sites. BWF. would retire the required number and class of credits determined in accordance with the Amended BDAR and the offset rules in the BC Regulation.
- Securing (purchasing) credits through the open credit market
- Paying into to the Biodiversity Conservation Fund (BCF).

The Biodiversity Conservation Trust is required to meet the Commonwealth offset requirement component in a like-for-like manner. This is by retiring like-for-like credits, by funding conservation actions that are listed in the Ancillary rules, Biodiversity conservation actions that benefit the threatened entity impacted or by funding other conservation measures approved by the NSW Minister for Energy and Environment that directly benefit the entity impacted.

A summary table is provided in **Table 7.1** which outlines the credit requirement for the relevant habitat areas for impacted MNES which are considered 'species credit species' under the BAM, as calculated using the BAM-C. As the Project has avoided all extents of Plains-wanderer mapped Important Habitat, and given that CPHR and Commonwealth DCCEEW have advised that offsets for the species are not required, a threatened species polygon or offset obligation has not been generated for Plains-wanderer.

Residual impacts for the following MNES, considered to be 'ecosystem credits' under the BAM will be offset via the ecosystem credit obligation generated by the Proposed Action:

- Australian Painted Snipe

- Blue-winged Parrot
- Diamond Firetail
- Latham's Snipe
- Pink Cockatoo (foraging habitat only)
- Painted Honeyeater
- Sharp-tailed Sandpiper
- Superb Parrot (foraging habitat only)
- Southern Whiteface
- White-throated Needletail
- Plains-wanderer (areas of associated PCTs outside mapped Important Habitat).

Table 7.1 Offset Summary

Entity	Area of impact (direct) ha			Total area of impact (direct) ha	Credits Required	Offsetting Approach
	Stage 1 – Linear	Stage 1 – Site based	Stage 2 - Linear			
Threatened Ecological Community						
Weeping Myall Woodlands	4.92	0.00	0.00	4.92	135	Like-for-like
Flora						
Chariot Wheels *Maireana cheelii*	2.01	0.0	2.66	4.67	116	Like-for-like
Slender Darling Pea *Swainsona murrayana*	166.13	0.00	279.08	445.21	13,058	Like-for-like
Winged Peppercress *Lepidium monoplocoides*	3.52	0.0	0.0	3.52	88	Like-for-like
Fauna						
Southern Bell Frog *Litoria raniformis*	34.87	0.00	17.29	52.16	1,426	Like-for-like

Under the BAM, offsetting for the Plains-wanderer is only required for impacts to mapped Important Habitat. Important Habitat would not be directly impacted by the Proposed Action and this habitat does, therefore, not require offsetting. However, other potential habitat (Supplementary Habitat) for the Plains-wanderer has been assessed and identified in the Project Area outside mapped Important Habitat.
This additional habitat requires assessment and potentially offsetting under the EPBC Act. However, as the Project has avoided all impacts to the NSW Important Habitat Mapping for the Plains-wanderer and the Project does not have a species credit offset liability for the Plains-wanderer associated with the NSW Important Habitat Mapping, no offsets are proposed under the EPBC Act.

At the request of Commonwealth DCCEEW and CPHR the credit obligation included within the Amended BDAR (April 2025) has been removed from this version on the BDAR. Instead, both agencies requested that this offset obligation be removed and replaced with a PWMP. The details of the is contained within **Section 5.2** above, and within Section 7.4.4 of the Amended BDAR.

The current base case option for credit retirement will be the establishment Biodiversity Stewardship Agreements (BSA) within the local area. During the EIS, BWF conducted a desktop feasibility assessment to determine potentially suitable Stewardship Sites based on regionally mapped PCTs (SVTM). This feasibility assessment identified extensive areas of PCT 46 and PCT 44, as well as smaller areas of PCT 160, PCT 17, PCT 28 and PCT 24 which correlate to the PCTs impacted most by the Proposed Action. BWF has actively consulted with landholders identified during the feasibility study, and others in the locality, about the potential to establish Stewardship Sites for the purpose of generating suitable ecosystem and species credits to retire for the Proposed Action through the available like-for-like and variation rules. This consultation has confirmed potential interest in hosting Stewardship Sites on their land, and potential future land access permissions for survey.

If the option of a local Stewardship Site is pursued, any surplus ecosystem and/or species credit liability for the Proposed Action will be done through the other approved offsetting options within NSW.

8.0 MNES Assessments

8.1 MNES to be Further Assessed

8.1.1 Threatened Ecological Communities

Six TECs were identified within the Supplementary SEARs and database searches as being likely or potentially impacted by the Proposed Action. DCCEEW identified one TEC as likely to be significantly impacted by the Proposed Action, and five TEC as having potential to be significantly impacted by the Proposed Action. These TECs were assessed as part of a likelihood of occurrence assessment and within field surveys.

The TECs considered for further assessment are detailed with **Table 8.1**. Of the six TECs considered, only Weeping Myall Woodland, has been included for further assessment within Section 8.2 as this was the only TEC listed under the EPBC Act identified as occurring within the Project Area.

Table 8.1 Threatened Ecological Communities assessed as requiring further assessment

MNES Name	EPBC Act	Further Assessment Required	Justification
Weeping Myall Woodlands	E	Yes	Weeping Myall Woodland was recorded within Subject Land during current surveys
Natural Grasslands of the Murray Valley Plains.	CE	No	PCTs 44 and 46, while associated with this TEC within BioNet Vegetation Classification does not conform to the TEC because: • The Subject Land lies generally north of those parts of the Murray Valley Plains supporting the CEEC, specifically those parts of the Hay Plain which are not considered natural grasslands. • Structurally, the vegetation within PCT 44 and PCT 46 is grassland derived from clearing *Acacia pendula* woodland, rather than the CEEC's requirement to be a natural grassland. • A comparison was made for the grassland at the patch scale between the species in the Listing Advice noted as common in the CEEC and species noted as common in grasslands that are not the CEEC. It was found that the grasslands contained more species associated with grasslands that are not the TEC than with species that are more commonly associated with the TEC.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	E	No	No PCTs recorded within the Subject Land are associated with this TEC within BioNet Vegetation Classification. The Listing Advice for this TEC states that *Eucalyptus macrocarpa* is dominant or co-dominant within this TEC. *Eucalyptus macrocarpa* was not recorded within the Subject Land or across the wider Project Area. As such, the TEC has been assessed as not present within the Subject Land.

MNES Name	EPBC Act	Further Assessment Required	Justification
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	E	No	No PCTs recorded within the Subject Land are associated with this TEC within BioNet Vegetation Classification. The Listing Advice for this TEC states that *Allocasuarina luehmannii* is dominant or co-dominant within this TEC. *Allocasuarina luehmannii* was not recorded within the Subject Land or across the wider Project Area. As such, the TEC has been assessed as not present within the Subject Land.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	No	No PCTs recorded within the Subject Land are associated with this TEC within BioNet Vegetation Classification. The Conservation Advice for this TEC states that White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. No White Box, Yellow Box or Blakely's Red Gum was recorded within the Subject Land or Project Area. While many of the PCTs on site a structurally a derive native grassland, the floristic composition of the understory vegetation on the site differs to that listed within the approved Conservation Advice for the TEC. As such, the TEC has been assessed as not present within the Subject Land.
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions.	CE	No	No PCTs recorded within the Subject Land are associated with this TEC within BioNet Vegetation Classification. The Conservation Advice for this TEC states that the primary diagnostic species particular to this community are the dominance of the box-barked eucalypt species, namely *Eucalyptus porosa* or *Eucalyptus behriana*. Neither species were recorded within the Subject Land. As such, the TEC has been assessed as not present within the Subject Land.

8.1.2 Threatened Flora Species

Ten threatened flora species listed under the EPBC Act were identified within Supplementary SEARs and database searches as potentially being present within the Subject Land. The threatened flora species considered for further assessment are detailed with **Table 8.2**.

Of the ten threatened flora species considered, five have been included for further assessment within **Section 8.2** and in **Appendix 2** as these species were either recorded within the Subject Land during field surveys or assumed to be present.

Table 8.2 Threatened Flora Assessed as Requiring Further Assessment

MNES Name	EPBC Act Listing Status	Further Assessment Required?	Justification
A spear-grass ***Austrostipa wakoolica***	E	No	The species was not recorded during targeted surveys across the Subject Land. As such, further assessment of this species is not required.
A burr daisy ***Calotis moorei***	E	No	The species was not recorded during targeted surveys across the Subject Land. As such, further assessment of this species is not required.
Chariot Wheels ***Maireana cheelii***	V	Yes	The species was recorded within the Subject Land during targeted surveys. **As such, further assessment is required.**
Claypan Daisy ***Brachyscome muelleroides***	V	No	The species was not recorded during targeted surveys across the Subject Land. As such, further assessment of this species is not required.
Mossgiel Daisy ***Brachyscome papillosa***	V	No	The species was not recorded during targeted surveys across the Subject Land. As such, further assessment of this species is not required.
Red Darling Pea ***Swainsona plagiotropis***	V	No	The species was not recorded during targeted surveys across the Subject Land. As such, further assessment of this species is not required.
Slender Darling Pea ***Swainsona murrayana***	V	Yes	The species was recorded within the Subject Land during targeted surveys. **As such, further assessment is required.**
Spike-rush ***Eleocharis obicis***	V	Yes	The species was recorded within the Subject Land. **As such, further assessment is required.**
Turnip Copperburr ***Sclerolaena napiformis***	E	No	The species was not recorded during targeted surveys across the Subject Land. As such, further assessment of this species is not required.
Winged Peppercress ***Lepidium monoplocoides***	E	Yes	The species was recorded within the Subject Land during targeted surveys. **As such, further assessment is required.**

8.1.3 Threatened Fauna

One EPBC listed fauna species, the Plains-wanderer, was identified within the Supplementary SEARs as likely to be significantly impacted by the Proposed Action and five as potentially being significantly impacted by the Proposed Action. A further 10 species are considered to have a moderate or higher likelihood of occurring within the Subject Land. The threatened fauna species considered for further assessment are detailed with **Table 8.3**. Of the 15 threatened fauna species considered, 12 have been included for further assessment within **Section 8.2**.

Table 8.3 Threatened Fauna Assessed as Requiring Further Assessment

MNES Name	EPBC Act	Further Assessment Required	Justification
Southern Bell Frog ***Litoria raniformis***	V	Yes	The species was recorded within the Subject Land and Project Area during field surveys. **As such, further assessment is required**.
Australian Painted Snipe ***Rostratula australis***	E	Yes	Despite not being recorded during BBUS surveys, the species is an ecosystem credit species and is predicted to utilise the associated PCTs within the Subject Land. **As such, further assessment is required.**
Blue-winged Parrot ***Neophema chrysostoma***	V	Yes	The species was recorded within the Subject Land and Project Area during field surveys. **As such, further assessment is required.**
Diamond Firetail ***Stagonopleura guttata***	V	Yes	The species was recorded within the Subject Land and Project Area during field surveys. **As such, further assessment is required**.
Grey Falcon ***Falco hypoleucus***	V	No	There is potentially suitable habitat in the Project Area, however the Grey Falcon has not been recorded within 30 km of the Project Area and is unlikely to occur at this location.
Latham's Snipe ***Gallinago hardwickii***	V, M	Yes	Species is considered to have moderate likelihood of occurring within the Subject Land. **As such, further assessment is required.**
Pink Cockatoo ***Lophochroa leadbeateri***	E	Yes	This species was not recorded during field surveys and is considered unlikely to be breeding onsite. However, suitable foraging is present within the Subject Land. The foraging habitat is considered to be an ecosystem component of the species; therefore it is predicted to use the PCTs within the Subject Land. **As such, further assessment is required.**
Painted Honeyeater ***Grantiella picta***	V	Yes	Despite not being recorded during BBUS surveys, the species is an ecosystem credit species and is predicted to utilise the associated PCTs within the Subject Land. **As such, further assessment is required.**
Plains-wanderer ***Pedionomus torquatus***	CE	Yes	The species was initially incidentally recorded within the Subject Land and Project Area during following field surveys, and subsequently identified in targeted spotlighting surveys. **As such, further assessment is required.**
Sharp-tailed Sandpiper ***Calidris acuminata***	V, M	Yes	Species is considered to have moderate likelihood of occurring within the Subject Land. **As such, further assessment is required.**
Southern Whiteface ***Aphelocephala leucopsis***	V	Yes	The species was recorded within the Subject Land and Project Area during field surveys. **As such, further assessment is required.**

MNES Name	EPBC Act	Further Assessment Required	Justification
Superb Parrot *Polytelis swainsonii*	V	Yes	This species was not recorded during field surveys and is considered unlikely to be breeding onsite. However, suitable foraging is present within the Subject Land. The foraging habitat is considered to be an ecosystem component of the species; therefore it is predicted to use the PCTs within the Subject Land. **As such, further assessment is required.**
White-throated Needletail *Hirundapus caudacutus*	V, M	Yes	Despite not being recorded during BBUS surveys, the species is an ecosystem credit species and is predicted to utilise the associated PCTs within the Subject Land. **As such, further assessment is required.**
Koala *Phascolarctos cinereus*	E	No	The species was not recorded during field surveys, as such no further assessment is required.
Grey Snake *Hemiaspis damelii*	E	No	The species was not recorded during field surveys, as such no further assessment is required.

8.1.4 Migratory Species

No species listed as migratory under the EPBC Act were recorded during field surveys.

Five migratory species are considered to have a moderate likelihood of occurring within the Subject Land. Three of these, Latham's Snipe, Sharp-tailed Sandpiper and White-throated Needletail, are also listed as Vulnerable and are discussed above. The remaining two species detailed in **Table 8.4.**

Migratory species are not a controlling provision of the Controlled Action Determination, therefore an assessment against the Supplementary SEARs has not been carried out. However, Assessments of Significance (AoS) under the EPBC Act have been conducted for these species and can be contained within **Appendix 2** of this report.

Table 8.4 Migratory Species Assessed as Requiring Further Assessment

MNES Name	EPBC Act Listing Status	Further Assessment Required?	Justification
Gull-billed Tern *Gelochelidon nilotica*	M	No	Migratory species are not a controlling provision of the Controlled Action Determination, therefore an assessment against the Supplementary SEARs has not been carried out. However, an AoS under the EPBC Act have been conducted for this species.
Pacific Swift *Apus pacificus*	M	No	Migratory species are not a controlling provision of the Controlled Action Determination, therefore an assessment against the Supplementary SEARs has not been carried out. However, an AoS under the EPBC Act have been conducted for this species.

8.2 Supplementary SEARs Assessments

8.2.1 Requirement for supplementary SEARs assessment

Item 16 of the Supplementary SEARs specified an assessment is required for each of the EPBC Act listed threatened species and communities assessed likely to be impacted by the action. This assessment, as well as the assessments of significance (**Appendix 2**) have been prepared for EPBC Act listed TECs and threatened species that have been:

- recorded onsite during Umwelt surveys
- assumed present due to being an ecosystem species under the BAM.

8.2.2 Weeping Myall Woodlands

The community occurs on the inland alluvial plains west of the Great Dividing Range in NSW and Queensland. It occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Brigalow Belt North, Murray-Darling Depression, Nandewar and Cobar Peneplain IBRA Bioregion (TSSC 2009).

The Weeping Myall Woodlands range from open woodlands to woodlands, generally 4 to 12 m high. The overstorey is dominated by Weeping Myall (*Acacia pendula*) trees and in some cases this species may be the only tree canopy species. Other woodland species may also form part of the overstorey of the ecological community, including *Alectryon oleifolius* subsp. *elongatus*, *Eucalyptus populnea* or *E. largiflorens*. *Amyema quandang* commonly occurs on the branches of Weeping Myall trees throughout the ecological community's range (TSSC 2009).

The Weeping Myall Woodlands EEC can naturally occur either as a grassy or a shrubby woodland. The understorey often includes an open layer of shrubs over a ground layer which includes a diversity of grasses and forbs. The ground layers can vary in species composition and cover depending on past and current grazing regimes, and the occurrence of recent rain.

The Weeping Myall Woodlands generally occur on flat areas, shallow depressions or gilgais on raised relict alluvial plains. Soils include black, brown, red-brown or grey clay or clay loam soils (TSSC 2009).

In the Subject Land, the Weeping Myall Woodlands EEC is associated with Vegetation Zone 6 of PCT 26 moderate to good condition. The EEC is not associated with derived native grassland condition (Zone 5) of PCT 26.

Table 8.5 Weeping Myall Woodlands Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Refer to **Section 3.3.1.2.**
Extent of habitat within Project Area	The EEC has a number of diagnostic features that a patch must meet as condition thresholds to be the EEC. As summarised in Section 4.5.4 of the Amended BDAR, an assessment of the Conservation Advice, Listing Advice and Policy Statement has found that Zone 6 (Moderate Good) of PCT 26 Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion conforms with Weeping Myall Woodlands EEC, while Zone 5 (DNG) does not. Approximately 42.56 ha of Weeping Myall Woodlands EEC (vegetation zone 6) has been identified in the Subject Land. All of the Weeping Myall Woodlands EEC (Zone 6) occurs within the Stage 1 - linear assessment Subject Land.
iii. Impacts of the Proposed Action	The Proposed Action will impact directly on approximately 4.92 ha of Weeping Myall Woodlands EEC (Zone 6) in Stage 1 – linear assessment Development Footprint.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records.

Item 16 Supplementary SEARs Assessment Component	Response
	• WTG 115 (Scoping phase ID: WTG 118) moved 188 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional Mitigation and Management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened ecological communities. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a Construction Soil and Water Management Plan (CSWMP) detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. Further details of avoidance, mitigation and management measures are provided in **Section 5.0** of this report, and Section 9.0 of the Amended BDAR report (specifically Table 9.1).
v. Significant residual impacts	An AoS has been provided in Section 2.1 of **Appendix 2**. The assessment has concluded that the Proposed Action is likely to have a significant impact on the EEC.
vi. Offsets proposed	Impacts to Weeping Myall Woodland will be offset through the retirement of 135 credits of PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion Refer to **Section 7.0** of this MNES Report and Section 11.0 of the Amended BDAR.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the Proposed Action's biodiversity offset obligations. This will be achieved through retiring 135 like-for-like threatened ecosystem credits within the Weeping Myall offset trading group (OTG).
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.3 Chariot Wheels

The Chariot Wheels is a small, tufted perennial shrub belonging to the saltbush family (Chenopodiaceae). Growing to 20 cm tall, it has a slender, woolly, erect branches arising from a swollen taproot and fleshy, linear, alternate leaves 5–9 cm long. Flowering and fruiting in the spring, producing tiny green flowers of 1 mm in width in the leaf axils (Mavromihalis, 2010a).

The species was once widely distributed across the inland plains of south-eastern Australia, occurring from south-western Queensland through western NSW to north-western Victoria. However, conversion of much of its former range to agriculture has resulted in an extensive decline in range and abundance. The species is now extinct in Queensland and northern NSW, and survives only in southern NSW and Victoria, where there are about 17 populations containing perhaps 700,000 plants. Remaining populations occur in the western Riverina IBRA bioregion, mostly between Hay and Deniliquin but extending as far west as Moulamein. In Victoria, it occurs in the north-west of the State, within an area broadly bounded by Mitiamo in the east, Swan Hill in the north and Minyip in the south, in the Riverina & Murray Darling Depression IBRA bioregions (Mavromihalis, 2010a).

The Chariot Wheels is usually found in chenopod shrubland and grassland communities on heavy clay soils, dominated by various native shrubs, grasses and herbs, notably *Maireana pentagona*, *Maireana excavata*, *Nitraria billardierei*, *Austrostipa nodosa*, *A. scabra*, *Erodium crinitum*, *Rhodanthe corymbiflorum*, *Hyalosperma semisterile* and *H. glutinosa*. In NSW, the species appears to favour heavier grey clay soils that support *Atriplex vesicaria* communities. Chariot Wheels typically occupies sparsely vegetated sites, with a high proportion of bare ground, often as a result of over-grazing and subsequent wind erosion. It often occurs in low-lying sites that become waterlogged during the winter months, and may be slightly saline (Mavromihalis, 2010a).

It is likely that a loss of habitat and the lack of competition from other species due to the occupation of a relatively hostile environmental niche are factors influencing the current distribution of the species. Most of these populations occur on private land or along roadsides, where they are threatened by continued degradation and destruction of habitat from weed invasion, grazing, cropping, clearing and increasing salinity. Recovery actions include mapping of habitat that is critical to survival of Chariot Wheels (Mavromihalis, 2010a).

Table 8.6 Chariot Wheels Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey for this species was subject to a two-phase grid-based systematic approach. A grid of 100 m^2 was overlayed over a topographic map of the subject land, with a 40 m diameter circle nested within the intersection of each x and y gridline. Surveyors used this grid overlay to target systematic surveys within circles and along grid lines between circles. 10 m wide transects were walked within each grid circle. Stage 1 of a two-phased staged approach has been completed across the Stage 1 – Linear and Stage 2 – Linear assessment areas. Approximately 2,120 hours of survey has been completed. A total of 1,912 km of transects were walked. This species has been **recorded** within the Subject Land.

Item 16 Supplementary SEARs Assessment Component	Response
Extent of habitat within Project Area	BioNet listed associated PCTs for Chariot Wheels that have been identified in the Project Area are PCTs 26, 44, 46 and 164. However a species polygon was generated based on PCT mapping within 100 m buffers of all individuals recorded as part of the targeted threatened species surveys. PCT mapping included all PCT and vegetation zones within the 100 m buffer, not just associated PCTs. These vegetation zones within the development footprint are 7, 9, 10 and 11 with a total area of 4.67 ha. Within the Subject Land, there was 48.58 ha of species polygon habitat mapping.
iii. Impacts of the Proposed Action	4.67 ha of habitat is currently assessed as suitable occupied habitat. Approximately 1,207 individuals were noted in the Subject Land, with fewer noted within the Project Area.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values including, including Chariot Wheels: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional Mitigation and Management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened flora habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation. • Retain tree roots where possible. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS.

Item 16 Supplementary SEARs Assessment Component	Response
	• Permanent bush fire protections will be implemented during construction. Where feasible, native vegetation has been avoided and impacts minimised, particularly threatened ecological communities. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1) as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 4.2 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	Impacts to the Chariot Wheel would be offset through the retirement of 116 species credits. Refer to **Section 7.0** of this MNES Report and Section 11.0 of the Amended BDAR.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring 116 like-for-like species credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.4 Slender Darling Pea

Slender Darling Pea is an ascending to erect perennial forb, growing to 25 cm high. The species occurs from South Australia through south-west Victoria and central NSW to south-east Queensland. In NSW, the species occurs in the central western slopes, the Western Division, and the Riverina area.

The species Inhabits grassland, herbland and open Black-box woodland, usually in depressions. Grows in heavy grey or brown clay, loam or red cracking clays. Often associated with low chenopod shrubs, wallaby-grass and spear grass. May require some disturbance and has been known to occur in paddocks that have moderately grazed or occasionally cultivated (DECCW 2022).

Table 8.7 Slender Darling Pea Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey for this species was subject to a two-phase grid-based systematic approach. A grid of 100 m^2 was overlayed over a topographic map of the subject land, with a 40 m diameter circle nested within the intersection of each x and y gridline. Surveyors used this grid overlay to target systematic surveys within circles and along grid lines between circles. 10 m wide transects were walked within each grid circle. Stage 1 of a two-phased staged approach has been completed across the Stage 1 – Linear and Stage 2 – Linear assessment areas. Approximately 1,360 hours of survey has been completed. A total of 1,227.77 kms of transects were walked. The species was **recorded** during surveys.

Item 16 Supplementary SEARs Assessment Component	Response
Extent of habitat within Project Area	BioNet listed associated PCTs for the Slender Darling Pea have been identified in the Project Area as PCTs 26, 28, 44, 46 and 164, and as vegetation zones 5, 6,7, 9, 10 and 12. The species polygon was generated based on PCT mapping within 500 m buffers of all individuals recorded as part of the targeted threatened species surveys. PCT mapping included all PCT and vegetation zones within the 500 m buffer, not just associated PCTs. This includes all vegetation zones within the development footprint with a total area of 445.21 ha. Within the Subject Land, there was 2,986.56 ha of species polygon habitat mapping.
iii. Impacts of the Proposed Action	445.21 ha of habitat has been assessed as occupied habitat for the species within the Development Footprint. Approximately 3,805 individuals were noted in the Project Area.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Slender Darling Pea: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional Mitigation and Management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened flora habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation. • Retain tree roots where possible.

Item 16 Supplementary SEARs Assessment Component	Response
	• Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. Where feasible, native vegetation has been avoided and impacts minimised, particularly threatened ecological communities. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 4.1 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	Impacts to Slender Darling Pea would be offset through the retirement of 13,058 species credits. Refer to **Section 7.0** of this MNES Report and Section 11.0 of the Amended BDAR.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring 13,058 like-for-like species credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.5 Spike-rush

Spike-rush is a small, tufted perennial sedge, growing to 30cm high, with a tufted habitat and striped cylindrical stems. Straw-coloured flower head, with a dark brown-tinge appear in November. The species occurs on the NSW south west plains, predominantly near Condobolin and Hay. The species is listed as Vulnerable under the EPBC Act and BC Act.

The species inhabits ephemerally wet low-lying grassland and shrublands, often in roadside mitre drains and depressions. NSW sites include depressions with heavy clay soils on the Lachlan River floodplain, associated with *Eragrostis australasica*, *Atriplex vesicaria*, and *Atriplex nummularia* shrubland, low-lying claypans near an irrigation channel, and a shallow open ditch on a low ridge with *Eucalyptus populnea* in red sandy soil over clay.

Table 8.8 Spike-rush Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey for this species was subject to a two-phase grid-based systematic approach. A grid of 100 m^2 was overlayed over a topographic map of the subject land, with a 40 m diameter circle nested within the intersection of each x and y gridline. Surveyors used this grid overlay to target systematic surveys within circles and along grid lines between circles. 10 m wide transects were walked within each grid circle.

Item 16 Supplementary SEARs Assessment Component	Response
	This species was not observed during targeted surveys during 2023 and 2024; however the species **was recorded** incidentally in two locations (in a swale beside an access track and in a shallow depression) during late December 2024 following a late November rainfall event. This linear roadside swale occurred in the gap of the survey grid lines, which accounts for why it was not identified in the grid based surveys. A total of 1,202.98 km of targeted survey transects were completed for this Project, totalling 1,510 hours of survey.
Extent of habitat within Project Area	Species polygon was generated across all PCTs / vegetation zones within a 500 m buffer of all *Eleocharis obicis* records (including those located outside of the Subject Land). The species polygon was not restricted to associated PCTs. The 500 m buffer is consistent with the 'area of suitable habitat' placed around the other threatened flora species which were subject to Stage 2 surveys. The area of listed associated PCTs is 55.75 ha of suitable habitat within the Subject Land.
iii. Impacts of the Proposed Action	7.31 ha of habitat is currently assessed as suitable habitat likely to be occupied by the species within the development footprint. Approximately 110 individuals were noted in the Project Area.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Spike-rush: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional Mitigation and Management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened flora habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants.

Item 16 Supplementary SEARs Assessment Component	Response
	• Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation. • Retain tree roots where possible. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. Where feasible, native vegetation has been avoided and impacts minimised, particularly threatened ecological communities. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as Section 5.0 of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 4.1 of Appendix 2. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	Impacts to Spike-rush would be offset through the retirement of 193 species credits. Refer to Section 7.0 of this MNES Report and Section 11.0 of the Amended BDAR.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring 193 like-for-like species credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.6 Winged Peppercress

The Winged Peppercress is a small annual herb endemic to inland south-eastern Australia, occurring within NSW and Victoria predominantly within mallee scrub in semi-arid areas. The species is listed as endangered under the EPBC Act. In NSW, the species is known to occur across several locations of the Hay Plain including the Booberoi regeneration area/railway sliding, Ulrana Nature Reserve near Sealake, along the Cobb Highway (south of Ivanhoe), Lake Cargelligo, Micabil and the Morundah property owned by the Department of Defence. These are all considered important populations (DECCW 2019).

Recorded in a wetland-grassland community *comprising Eragrostis australasicus, Agrostis avenacea, Rytidosperma duttonianum, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma* and *Pycnosorus globosus* on waterlogged grey-brown clay. Also recorded from a *Maireana pyramidata* shrubland. The species is highly dependent on seasonal conditions. Occurs in periodically flooded and waterlogged habitats in arid to semi-arid areas with an average rainfall of 200–450 mm per year and does not tolerate grazing disturbance (DECCW 2019).

The key threats associated with the species decline in distribution and abundance is associated with habitat destruction and degradation. Current major threats include altered flooding regimes, road works, weed invasion and grazing.

Table 8.5 Winged Peppercress Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey for this species was subject to a two-phase grid-based systematic approach. A grid of 100 m^2 was overlayed over a topographic map of the subject land, with a 40 m diameter circle nested within the intersection of each x and y gridline. Surveyors used this grid overlay to target systematic surveys within circles and along grid lines between circles. 10 m wide transects were walked within each grid circle. Stage 1 of the two-phase staged approach has been completed across the Stage 1 – Linear and Stage 2 – Linear assessment areas. Approximately 12,370 hours of survey has been completed. A total of 1,887.78 kms of transects were walked. The species was **recorded** during surveys.
Extent of habitat within Project Area	Species polygon was generated across all PCTs / vegetation zones within a 100 m buffer of all *Lepidium monoplocoides* records (including those located outside of the Subject Land). The species polygon was generated based on associated PCTs across the Subject Land within which the species was recorded. Additionally, where the species was found in vegetation zones of PCTs not listed as associated in BioNet, these vegetation zones were also included in the species polygon. This area of associated PCT is 42.09 ha within the Subject Land.
iii. Impacts of the Proposed Action	The Proposed Action will impact on 3.52 ha of habitat that is currently assessed as suitable habitat likely to be occupied by the species within the Development Footprint. A total of 1,355 individuals were recorded within the Project Area.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Winged Peppercress: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Other mitigation and management actions include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks.

Item 16 Supplementary SEARs Assessment Component	Response
	• The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened flora habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation. • Retain tree roots where possible. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 3.2 of **Appendix 2**. The assessment has concluded that the Proposed Action is likely to have a significant impact on the species.
vi. Offsets proposed	Impacts to Winged Peppercress would be offset through the retirement of 88 species credits. Refer to **Section 7.0** of this MNES Report and Section 11.0 of the BDAR
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring 88 like-for-like species credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.7 Australian Painted Snipe

The Australian Painted Snipe is endemic to Australia. Historically, the species was distributed through most of the continent. The Murray-Darling Basin, particularly the Riverina Region of Victoria and NSW, appeared to have been a stronghold for the species. The patterns of present-day distribution are poorly understood (DECCW 2017).

The Australian Painted Snipe occurs in shallow freshwater, or occasionally brackish, ephemeral and permanent wetlands. This includes lakes, swamps, claypans inundated and waterlogged grassland/saltmarsh, dams, rice crops, sewage farms and bore drains. Typically, these areas also contain a good cover of grasses, rushes and reeds, low scrub, *Muehlenbeckia* spp., open timber or samphire (DECCW 2017).

The Australian Painted Snipe may breed in response to rainfall, with breeding recorded in all months. Breeding habitat for this species is quite specific: shallow wetlands with areas of bare wet mud and mixed heights of low vegetation. The Australian Painted Snipe has also been recorded nesting in and near swamps, canegrass swamps, flooded areas including grazing land, among cumbungi, sedges, tussock grasses, various couch grasses, and samphires (*Tecticornia* spp.), also in ground cover of water-buttons and grasses, at the base of tussocks and under low saltbush (DECCW 2017).

This species is associated with PCTs 10, 13, 17, 24 and 160 and vegetation zones 1, 2, 3, 4 and 11. There is 69.06 ha of potential habitat within the Subject Land, of which 8.88 ha occurs within the Development Footprint. Although the species is associated with grassland habitat the DNG vegetation zones for relevant PCTs have not been included as they would only be used opportunistically during regional flooding events, where marginal habitat may become suitable. There are seven records of this species within 30 km of the Subject Land. It was not recorded by Umwelt during surveys.

Table 8.9 Australian Painted Snipe Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Targeted species search was not carried out specifically for the Australian Painted Snipe as it is an ecosystem-credit species. However, bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hours of survey effort. The species was not recorded during bird utilisation surveys.
Extent of habitat within Project Area	This species is associated with PCTs 10, 13, 17, 24 and 160 and vegetation zones 1, 2, 3, 4, 11 and 13. There is 69.06 ha of suitable habitat within the Subject Land, of which 8.88 ha occurs within the Development Footprint.
iii. Impacts of the Proposed Action	The Proposed Action will directly impact on 69.06 ha of suitable habitat for this species. The species was not recorded to occur within the Subject Land.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Australian Painted Snipe: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records.

Item 16 Supplementary SEARs Assessment Component	Response
	• WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and Management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 3.3 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Australian Painted Snipe is an ecosystem credit species, impacts to this species will be offset through the retirement of the Proposed Action's credit obligation.

Item 16 Supplementary SEARs Assessment Component	Response
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.8 Blue-winged Parrot

The Blue-winged Parrot is a slender parrot that can grow up to 24 cm in length and weigh less than 50 g. The species has an olive-green head and upper body, grading to light green on the fore-neck, with a green-blue upper tail with yellow sides. The underparts of the parrot are yellow and there may be orange in the centre of the belly (DCCEEW 2023).

Blue-winged parrots breed on mainland Australia south of the Great Dividing Range in southern Victoria from Port Albert in Gippsland west to Nelson, and sometimes in the far south-east of South Australia, and the north-western, central and eastern parts of Tasmania. The species is a partial migrant, with variable numbers of parrots migrating from Bass Straight in winter. During the non-breeding period, from autumn to early spring, birds are recorded from northern Victoria, eastern South Australia, south-western Queensland and western NSW, with some birds reaching south-eastern NSW and eastern Victoria, particularly on the southern migration (DCCEEW 2023).

They inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They generally favour grasslands and grassy woodlands and often found near wetlands and both near the coast and in semi-arid zones. The species has also been known to inhabit modified environments such as airfields, golf courses and paddocks. They breed in Tasmania, coastal south-eastern Australia and Southern Victoria in Spring and Summer. Nests are made in hallows and prefer a vertical opening in live or dead trees or stumps (DCCEEW 2023). Habitat critical to the survival of the Blue-winged Parrot includes:

- Foraging and staging habitats found from coastal, sub-coastal and inland areas, right through to semi-arid zones including: grasslands, grassy woodlands and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs.
- Wetlands both near the coast and in semi-arid zones used for foraging and staging.
- Eucalypt forests and woodlands within the breeding range in Tasmania, coastal southeastern South Australia and southern Victoria.
- Live and dead trees and stumps with suitable hollows within the breeding range.

This species is associated with PCTs 13, 17, 24, 26, 28, 44, 46, 160 and 164 and all vegetation zones. There is 4,268.46 ha of potential habitat within the Subject Land, of which 636.40 ha occurs within the Development Footprint and would be removed. Blue-winged Parrots were observed on site during surveys conducted by Umwelt.

Table 8.10 Blue-winged Parrot Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Targeted species search was not carried out specifically for the Blue-winged Parrot as it is an ecosystem-credit species. However, bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hours of survey effort. The species was not recorded during bird utilisation surveys. Although, this species was incidentally **recorded** in the Subject Land.
Extent of habitat within Project Area	This species is associated with PCTs 13, 17, 24, 26, 28, 44, 46, 160 and 164 and all vegetation zones. There is 4,263.8 ha of potential habitat within the Subject Land, of which 636.40 ha occurs within the Development Footprint
iii. Impacts of the Proposed Action	636.40 ha of potential habitat occurs within the Development Footprint and would be removed by the Project. The Proposed Action will impact on the foraging and potential breeding habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging and potential breeding habitat. Vehicle strike could occur during construction stage. Increase of weed extent may impacts on habitat composition during construction. The extent of occurrence and area of occupancy of this species are estimated to be 170,000 km^2, and 11,000 $km^{2,}$ respectively. The removal of 636.40 ha is unlikely to have a significant impact on the Blue-winged Parrot.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Blue-winged Parrot: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and Management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery.

Item 16 Supplementary SEARs Assessment Component	Response
	• Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened flora habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 4.3 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Blue-winged Parrot is an ecosystem credit species, impacts to this species will be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.9 Diamond Firetail

The Diamond Firetail is a large finch with a length between 10 to 12 cm and weighing 17 grams. The bird has a bright red bill, eyes and rump. The white throat and lower breast are separated by a broad black breast-band that extends into the strongly white-spotted, black flanks.

The Diamond Firetail occurs on the south-east mainland of Australia, from south-east Queensland to Eyre Peninsula, South Australia. They inhabit eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats including farmland and grassland with scattered trees, preferring areas with relatively low tree density, few large logs, and little litter cover by high grass cover (DCCEEW, 2023e).

Diamond Firetail predominately forage at ground level, on grass and herbs seeds and insects. Groups separate into small colonies to breed between August and January. They often build their nests into the base of large stick-nests of birds of prey or among the foliage of prickly shrubs such as hakea and boxthorn (DCCEEW, 2023e).

Habitat critical to the survival of the Diamond Firetail include areas of:

- Eucalypt, Acacia or Casuarina woodlands, open forests and other lightly timbered habitats
- low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding
- *Allocasuarina verticillata* within the Mt Lofty Ranges.

The Diamond Firetail is associated with PCTs 10, 13, 26, 28, 44 and 46 and all vegetation zones. There is 4,268.46 ha of suitable habitat for this species within the Subject Land, with 636.40 ha occurring within the Development Footprint and therefore being directly impacted. The Diamond Firetail has been recorded within the Subject Land during surveys conducted by Umwelt.

Table 8.11 Diamond Firetail Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Targeted species search was not carried out specifically for the Diamond Firetail as it is an ecosystem-credit species. However, bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hours of survey effort. This species was **recorded** in the Subject Land.
Extent of habitat within Project Area	Habitat for the Diamond Firetail has been identified in the Project Area associated with PCTs 10, 13, 26, 28, 44 and 46 and all vegetation zones. There is 4,268.46 ha of suitable habitat for this species within the Subject Land, with 636.40 ha of this occurring within the Development Footprint.

Item 16 Supplementary SEARs Assessment Component	Response
iii. Impacts of the Proposed Action	Removal of 636.40 ha of suitable habitat within the Development Footprint. The Project would impact on the foraging and potential breeding habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging and potential breeding habitat. Vehicle strike could occur during construction stage. Increase of weed extent may impacts on habitat composition during construction.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Diamond Firetail: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna.

Item 16 Supplementary SEARs Assessment Component	Response
	A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 4.4 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Diamond Firetail is an ecosystem credit species, impacts to this species will be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.10 Latham's Snipe

Latham's Snipes are a migratory species that breed in Japan at the main breeding site in Hokkaido, and in far eastern Russia. During the non-breeding season they migrate direct to Australia, as suggested by the lack of records between Japan, Russia, and Australia. They arrive in Australia from Late July to early August onwards, departing north in Australia by late February, eventually leaving Northern Queensland by mid-April. The Latham Snipe is dispersive during its stay in Australia. The species probably moves in response to rainfall and the availability of food. For example, the species abandons seasonally drying wetlands and moves to wetter or more permanent habitats elsewhere. Data from regular counts in southern Australia indicate that the species is highly mobile during the non-breeding season (Higgins & Davies 1996).

In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2,000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (Higgins & Davies 1996).

Associated PCTs are not provided for this species. However, due to its similarity to the Australian Painted Snipe, PCTs 10, 13, 17, 24 and 160 and vegetation zones 1, 2, 3, 4, and 11 are considered suitable habitat for this species. There is 69.06 ha of potential habitat within the Subject Land, of which 8.88 ha occurs within the Development Footprint. Although the species is associated with grassland habitat the DNG vegetation zones for relevant PCTs have not been included as they would only be used opportunistically during regional flooding events, where marginal habitat may become suitable. There are seven records of Latham's Snipe within a 30 km radius of the Subject Land, however it was not observed on site.

Table 8.12 Latham's Snipe Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey requirements are not explicitly stated. Seasonal bird and bat utilisation surveys were undertaken. However, bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hours of survey effort. The species was not recorded during bird utilisation surveys. The species was not recorded during bird utilisation surveys.
Extent of habitat within Project Area	Associated PCTs are not provided for this species. However, due to its similarity to the Australian Painted Snipe, PCTs 10, 13, 17, 24 and 160 and vegetation zones 1, 2, 3, 4 and 11 are considered suitable habitat for this species. Therefore, there is 69.06 ha of potential habitat within the Subject Land, of which 8.88 ha occurs within the Development Footprint and will be removed.
iii. Impacts of the Proposed Action	Removal of 8.88 ha of suitable habitat within the Development Footprint. The Proposed Action will impact on potential foraging habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging habitat.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Latham's Snipe: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction.

Item 16 Supplementary SEARs Assessment Component	Response
	• Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as Section **5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 3.3 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Latham's Snipe was not recorded onsite no species-specific offsets are proposed for this species. Potential impacts to this species will be indirectly offset through the retirement of the Project's ecosystem credit obligations.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to Section **7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.11 Painted Honeyeater

The Painted Honeyeater is a small to medium honeyeater with a wholly or mostly pink bill and almost wholly white underparts. The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The largest population and almost all breeding records occur from south of 26 degrees south, on inland slopes of the Great Diving Range between the Grampians (Victoria) and Roma (Queensland).

The Painted Honeyeater makes seasonal north-south movements determined by fruiting mistletoe, before moving to semi-arid regions after breeding. The species is considered to have a single population, based on its dispersive habits.

The species inhabits a range of woodlands and shrublands, particularly weeping myall, brigalow woodlands, box-gum woodlands and box-ironbark forests that support a high density of mistletoe of the genus *Amyema* spp. (DAWE 2021a). The species prefers woodlands which contain a higher number of mature trees, at these trees host more mistletoes. The painted honeyeater is more common in wider blocks of remnant woodland than narrower strips (DoE 2015a).

The recovery plan for the painted honeyeater identifies Key Biodiversity Areas (KBAs) for the painted honeyeater being sites of critical importance to the long-term persistence of the Painted Honeyeater (CoA 2021a). There are seven KBAs for the painted honeyeater in Australia including five in NSW:

- Binya and Cocoparra KBA is the Cocoparra National Park in the Riverina region, covering about 8,357 ha.
- Capertee Valley KBA which occurs partly in the Gardens of Stone National Park and Wollemi National Park.
- Goonoo KBA covers about 1034 km^2 of woodland, between the towns of Dubbo, Gilgandra and Dunedoo, which is partly within national park estate.
- Pilliga Forests/Scrub KBA covering over 5,000 km^2 of semi-arid woodland in temperate north-central NSW.
- South-west slopes of NSW and ACT KBA covers an area of 25,653 km^2 supporting significant wintering populations of a number of threatened species (DAWE 2021a).

The Painted Honeyeater is associated with PCTs 10, 13, 26 and 28 and vegetation zones 1, 2, 6 and 8 within the Subject Land. There is 64.98 ha of suitable habitat within the Subject Land, of which 7.23 ha is within the Development Footprint and will be removed. There are seven records of this species with a 30 km buffer of the Subject Land.

Table 8.6 Painted Honeyeater Supplementary SEARS Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Targeted species search was not carried out specifically for the Painted Honeyeater as it is an ecosystem-credit species. However bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hour of survey effort. The species was **not recorded** during bird utilisation surveys.
Extent of habitat within Project Area	Habitat for the Painted Honeyeater has been identified in the Project Area associated with PCTs 10, 13, 26 and 28 and vegetation zones 1, 2, 6 and 8. There is 64.98 ha of suitable habitat for this species within the Subject Land, with 7.23 ha of this occurring within the Development Footprint.

Item 16 Supplementary SEARs Assessment Component	Response
iii. Impacts of the Proposed Action	7.23 ha of potential habitat occurs within the Development Footprint and will be removed by the Proposed Action. The Proposed Action will impact on the foraging and potential breeding habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging and potential breeding habitat. Vehicle strike could occur during construction stage. Increase of weed extent may impacts on habitat composition during construction.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Painted Honeyeater: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna.

Item 16 Supplementary SEARs Assessment Component	Response
	A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	Removing 7.23 ha of potential habitat would result in a <0.01% reduction in the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the Painted Honeyeater national population. This is not considered to be a significant residual impact on the species. An AoS is provided in Section 4.5 of **Appendix 2**.
vi. Offsets proposed	As Painted Honeyeater is an ecosystem credit species, impacts to this species would be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.12 Plains-wanderer

The Plains-wanderer is a small quail-like bird measuring between 15–19 cm in length, with a wing-span of 28–36 cm and a mass of 40–80 g in males and 55–95 g in females. Adult plumage is different amongst sexes, with females distinguished by their rufous breastband and white-spotted black collar. Males retain a plainer plumage of light brown colouration above, covered with blackish crescents.

Plains-wanderers are distributed across north-central Victoria, Southern NSW (around the Riverina region), eastern South Australia and west-central Queensland.

Plains-wanderer inhabit treeless, lowland sparse grasslands that usually occur on hard red-brown clay soils. Grassland structure is considered more crucial than floristic composition, with habitat preference appearing to be ~50% of bare ground with most vegetation being less than 5cm in height with some widely spaced plants up to 30cm. Occasionally the Plains-wanderer inhabits other types of habitat including stubble, amongst low cereal crops and in a low, sparse chenopod scrubland (Commonwealth of Australia 2016). Recently, radio-tracking studies have suggested that the Plains-wanderer requires a mosaic of landscape elements including denser grass swards (Nugent et al. 2022). Denser habitats may have previously been overlooked as the detection probability would be lower in these areas relative to open habitats as visual searching (either diurnal searches or nocturnal spotlighting) was used. Plains-wanderer populations ago substantial fluctuations due to drought as it causes grass cover to become too sparse and wet conditions that result on the overgrowth of grass (Baker-Gabb et al. 1990; 2016).

The primary threats to Plains-wanderers are the procurement of native grasslands, which can take decades to recover. This cultivation of native grasslands has essentially eliminated the species from southern South Australia, Victoria and much of the NSW Riverina. Other threats include inappropriate grazing routines that impacts the preferential grass height and extent of available bare ground, inappropriate burning regimes, insectivore applications and predation from foxes, feral cats and native birds of prey.

Table 8.13 Plains-wanderer Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	As per Section 5.3(1)(c) of the BAM, no targeted surveys are required for species with Important Habitat mapping. Several studies (Baker-Gabb et al. 2016; Antos and Schultz 2020) used nocturnal vehicle-based spotlighting. Nugent et al. (2022a) combined spotlighting with the use of thermal scopes. Important Habitat mapping for the species occurs within the Project Boundary and adjacent to the Development Corridor. The Project design has been changed since initial project layout to avoid areas of Important Habitat mapping for this species such that no Important Habitat is proposed to be impacted. Surveys were conducted in Spring 2024 using methodology developed in consultation with Commonwealth DCCEEW which recommended spotlight from the vehicle travelling at 6–7 km/hr across grid-based survey areas comprised of 10–11 transects that are 1 km long and set 50 m apart. Each grid should be surveyed twice, 2–3 nights apart. This species was **recorded** in the Subject Land.
Extent of habitat within Project Area	Consultation with Commonwealth DCCEEW in 2023 identified the need for additional survey and assessment of Plains-wanderer in order to meet the assessment requirements under the EPBC Act. Commonwealth DCCEEW noted during consultation that 'habitat critical for the survival of the species' was more broadly defined than Important Habitat mapping, thus mapping of Supplementary Habitat for the species would be necessary. The method for mapping Supplementary Habitat for Plains-wanderer is detailed in Section 8.4.3.1 of the BDAR and summarised below: • Capture of high-resolution aerial imagery and LiDAR: high-resolution aerial imagery and LiDAR was collected across the Project Area using a combination of drones and satellite imagery • Analysis of the imagery via the use of remote sensing technology: following the collection of high-resolution aerial imagery and LiDAR, the imagery was processed, the ground identified, and the vegetation in the image classified into structural layers based on height and colour. This allowed Umwelt to identify which parts of the survey areas were structurally similar to those preferred by Plains-wanderers, specifically, areas which were comprised approximately 50% bare ground, 40% herbs and grasses. • Validation of the analysis against field data collected for the BDAR: the remote sensing classification and areas identified as potential habitat were validated against the BAM VI plot data and rapid mapping point data collected during field surveys. • Generation of Supplementary Habitat mapping: the following process was followed ○ 100 m buffer was placed around areas within which the structure of the vegetation was found to be consistent with that preferred by Plains-wanderer ○ All records of the species within the Project Area were buffered by 362 m, to reflect the area equivalent to the maximin known home range of the species (41 ha) ○ Identification and incorporation of all patches of red or mottled soil, as observed on Airbus high-resolution aerial image within PCT 44, PCT 46, PCT 26, PCT 28, PCT 164. ○ Incorporation of secondary habitat mapping (TBDC, 2025) as contained within the TBDC profile for Plains-wanderer

Item 16 Supplementary SEARs Assessment Component	Response

- Removal of all areas mapped as non-native, infrastructure, waterbody, or a woody vegetation type as per the vegetation mapping carried out for the Project
- Removal of any areas which overlapped with mapped Important Habitat for the species

For the purposes of this assessment, Plains-wanderer habitat types have been defined as follows:

Important Habitat: As defined within the BAM. Specifically, mapping of Important Habitat areas provided by the DPIE for those species for which the habitat constraint in the TBDC refers to a mapped important area.

Primary Habitat: Plains-wanderer primary habitat mapping completed for National Parks and Wildlife Service (NPWS) (TBDC, 2025). Primary habitat of the plains-wanderer typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses. Given that primary habitat mapping informed the mapped Important Habitat, primary habitat is considered to be commensurate to Important Habitat.

Secondary Habitat: Plains-wanderer secondary habitat mapping completed for NPWS (TBDC, 2025).

Supplementary Habitat: Supplementary Habitat mapping carried out by Umwelt as described in Section 8.4.3.1 of the Amended BDAR.

Associated PCTs: PCT considered to be associated with the species based on an analysis to determine the relationship between Plains-wanderer records within the NSW BioNet Atlas of Wildlife (DEECCW, 2025), records of the species identified within the Project Area, and the State Vegetation Type Mapping (DEECCW, 2024). For the purposes of this assessment, the associated PCTs are PCT 44, PCT 46, PCT 26 (derived native grassland condition state only), PCT 28 (derived native grassland condition state only) and PCT 164.

The area of each habitat type within the Development Footprint, Subject Land, and Project Area is detailed below.

Habitat Type	Area (ha) Development Footprint	Area (ha) Subject Land	Area (ha) Project Area	Estimate Individuals (home range) – Development Footprint	Estimate Individuals (NPWS metric) – Development Footprint	Estimate of Individuals (home range) – Subject Land	Estimate of Individuals (NPWS metric) – Subject Land	Estimate of Individuals (home range) – Project Area	Estimate of Individuals (NPWS metric) – Project Area
Important Habitat	0.00	0.00	1,456.26	0	0	0	0	45	3
Secondary Habitat	138.21	873.97	3,466.43	4	0.3	27	2	108	7
Supplementary Habitat	170.86	1,148.44	4,940.21	5	0.3	35	2	137	9
Associated PCT Habitat	618.87	4,062.05	18,671.81	19	1	126	8	582	38

Item 16 Supplementary SEARs Assessment Component	Response
iii. Impacts of the Proposed Action	There is 1,456.26 ha of mapped Important Habitat within the Project Area. The Proposed Action has avoided all extents of mapped Important Habitat for the species such that no direct impacts to mapped Important Habitat will occur as a result of the Project. Notwithstanding, it expected that the mapped Important Habitat may be subject to indirect and prescribed impacts, such as impacts to connectivity, associated with the construction and operation of the Proposed Action. The Proposed Action would impact of 138.21 ha of secondary habitat. The removal of 138.21 ha of secondary habitat equates to 15% of the available secondary habitat across the Subject Land and 9% of secondary habitat across the Project Area. Based on a density estimate of between 7–108 individuals being supported within the mapped secondary habitat within the Project Area, it is estimated that the Project would impact between 0.3–4 individuals. Based on this estimate, and if considering impacts to mapped secondary habitat, between 0.1% and 0.6% of the NSW population may be impacted. The Proposed Action would result in the removal of 170.86 ha of Supplementary Habitat. There is 1,148.44 ha of Supplementary Habitat mapped across the Subject Land and 4,940.21 ha mapped across the Project Area. The removal of 170.86 ha of Supplementary Habitat equates to 15% of the available habitat across the Subject Land and 3% of habitat across the Project Area. Based on a density estimate of between 9-137 individuals being supported within the Supplementary Habitat within the Project Area, it is estimated that the Proposed Action would impact between 0.3 to 5 individuals. Based on this estimate, and if considering impacts to Supplementary Habitat, between 0.1% and 0.7% of the NSW population may be impacted. The Proposed Action would remove 618.87 ha of PCT 26 DNG, PCT 28 DNG, PCT 44, PCT 46 and PCT 164, which, based on the analysis of the relationship between Plains-wanderer records and the STVTM may be considered potential habitat for the species. There is a total of 1,848,223.03 ha of these PCTs mapped across NSW as per NSW SVTM, comprised of: • PCT 28: 418,372.27 ha • PCT 44: 496,463.26 ha • PCT 46: 386,052.38 ha • PCT 164: 547,335.11 ha. In addition, there are 18,671.81 ha of these PCTs mapped across the Project Area and 4,062.05 ha mapped across the Subject Land. While not all areas of these PCTs constitute suitable habitat for the species, the removal of 618.87 ha of potential Plains-wanderer habitat within Development Footprint equates to 15% of the available potential habitat within the Subject Land, 3% within the Project Area, and 0.03% of available potential habitat across NSW. Based on a density estimate of between 38-582 individuals being supported within the associated PCT habitat within the Project Area, it is estimated that the Proposed Action would impact between 1 to 19 individuals. Based on this estimate, and if considering impacts to potential habitat associated with PCT 26 DNG, PCT 28, PCT 44, PCT 46, and PCT 164, between 0.1% and 2.5% of the NSW population may be impacted.

Item 16 Supplementary SEARs Assessment Component	Response
	As the Proposed Action has avoided all extents of Plains-wanderer mapped Important Habitat, and given that CPHR and Commonwealth DCCEEW have advised that offsets for the species are not required, a threatened species polygon for Plains-wanderer has not been generated. Clearing for turbine pads and access roads may also cause fragmentation of Plains-wanderer habitat. Recently, radio-tracking studies have suggested that the Plains-wanderer requires a mosaic of landscape elements including denser grass swards (Nugent et al. 2022). Denser habitats may have previously been overlooked as the detection probability would be lower in these areas relative to open habitats as visual searching (either diurnal searches or nocturnal spotlighting) was used. This suggests that suitable habitat may be more connected than previously assumed. Thus, minor habitat clearings may be of less concern. It is likely to that habitat gaps only be partial movement barriers, rather than absolute barriers (i.e. gaps, as they would only be several metres wide. These gaps would be crossed at a lower rate compared to similar movement distances within intact habitat). The Plains-wanderer appears to avoid trees, generally keeping 300 m away, as trees provide perches for raptors, which prey upon the species (Baker-Gabb 2014 cited in Department of the Environment and South Australian Department of Environment, Water and Natural Resources 2016). Similarly, the construction of buildings, sub-stations, associated fencing, etc may provide raptor perches. The Proposed Action may affect fire regimes at a local scale by requiring fire management in the vicinity of turbines (e.g. increased frequency but reduced severity). The formation of pads and access tracks may affect surface water flows and sub-surface hydrology. There may be some risk of pollution during construction (e.g. fuel spills) but this would be minimal during operation. Noise during construction and/or operation may have a localised effect on habitat use by the Plains-wanderer.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Plains-wanderer: • The Project layout was specifically designed to avoid all extents of Important Habitat Mapping for Plains-wanderer. • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to maximise distance offset to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 71 (Scoping phase ID: WTG 73) moved 90.0 m south west of its original position but within the Development Corridor to maximise distance offset to nearby Plains-wanderer primary habitat. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to Plains-wanderer primary habitat and nearby threatened species records. • WTG 119 (Scoping phase ID: WTG 121) moved 108.8 m north of its original position but within the Development Corridor to maximise distance to nearby primary Plains-wanderer habitat.

Item 16 Supplementary SEARs Assessment Component	Response
	• WTG 107 (Scoping phase ID: WTG 109) moved 404.9 m north west of its original position but within the Development Corridor to maximise distance to nearby stick nests and primary Plains-wanderer habitat. Other mitigation and management actions include: • The preparation of a BMP and stand-alone Plains-wanderer Management Plan to mitigate against potential impacts to the species. • Pre-clearing surveys to relocate birds and nests. • Weed management. • Feral predator control. • Locating ancillary infrastructure outside Plains-wanderer habitat to the fullest extent possible to reduce perching opportunities for raptors. • Minimising the height of fences to reduce visibility for raptors. • Clumping ancillary infrastructure to reduce amount of habitat that would become avoided due to predation risk. • Minimising the width of access roads to reduce habitat fragmentation. • Speed limits for Project vehicles (40 km for internal (private) roads and 80 km for public roads) to reduce the risk of vehicle strikes to fauna. Ensure current site drainage patterns are retained to maintain habitat quality and distribution. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	The known presence of the species and habitat critical for the survival within the Project Area and Development Footprint has resulted in a change in design of the Proposed Action to entirely avoid all areas mapped as Important Habitat. However, the Proposed Action would result in the following residual impacts: • 138.21 ha of secondary habitat, equating to 15% of available secondary habitat across the Subject Land and 9% of available secondary habitat across the Project Area • 170.86 ha of Supplementary Habitat, equating to 15% of available secondary habitat across the Subject Land and 3% of available secondary habitat across the Project Area • 618.87 ha of associated PCTs, equating to 15% of available associated PCT habitat across the Subject Land, 3% of available associated PCT habitat across the Project Area, and 0.03% of available potential associated PCT habitat across NSW. While any indirect impacts may be moderated somewhat by the detail within the proposed BMP, impacts by the Proposed Action are likely to remain of sufficient intensity and significant impact on the Plains-wanderer is likely.

Item 16 Supplementary SEARs Assessment Component	Response
vi. Offsets proposed	As the Project has avoided all extents of Plains-wanderer mapped Important Habitat, and given that CPHR and Commonwealth DCCEEW have advised that offsets for the species are not required, a threatened species polygon for Plains-wanderer has not been generated.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	As the Proposed Action has avoided all mapped Important Habitat, offsets for Plains-wander are not required. No offset package to compensate for the significant residual impacts to Plains-wanderer is proposed. Refer to **Section 7.0** of this MNES Report and Section 11.0 of the Amended BDAR.
viii. Details of offset package to compensate for significant residual impacts	No offset package to compensate for the significant residual impacts to Plains-wanderer is proposed. Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.13 Pink Cockatoo

The Pink Cockatoo occurs in the Murray-Darling, Eyre and Bulloo River basins, from Isisford and Roma in the north, through western NSW to north-west Victoria and west to eastern South Australia. They inhabit arid and semi-arid woodlands dominated by *Acacia aneura*, mallee and box eucalypts, *Callitris gracilis* or *Casuarina cristata*. The main requirements within these vegetation types are fresh surface water and trees with suitable nesting hollows (DECCW 2024).

Suitable nesting hollows are found in trees that are large and tall relative to the typical structure or arid and semi-arid woodlands. The subspecies tend to prefer hollows that have an:

- average hollow entrance diameter 13.3 x 27.7 cm (range 8–30 x 9–80 cm)
- average hollow depth of 53.9 cm (range 19–180 cm)
- average nest chamber floor diameter of 18 cm (range 9–34 cm)
- average nest tree diameter at breast height of 72.5 cm (range 34–149 cm).

The Pink Cockatoo prefers not to nest in proximity to other breeding pairs, with breeding pairs having a home range of approximately 30 km^2. Pairs usually renest in the same area each season and stay together throughout the year. Eggs are laid in August and September (DECCW 2024).

This subspecies is associated with PCTs 10, 13, 26 and 28 and all vegetation zones evaluated as an 'ecosystem credit' species. There is 4,268.46 ha of potential habitat within the Subject Land, of which 636.40 ha occurs within the Development Footprint and will be removed. The Pink Cockatoo was not recorded during surveys carried out by Umwelt, however, was it was recorded during surveys undertaken for biodiversity assessments of proposed windfarms in the locality.

Table 8.14 Pink Cockatoo Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey requirements are not explicitly stated. Band et al. (2007) recommend vantage point surveys. Bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hours of survey effort. The Pink Cockatoo was not recorded during bird utilisation surveys. Searches for hollow bearing trees were undertaken during the habitat assessment survey and opportunistically during all other surveys. Area searches were carried out in accordance with Survey guidelines for Australia's threatened birds (DEWHA, 2010b) and were completed by 2 ecologists per survey, covering areas of tree cover to search for hollows and the presence of breeding Pink Cockatoo's. Surveys were comprised of 20 min/2 ha area searches at 12 survey locations, repeated four (4) times.

Item 16 Supplementary SEARs Assessment Component	Response
	Surveys were carried out over the following dates: • 30 September 2024 • 1–2 October 2024 • 1–2 November 2024.
Extent of habitat within Project Area	Habitat for the Pink Cockatoo has been identified in the Project Area associated with PCTs 10, 13, 26 and 28 and vegetation zones of these being 1, 2, 5, 6, 7 and 8. There is 4,268.46 ha of suitable habitat for this species within the Subject Land.
iii. Impacts of the Proposed Action	The Proposed Action will directly impact on 636.40 ha of habitat. Living or dead tree with hollows greater than 10 cm diameter may also be impacted by the Proposed Action.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Pink Cockatoo: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat.

Item 16 Supplementary SEARs Assessment Component	Response
	• Where micro-siting eventuates, the revised location of the blade of a WTG is to be at least 50 metres from the canopy of existing hollow-bearing trees; or where the proposed location of the blade of a WTG is already within 50 m of the canopy of existing hollow-bearing trees, the revised location is not to be any closer to the existing hollow-bearing trees. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	The Proposed Action would directly impact on 636.40 ha of habitat. Living or dead tree with hollows greater than 10 cm diameter may also be impacted by the Proposed Action. An AoS has been provided in Section 3.4 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Pink Cockatoo is a dual credit species, offsets can be either species credit or ecosystem credit, depending on the type of habitat being impacts. As the species was not recorded during BBUS surveys, the species is assumed to be present onsite as an ecosystem species. As such, impacts to this species will be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.14 Sharp-tailed Sandpiper

The Sharp-tailed Sandpiper are a migratory species that breed in northern Siberia, east to the Chaun Gulf and the Kolyma River delta. The species generally passages through eastern Mongolia, China, Korea, Japan, Micronesia, the Philippines and southeast Asia. In the non-breeding season, arriving in mid-August to December, approximately 91% of the East Asian – Australasian population occurs in Australia and New Zealand. They occur across the entirety of Australia, however, are most common in the south-east (DCCEEW 2024).

The species inhabits both fresh and hypersaline environments, feeding along the edge of water on mudflats, coastal and inland wetlands and sewage ponds. After rainfall events the species may also feed on areas of agricultural pasture (DCCEEW 2024).

Associated PCTs are not provided for this species. However, due to its similarity to the Australian Painted Snipe, PCTs 10, 13, 17, 24 and 160 and vegetation zones 1, 2, 3, 4 and 11 are considered suitable habitat for this species. There is 69.06 ha of potential habitat within the Subject Land, of which 8.88 ha occurs within the Development Footprint. Although the species is associated with grassland habitat the DNG vegetation zones for relevant PCTs have not been included as they would only be used opportunistically during regional flooding events, where marginal habitat may become suitable. There are 10 records of the Sharp-tailed Sandpiper within a 30 km radius of the Subject Land, however it was not observed on site.

Table 8.15 Sharp-tailed Sandpiper Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Targeted species search was not carried out specifically for the Sharp-tailed Sandpiper as survey is not required under the BAM for this migratory species. However, bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hours of survey effort. The species was not recorded during bird utilisation surveys or incidentally.
Extent of habitat within Project Area	Associated PCTs are not provided for this species. However, due to its similarity to the Australian Painted Snipe, PCTs 10, 13, 17, 24 and 160 and vegetation zones 1, 2, 3, 4 and 11 are considered suitable habitat for this species. Therefore, there is 69.06 ha of potential habitat within the Subject Land, of which 8.88 ha occurs within the Development Footprint and will be removed.
iii. Impacts of the Proposed Action	Removal of 8.88 ha of suitable habitat within the Development Footprint. The Proposed Action will impact on potential foraging habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging habitat.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Sharp-tailed Sandpiper: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records.

Item 16 Supplementary SEARs Assessment Component	Response
	Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 4.8 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Sharp-tailed Sandpiper was not recorded onsite no species-specific offsets are proposed for this species. Potential impacts to this species will be indirectly offset through the retirement of the Project's ecosystem credit obligations.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.15 Superb Parrot

The Superb Parrot is a medium-sized parrot listed as vulnerable under the EPBC Act. The core range of the Superb Parrot is west of the Great Dividing Range in NSW from Canberra and Goulburn to as far west as Nyngan and Swan Hill, that is mostly in the Riverina and south-west slopes regions. In Victoria it is largely confined to the Barmah forest area (TSSC 2016b, DAWE 2021b). The Superb Parrot also occurs in central west plains and north-west plains regions of NSW up to Coonabarabran and Narrabri.

The birds breed between September and January, with nesting typically from October to late December, mostly in the south-west slopes and Riverina regions. The Superb Parrot breeds singly or in loose colonies of up to 15 pairs with nests in hollow branches (rarely trunks) of large, living or dead trees near water. On the inland slopes, they use at least six species of eucalypts but have a particular reliance on *Eucalyptus blakelyi*. Most nest sites are within 10 km of feeding areas, that is box-gum woodland and are sometimes within it (TSSC 2016b). The same nest sites are used in successive years (DAWE 2021b).

There are three main breeding areas for the Superb Parrot (TSSC 2016b). These are included within the three global KBAs that are identified as important for the Superb Parrot, that is:

South-west slopes of NSW KBA which supports the Painted Honeyeater, a significant wintering population of the Swift Parrot (*Lathamus discolor*) and the core distribution of the Superb Parrot (DAWE 2021b). The KBA approximates an 80 km stretch of the Great Dividing Rang from Wagga Wagga to Orange, south-east through Boorowa and Yass to Queanbeyan south to Tarcutta, Gundagai, Tumut and Adelong (DAWE 2021b). The south-west slopes of NSW KBA covers an area of 25,653 km^2.

Murrumbidgee Red Gums KBA covers an area of 2,451 km^2 consisting of two stretches of the Murrumbidgee River, one west of Wagga Wagga and the other centred on Darlington Point south of Griffith (CoA 2021b). Breeding occurs along the Murrumbidgee River, between Wagga Wagga and Toganmain Station, and farther north at Goolgowi (TSSC 2016b).

Barmah-Millewa KBA covers an area of 2,635 km^2 and is defined by the river red gum forest of the Barmah-Millewa (DAWE 2021b). The Superb Parrot breeds along the Murray and Edward Rivers, from east of Barmah and Millewa State Forest to south of Taylors Bridge (NSW and Victoria) (TSSC 2016b).

In the Riverina, the majority of Superb Parrot nests are in large, living trees with many hollow branches, typically located close to a watercourse. Birds also occasionally nest in large standing dead trees. Nest sites are usually located within 10 km of box-gum woodland, primarily *Eucalyptus largiflorens*, *E. melliodora* and *E. microcarpa* or box-pine Callitris woodland. Box-gum woodlands on the inland slopes and tablelands of Victoria, NSW and ACT comprising at least six species of eucalypts including *E. camaldulensis*, *E. blakelyi*, *E. bridgesiana*, *E. albens* and *E. polyanthemos*.

Local abundance outside the breeding season is reliant upon plant productivity. The birds may migrate to *Acacia pendula* woodlands between the Murrumbidgee and Murray rivers and are rarely seen on the inland slopes during winter with most of that breeding population moving to eucalypt-pine-woodlands in west central and north central NSW (CoA 2021b) in response to availability of food.

The Superb Parrot feeds in trees and understorey shrubs and on the ground, including artificial habitats such as crops, and their diet consists mainly of grass seed and herbaceous plants (CoA 2021b).

The Superb Parrot is associated with PCTs 10, 13, 26, 28 and 46 and all vegetation zones constituting foraging habitat when assessed as 'ecosystem credit' . There is 4,268.46 ha of suitable habitat within the Subject Land, of which 636.40 ha is within the Development Footprint and will be removed. There are 14 records of this species within 30 km of the Subject Land, however this species was not observed by Umwelt during surveys.

Table 8.16 Superb Parrot Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	DCCEEW is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements) i.e. seasonal bird utilisation (vantage point) surveys. Opportunistic searches suitable hollow bearing trees during all surveys in the correct survey period. Bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With 10 vantage point locations this is a total of 480 hrs survey. The species was not recorded during bird utilisation surveys. Searches for hollow bearing trees was undertaken during the habitat assessment survey and opportunistically during all other surveys. Area searches were carried out in accordance with Survey guidelines for Australia's threatened birds (DEWHA, 2010b) and were completed by 2 ecologists per survey, covering areas of tree cover to search for hollows and the presence of breeding Superb Parrot. Surveys were comprised of 20 min / 2 ha area searches undertaken at 12 survey locations, repeated four times. Surveys were carried out over the following dates: • 30 September 2024 • 1–2 October 2024 • 1–2 November 2024.
Extent of habitat within Project Area	Habitat for the Superb Parrot has been identified in the Project Area associated with PCTs 10, 13, 26, 28 and 46 and all vegetation zones for foraging habitat. There is 4,268.46 ha of suitable habitat for this species within the Subject Land
iii. Impacts of the Proposed Action	The Proposed Action will directly impact on 636.40 ha of foraging and potential breeding habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging and potential breeding habitat. Vehicle strike could occur during construction stage. Increase of weed extent may impacts on habitat composition during construction. The extent of occurrence for superb parrots was estimated to be approximately 81,200 km^2 and the area of occupancy estimated to be 1000 km2 in the Bird Action Plan 2000. More recent estimates (using the IUCN 2 x 2 km grid method) suggest the AOO is approximately 5,360 km^2 and the EOO (using the convex hull method) is approximately 317,104 km^2.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Superb Parrot:

Item 16 Supplementary SEARs Assessment Component	Response
	• WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.

Item 16 Supplementary SEARs Assessment Component	Response
v. Significant residual impacts	An AoS has been provided in Section 4.11 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Superb Parrot is a dual credit species, offsets can be either species credit or ecosystem credit, depending on the type of habitat being impacts. As the species was not recorded during BBUS surveys, the species is assumed to be present onsite as an ecosystem species. As such, impacts to this species will be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.16 Southern Bell Frog

The Southern Bell Frog is a large sexually dimorphic frog, with females consistently reaching 100 mm snout to vent length. The species displays varied colouring, from dull olive to bright emerald green with golden-bronze patches. The skin of the frog is warty and the groin and hind skin of the thighs almost always display bright blue skin. The species is highly active and mobile, with some individuals recorded moving 1 km within a 24 hour period in favourable climatic conditions (Clemann, N. and Gillespie, G.R, 2012).

The Southern Bell Frog was once abundant throughout the Murray and Murrumbidgee rivers and their tributaries, but has undergone a reduction in population size, and now can only be found in a small number of locations throughout its former range, predominantly on private land (DEC 2005).

The Southern Bell Frog inhabits various wetland environments within its distribution range. Specifically, in the western part of its habitat, this species occurs in or around permanent or ephemeral black box/lignum/nitre goosefoot (swamps, as well as Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys (DEC 2005). These frogs prefer sites with emergent, submerged or floating vegetation, with slow flowing or still water. The species also occupies manmade habitats such as farm dams and irrigated crop land and channels in locations where natural habitat is scarce. Overwintering habitat for the species is largely unknown, but likely occurs within dense vegetation, soil cracks or ground debris.

For western populations, the species predominantly occupies refugia during dry periods, seeking shelter in permanent waterbodies, vegetation, ground debris and cracking soils. Large rainfall events and subsequent flooding trigger mass-dispersal and breeding, and during these times Southern Bell Frogs may recolonise previously unoccupied areas. During breeding events male frogs will call in chorus from the edges of flooded waterbodies or floating emergent vegetation. Females lay up to 4000 eggs, contained within a jelly raft which breaks up and sinks after fertilization. Tadpoles emerge within four days. Metamorphosis of tadpoles typically takes up to 14 months, however, can be as short as two months in response to adverse conditions such as drying waterbodies or high competition.

The Southern Bell Frog was recorded within almost all waterbodies within the subject land, with multiple instances of males chorusing, gravid females and amplexus (mating embrace exhibited by Southern Bell Frogs). Individuals were observed predominantly on the edges of and within farm dams with minimal fringing vegetation, and on the edges and within the Coleambally Outfall Drain.

Threats to the Southern Bell Frog include habitat loss and fragmentation, habitat degradation, altered flooding regimes, predation by introduced fish, extended drought periods, chemical populations in water bodies, salinisation and disease, particularly Chytridiomycosis caused by the Chytrid fungus (*Batrachochytrium dendrodatidis*).

Table 8.7 Southern Bell Frog Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Aural-visual surveys total 480 minutes per 500 m transect, repeated four times. Aural-visual surveys at all water bodies within the development corridor. This species was widely recorded. Repeat nights were only undertaken when the species was not recorded on the first night. This species was recorded in the Subject Land.
Extent of habitat within Project Area	Habitat for the Southern Bell Frog has been identified in the Project Area associated with PCTs 10, 13, 17 and 24 and vegetation zones 1, 2, 3 and 4. There is 374.05 ha of suitable habitat for this species within the Subject Land.
iii. Impacts of the Proposed Action	The Proposed Action will directly impact on 52.16 ha of habitat.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Southern Bell Frog: • WTG 23 (Scoping phase ID: WTG 24) moved 31.8 m south-south-west of its original position but within the Development Corridor to minimise disturbance in potential Southern Bell Frog habitat. • WTG 28 (Scoping phase ID: WTG 29) moved 88.9 m north-east of its original position but within the Development Corridor to maximise distance offsets to nearby stick nest, whilst continuing to avoid potential Southern Bell Frog habitat. • WTG 71 (Scoping phase ID: WTG 73) moved 90.0 m south west of its original position but within the Development Corridor to maximise distance offset to potential Southern Bell Frog habitat. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to potential Southern Bell Frog habitat. • WTG 132 (Scoping phase ID: WTG 133) moved 119.1 m south west of its original position but within the Development Corridor to maximise distance to potential Southern Bell Frog habitat. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery.

Item 16 Supplementary SEARs Assessment Component	Response
	• Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	An AoS has been provided in Section 3.2 of **Appendix 2**. The assessment has concluded that the Proposed Action is likely to have a **significant impact** on the species.
vi. Offsets proposed	Impacts to Southern Bell Frog would be offset through the retirement of 1,426 species credits. Refer to **Section 7.0** of this MNES Report and Section 11.0 of the Amended BDAR
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring 1,426 like-for-like species credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.17 Southern Whiteface

The Southern Whiteface is small thornbill-like bird with a brown dorsum, white belly, dark brown wings and a black tail with a narrow white tip. Adult birds reach 11.5 cm in length with a cream colour eye, grey legs and a stubby dark grey bill. The species occurs across much of mainland Australia south of the tropics, from the north-eastern edge of the Western Australia wheatbelt, east to the Great Dividing Range. They inhabit a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. Generally dominated by acacias or eucalypts on ranges, foothills and lowlands and plains (DCCEEW, 2023c).

Southern Whiteface feed on invertebrates, foraging almost exclusively on the ground, favouring habitat with low tree densities and herbaceous understorey litter cover (DCCEEW, 2023c). Breeding predominately takes place between July and October throughout the species range, with nests generally being built in hollows and crevices (DCCEEW, 2023c).

Habitat critical to the survival of the Southern Whiteface include areas of:

- Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both.
- Habitat with low tree densities and herbaceous understorey litter cover which provides essential foraging habitat.
- Living and dead trees with hollows and services which are essential for roosting and nesting.

The southern whiteface is associated with is associated with all PCTs and vegetation zones within the Subject Land. There is 4,268.46 ha of potential habitat within the Subject Land, of which 636.40 ha occurs within the Development Footprint and would be removed. This species was observed on site during surveys conducted by Umwelt.

Table 8.17 Southern Whiteface Supplementary SEARs Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Targeted species search was not carried out specifically for the Southern Whiteface as it is an ecosystem-credit species. However, bird utilisation surveys were undertaken seasonally from March 2022 to February 2024. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. Two of the eight survey periods occurred within the breeding period. With ten vantage point locations this is a total of 480 hours of survey effort. This species was **recorded** in the Subject Land.
Extent of habitat within Project Area	No associated PCTs for the Southern Whiteface have been stated in the TBDC at the time of writing. Hence, it is conservatively assumed that they have the potential to use all PCTs within the Subject Land. Therefore, there is 4,268.46 ha of potential habitat available.
iii. Impacts of the Proposed Action	636.40 ha of potential habitat occurs within the Development Footprint and will be removed by the Proposed Action. The Proposed Action will impact on the foraging and potential breeding habitat of the species. Removal of habitat from clearance for turbines could reduce the availability of foraging and potential breeding habitat. Vehicle strike could occur during construction stage. Increase of weed extent may impacts on habitat composition during construction. The extent of occupancy is estimated to be 4,910,000 km^2 with a stable trend and the area of occupancy is estimated to be 70,000 km^2 with a contracting trend. Removing 636.40 ha (6.36 km^2) potential habitat would result in a 0.01% reduction in the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the southern whiteface national population.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including Southern Whiteface:

Item 16 Supplementary SEARs Assessment Component	Response
	• WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants. • Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided in Section 7.4 of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.

Item 16 Supplementary SEARs Assessment Component	Response
v. Significant residual impacts	Removing 636.40 ha (6.36 km^2) potential habitat would result in a 0.01% reduction in the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the Southern Whiteface national population. An AoS has been provided in Section 4.10 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As Southern Whiteface is an ecosystem credit species, impacts to this species would be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

8.2.18 White-throated Needletail

The White-throated Needletail is a migratory swift which breeds in north-east Asia and spends the non-breeding season in eastern and south-eastern Australia. It occurs in coastal regions of NSW extending inland to the western slopes of the Great Dividing Range from October/November to mid-March/April with numbers typically peaking during February and March (TSSC 2019). The white-throated needletail roosts in trees amongst dense foliage in the canopy or in hollows (TSSC 2019). The number of White-throated Needletail observed in Australia has declined by an estimated 74% since the 1950s primarily due to large-scale deforestation of its breeding habitat (Tarburton 2014).

In Australia, the White-throated Needletail is mostly aerial from heights of less than one metre up to more than 1,000 m above the ground mostly above wooded areas (TSSC 2019). Due to its flight behaviour the White-throated Needletail is particularly vulnerable to blade strike and is disproportionally represented in Australian blade strike data (Hull et al 2013). A high proportion of the White-throated Needletail flight activity is at RSA height.

The White-throated Needletail is associated with all PCTs and vegetation zones within the Subject Land. There is 4,268.46ha of suitable habitat within the Subject Land, of which 636.40 ha occurs within the Development Footprint and would be removed. There are five records of the species within 30 km of the Subject Land, however it was not recorded by Umwelt during surveys.

Table 8.18 White-throated Needletail Supplementary SEARS Assessment

Item 16 Supplementary SEARs Assessment Component	Response
ii. Survey Methods	Survey requirements are not explicitly stated. Seasonal bird and bat utilisation surveys were undertaken. Each of the 10 vantage point survey locations were surveyed for 1 hour six times per survey period (eight in total). This equates to 48 hours of survey per vantage point survey location. With 10 vantage point locations this is a total of 480 hours of survey effort. The White-throated Needletail was not recorded during BBUS.
Extent of habitat within Project Area	Habitat for the White-throated Needletail has been identified in the Project Area associated with all PCTs and vegetation zones. There is 4,268.46 ha of suitable habitat for this species within the Subject Land, with 636.40 ha of this occurring within the Development Footprint.
iii. Impacts of the Proposed Action	The Proposed Action would directly impact on 636.40 ha of suitable habitat over which the species can forage. The main potential impact to the White-throated Needletail is the reduction in aerial space it may disperse through due to the presence of wind turbines, as well as mortality from blade strike.
iv. Avoidance, Mitigation and Management Measures	Below outlines specific design refinements made by BWF during the development of the Amended BDAR and EIS to avoid and minimise impacts to biodiversity values, including White-throated Needletail: • WTG 34 (Scoping phase ID: WTG 35) moved 161.6 m east-south east of its original position but within the Development Corridor to avoid threatened species records. • WTG 35 (Scoping phase ID: WTG 36) moved 50.2 m north-north west of its original position but within the Development Corridor to avoid threatened species records. • WTG 79 (Scoping phase ID: WTG 81) moved 53.2 m south west of its original position but within the Development Corridor to avoid threatened species records. • WTG 115 (Scoping phase ID: WTG 118) moved 188.0 m north east of its original position but within the Development Corridor to maximise distance offset to nearby threatened species records. Additional mitigation and management measures include: • Native vegetation removal will be minimised through detailed design. Avoidance and minimisation of further clearing of vegetation by utilising the existing tracks for cabling corridors and access tracks. • The preparation and approval of a BMP prior to construction. • Any unexpected threatened species that are found during construction, will halt work immediately in the vicinity of the discovery. • Exclusion zones within the Development Footprint marked by a qualified surveyor, with specific exclusion zones for known areas of threatened fauna habitat. • Pre-clearance surveys will be conducted by a qualified ecologist, prior to daily construction. • Prior to all vegetation removal, pre-clearance inspections will be undertaken by a suitably qualified professional. • Where possible, trim vegetation rather than clear or removal whole plants.

Item 16 Supplementary SEARs Assessment Component	Response
	• Micro-siting will be used to minimise the construction of access roads, stockpiles, vehicle parking, site compounds, hardstands and WTGs to avoid unnecessary removal or impacts to native vegetation and/or fauna habitat. • Retain dead trees and tree trunks where practical. • Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of a CSWMP detailed in the CEMP and implemented in consultation with BCS. • Permanent bush fire protections will be implemented during construction. • Speed limits on all access tracks to reduce the risk of vehicle strikes to fauna. A BBAMP will be implemented to measure any impacts on aerial fauna by the Proposed Action. The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD. The BBAMP will be prepared following approval of the Proposed Action in consultation with relevant government agencies, however, a conceptualisation of the BBAMP is provided below Section 7.4. of the Amended BDAR. Further details of avoidance, mitigation and management measures are provided in Section 7.0 and Section 9.0 of the Amended BDAR report (specifically Table 9.1), as well as **Section 5.0** of this MNES Report.
v. Significant residual impacts	Direct and indirect impacts from wind farms are known threats to White-throated Needletail (TSSC 2019). No individuals were recorded during surveys therefore the Subject Land may only be occasionally used by this species. An AoS has been provided in Section 4.12 of **Appendix 2**. The assessment has concluded that the Proposed Action is unlikely to have a significant impact on the species.
vi. Offsets proposed	As White-throated Needletail is an ecosystem credit species, impacts to this species would be offset through the retirement of the Proposed Action's credit obligation.
vii. How the NSW BAM has been applied in accordance with objects of the EPBC Act to offset residual impacts	The Amended BDAR specifically addresses Section 10 of the BAM and provides information on the application of the no net loss standard and the project biodiversity offset obligations. This will be achieved through retiring like-for-like ecosystem credits.
viii. Details of offset package to compensate for significant residual impacts	Refer to **Section 7.0** of this MNES Report and Section 12.0 of the Amended BDAR.

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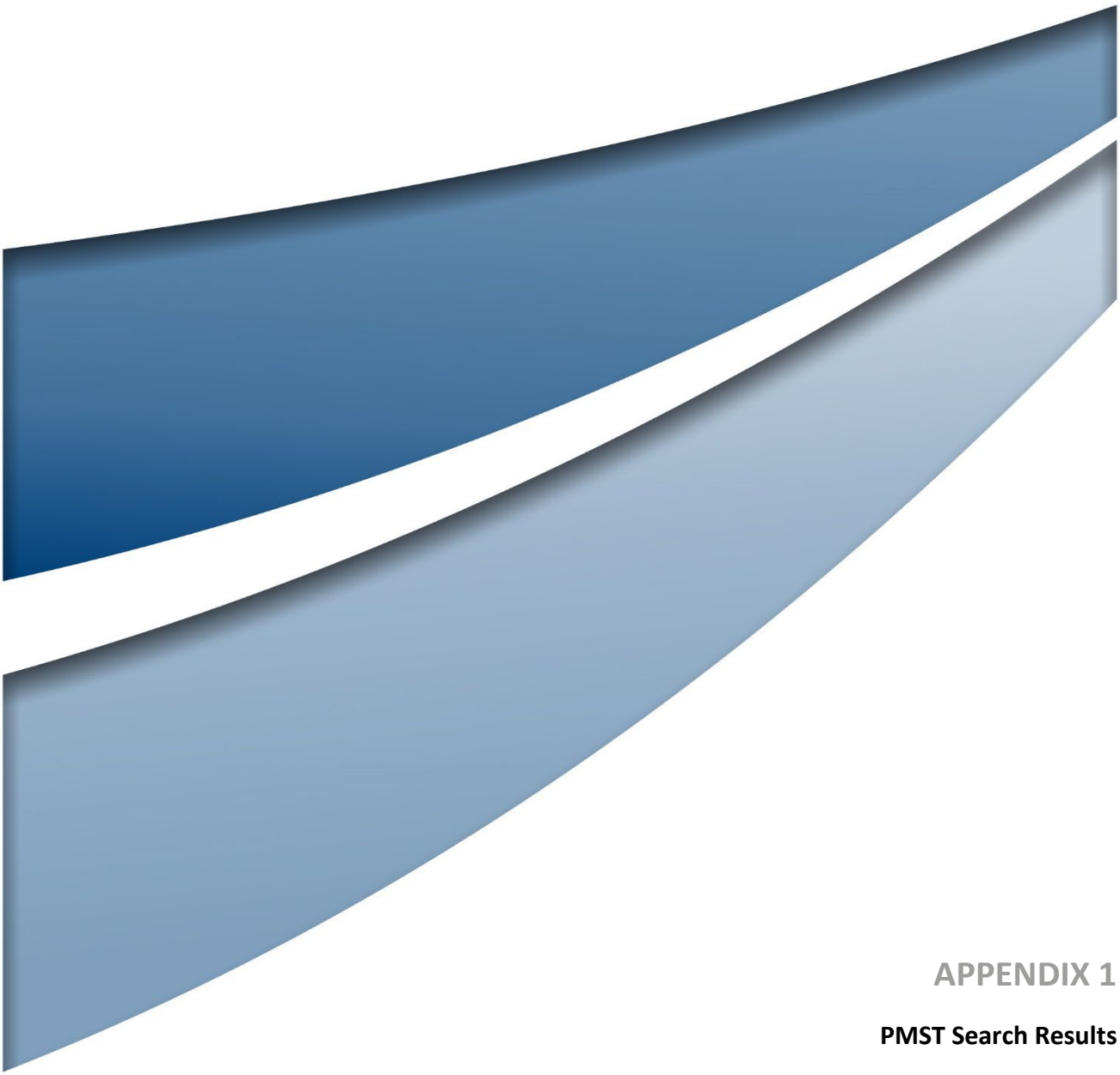

APPENDIX 1

PMST Search Results

EPBC Act Protected Matters Report

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

Report created: 20-Jan-2025

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

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	37
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	13
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	400 - 500km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	200 - 300km upstream from Ramsar site	In feature area
Riverland	300 - 400km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Natural Grasslands of the Murray Valley Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Craterocephalus fluviatilis Murray Hardyhead [56791]	Endangered	Species or species habitat may occur within area	In buffer area only
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
Litoria raniformis Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
PLANT			
Austrostipa wakoolica [66623]	Endangered	Species or species habitat may occur within area	In feature area
Brachyscome papillosa Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat known to occur within area	In feature area
Maireana cheelii Chariot Wheels [8008]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sclerolaena napiformis Turnip Copperburr [11742]	Endangered	Species or species habitat may occur within area	In feature area
Solanum karsense Menindee Nightshade [7776]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat known to occur within area	In feature area
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Telstra Corporation Limited [15351]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma			
Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Oolambeyan	National Park	NSW	In feature area
South West Woodland	Nature Reserve	NSW	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Bullawah Wind Farm	2022/09423		Assessment	In feature area
Conargo Wind Farm and Battery	2024/10001		Assessment	In buffer area only
Dinawan Wind Farm	2023/09537		Assessment	In buffer area only
EnergyConnect NSW - Eastern Section	2020/8766		Post-Approval	In feature area
New transmission infrastructure ? Victoria NSW Interconnector ? West (NSW)	2024/09871		Assessment	In buffer area only
Pottinger Solar Farm	2023/09678		Referral Decision	In feature area
Pottinger Wind Farm	2023/09679		Assessment	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
The Plains Solar Farm	2023/09584		Assessment	In buffer area only
The Plains Wind Farm	2022/09404		Assessment	In buffer area only
Yanco Delta Wind Farm	2022/09214		Post-Approval	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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APPENDIX 2

MNES Assessment of Significance

umwelt
Environmental & Social Consultants

BayWa r.e.

BULLAWAH WIND FARM PROJECT

EPBC Act Assessments of Significance

FINAL

August 2025

BULLAWAH WIND FARM PROJECT

EPBC Act Assessments of Significance

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Bullawah Wind Farm Pty Ltd

Project Director: Nathan Baker
Project Manager: Thomas Buchan
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Report No. 22110/R43/Appendix E/Appendix 2
Date: August 2025

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Disclaimer

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	Name	Date	Name	Date
Final	Bill Wallach	4 April 2025	Nathan Baker	4 April 2025
V2 (Revised Final)	Rachel Musgrave	27 August 2025	Nathan Baker	28 August 2025

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1.0 Guidance to the MNES Impact Assessment

The Significant Impact Guidelines for MNES (CoA 2013) provide overarching guidance on determining whether an action is likely to have significant impacts on an MNES. The definitions and concepts as outlined in the Significant Impact Guidelines 1.1 (CoA 2013) that have been applied in these assessments are summarised in **Table 1.1**.

Table 1.1 Significant Impact Guidelines

Term	Definition or concept
Significant impact	A significant impact is an impact which is important, notable, or of consequence, having regard to its context or intensity. A significant impact is likely if there is a real or not remote chance or possibility. In determining this the following matters are considered: • The sensitivity of the environment which would be impacted. • The timing, duration and frequency of the action and its impacts. • All on-site and off-site impacts. The total impact which can be attributed to the action over the entire geographic area affected and over time. • Existing levels of impact from other sources. • The degree of confidence with which the impact of the action are known and understood.
A population of an endangered or critically endangered species	A population of a species is an occurrence of the species in a particular area. Occurrences of the species are not limited to: • a geographically distinct regional population, or collection of local populations, or • a population, or collection of local populations, that occurs within a particular bioregion.
An important population of a vulnerable species	In the case of a vulnerable species, an important population is a population that is necessary for a species' long-term survival and recovery. This may include populations that are: • key source populations either for breeding or dispersal, or • populations that are necessary for maintaining genetic diversity, and/or • populations that are near the limit of the species range.
Important habitat for migratory species	An area of 'important habitat' for a migratory species is: • habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species and/or • habitat that is of critical importance to the species at particular life-cycle stages, and/or • habitat utilised by a migratory species which is at the limit of the species range, and/or • habitat within an area where the species is declining.

Term	Definition or concept
Population of a migratory species	The entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.
Habitat critical to the survival of a species or ecological community	Habitat critical to the survival of a species or ecological community refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community. Such habitat may be but is not limited to: • habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community, and/or • habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.
Register of Critical Habitat	Section 207A of the EPBC Act provides for a register of critical habitat including the location and extent information based on up to date scientific information available to the Threatened Species Scientific Committee and the Minister. At the time of preparation of this assessment there are only five areas of critical habitat listed in the register. None of the threatened species and ecological communities assessed in this assessment are included in the register of critical habitat.

2.0 Critically Endangered or Endangered Ecological Communities

2.1 Weeping Myall Woodlands

2.1.1 Relevant Guidelines and Policy Statement

Relevant guidelines and policy statements available for this MNES include:

- Approved Conservation Advice for Weeping Myall Woodlands ecological community (DEWHA 2008).
- Adopted/made threat abatement plans:
    - Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (2017) (DoEE 2017b).
    - Threat abatement plan for disease in natural ecosystems caused by *Phytophora cinnamomi* (DoEE 2018).

2.1.2 Potential Impact

- Earthworks, foot traffic, plant or vehicle movements may lead to introduction or spread of weed species that would reduce the quality and integrity of adjacent native vegetation, EECs and habitat during the construction phase (Short term, permanent) across Zones 1–12.
- Transport of weeds and pathogens from the site to adjacent vegetation, which may reduce the quality of native vegetation, EEC's and habitat for native fauna species. This impact is expected to occur throughout the construction and operational phase.
- Edge effects may result in increased competition between native fauna species for resources and displacement of native fauna species during the operational phase (long term, permanent).
- Increased fire risk due to the use of machinery (particularly in summer), the storage and utilisation of flammable materials on site and human-caused fires during the construction and operational phase.
- Pollutant spills during the construction and operational phase may contaminate and change the composition of soils, resulting in detrimental impacts to native vegetation.

2.1.3 Significant Impact Criteria Consideration

Table 2.1 Assessment of Significance for Weeping Myall Woodlands

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:
reduce the extent of an ecological community
A total of 42.56 ha of Weeping Myall Woodlands occurs within the Subject Land. Approximately 4.92 ha of this is expected to be impacted within the Development Footprint of the Proposed Action. The estimated total current national extent of Weeping Myall Woodlands is estimated to be between 220,000 and 361,000 ha, of which 190,000–330,000 ha are known to occur within NSW (Benson 2006) (TSSC 2009). The permanent loss of up to 4.92 ha EEC as a result of the Proposed Action represents a low reduction in the estimated current extent of the community across its national range, and is unlikely to significantly reduce the extent of the ecological community.
Fragment or increase fragmentation of an ecological community
The direct impacts from the Proposed Action would clear linear extents of Weeping Myall Woodlands, with widths being up to 25 m wide in areas of access tracks, and up to 350 m wide in areas around turbines. This clearing would further fragment patches of the EEC, reducing connectivity by these distances around the Development Footprint.
Adversely affect habitat critical to the survival of an ecological community
No areas of habitat are identified as important habitat in TSSC 2006. Within the Project Area the area of TEC to be impacted is similar to broader extents of the TEC. This extent of the EEC occurs within a broader pattern of occurrence within the Hay Plain that likely also supports similar habitat values.
Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
Section 6.9 of the EIS indicates that with implementation of mitigation and management measures that impacts to surface water would be adequately managed during construction and impacts during operation would be limited to runoff and associated localised erosion from impervious surfaces, and accidental chemical spills. Impacts to groundwater during construction and operation are assessed as unlikely as groundwater is very unlikely to be intercepted. The effects of increased shadow cast by turbines are unlikely to modify solar access to the degree that the community's survival is significantly impacted. These potential limited changes to hydrology are unlikely to have a significant impact on abiotic factors necessary for the ecological community's survival both within the Development Footprint or more widely.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, or
The clearing for construction and operation, along with potential indirect impacts such a changes in solar access, hydrology, and competition from changes in weeds and pest species would not cause a substantial change in the species composition or functionality of important species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species that are harmful to the listed ecological community to become established, or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
Vegetation clearing, and vegetation change as a result of associated landform change to manage drainage, would be restricted to the Development Footprint. There is potential for these changes within the Development Footprint to support increased numbers of existing weeds within the project boundary and introduce species not yet established elsewhere within the project boundary. Increased numbers of weeds within the Development Footprint could also increase risk through increased propagules such as seeds to areas within the project boundary. Management of weeds within this Development Footprint would occur as per the BMP.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:
Interfere with the recovery of an ecological community.
No recovery plan has been prepared for the TEC. The approved conservation advice notes priority recovery and threat abatement actions required for the listed ecological community. Relevant ones to the project include: • Protecting remnants of the listed ecological community through the development of conservation agreements and covenants. • Protecting remnants from weeds including the speedy eradication of any new invasions. • The Proposed Action would not protect any remnants of the EEC, but would directly impact 4.92 hectares. The Proposed Action may increase the risk of weed competition through its construction and operation across the development corridor and potentially the Proposed Action boundary, but these should be managed at least within the Development Footprint by the proposed BMP at least within the Development Footprint. The Proposed Action is therefore likely to interfere with the recovery of the community.
Conclusion:
The Proposed Action would likely: • reduce the extent of Weeping Myall Woodlands • fragment or increase fragmentation of Weeping Myall Woodlands • interfere with the recovery of Weeping Myall Woodlands. As such the Proposed Action is **likely** to have a significant impact on Weeping Myall Woodlands.

3.0 Critically Endangered and Endangered Species

3.1 Winged Peppercress

3.1.1 Relevant Guidelines and Policy Statements

- Relevant guidelines and policy statements available for this species include:
- National Recovery Plan for the Winged Peppercress *Lepidium monoplocoides* (Mavromihalis 2010).
- Adopted/made threat abatement plans:
    - Threat abatement plan for competition and land degradation by Rabbits (2016) (DoEE 2016).
    - Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (2017) (DoEE 2017).

3.1.2 Potential Impacts

Potential impacts for this species include:

- The direct removal of 3.52 ha of suitable habitat in the Development Footprint.
- Habitat destruction and degradation associated with the clearing of grassland and grassy woodlands habitats across the inland plains of NSW as part of construction and/or roadworks.
- Altered hydrology of sites that are seasonally wet including floodplains through change in flooding regimes through irrigation or draining.
- Habitat degradation through invasive weed species, particularly exotic annual grasses.
- Population declines via reduced seed production through defoliation from increased grazing by rabbits.
- Physical damage by vehicle collision due to increased off-road vehicle movements and livestock trampling due to changes in agricultural practices.

3.1.3 Significant Impact Criteria Consideration

For the purpose of this assessment the following assumptions have been made:

- Thirteen general locations of about 6,000 individuals have been identified in Mavromihalis (2010).
- No habitat that is critical to the survival of this species is provided, but Mavromihalis (2010) has identified that all 13 known locations are important and required for the conservation of the species. This presumes that all individuals on site are part of a population critical to the survival of the species, and by extension habitat critical to the species.

- No area of occupancy is provided.
- The plants in the project boundary are considered part of population of this species with records at least from Lake Urana to the east of the site to recent records to the west of the site around Cobb Highway and includes at least the collection of local populations (such as any presumed present in the Development Footprint) within the Hay Plain and more widely in the Riverina Bioregion.

Table 3.1 Assessment of Significance for Winged Peppercress

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
lead to a long-term decrease of a population
The population size of the Winged Peppercress was estimated in 2010 to be <6,000 plants nationally with approximately <3,000 in Victoria and <3,000 in New South Wales (Mavromihalis 2010) although the population at many localities appears dynamic. The species has been recorded in the subject land during two-phase grid-based systematic surveys. The National Recovery Plan for the Winged Peppercress states that all 13 known locations are considered important populations and are required for the conservation of the Winged Peppercress. 1,355 individuals were recorded during surveys in the survey corridor and a total of 3.52 ha of suitable habitat is expected to be impacted within the Development Footprint. 1,435 individuals represent approximately 24% of the estimated national population for the species (Mavromihalis 2010). The density of individuals across the 3.52 ha of habitat was low with most individuals clustered in three main locations. It was also noted that individuals were typically present near areas of very open vegetation and/or non-saline scalds. The number of individuals observed in the survey corridor may be an underestimation compared to other less cryptic species, but that is speculative. The apparent dynamic nature of the species' populations and the very patchy nature of its occurrence within broadly suitable assemblages suggests that habitat, (including specific habitat features like vegetation density which may also be dynamic), is important even if not currently occupied. The removal of habitat whether occupied or not, along with the importance of all individuals nationally, suggests that any loss of individuals and habitat may be significant and may lead to a long-term decrease of a population.
reduce the area of occupancy of a population
Approximately 42.09 ha of habitat for the Winged Peppercress was identified in the Subject Land. Of this potential habitat it has been determined that, 3.52 ha would be directly disturbed. For a species that appears to have the capacity for dynamic populations with our poor understanding of seedling recruitment, seed ecology and dispersal, it is difficult to estimate the area of occupancy. As such, the reduction of habitat and individuals is precautionarily presumed to be a significant reduction in the area of occupancy of the species.
fragment an existing population into two or more populations
As the known occurrences on site are relatively clustered, it is unlikely that the impact to suitable habitat and known individuals on site would result in the fragmentation of the existing population into two or more populations
adversely affect habitat critical to the survival of a species
As this is considered an important population, actions that impact critical habitat including grasslands, wetlands and floodplain woodlands could impact the survival of the species. A total of 3.52 ha of suitable habitat is expected to be impacted by the Proposed Action, which adversely affect habitat critical to the survival of the species

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
disrupt the breeding cycle of a population
The Proposed Action is to impact 3.52 ha of habitat described above. For those plants and habitat occurring within the Development Footprint that are not cleared, the breeding cycle could possibly be disrupted by soil disturbance affecting residual short-lived soil-stored seed bank. The National Recovery Plan for the Winged Peppercress states that seasonally wet habitat with regular wetting and drying cycles is required to maintain open habitat and facilitate seed germination. It is expected that some seed remains formant in the soil for several years. Indirect impacts to soil profiles and soil hydrology are expected to be minimal and so indirect impacts to the breeding cycle as a result outside the Development Footprint are expected to be limited. It should be noted that assessing the occurrence of above-ground plants is largely limited to the targeted area of survey (survey corridor) and that no incidental observations of the species occurred outside the survey corridor. The species is small and skeletal so may be cryptic, particularly if growing amongst any other vegetation, so it is feasible that this species is difficult to see relative to other threatened flora species; most plants were noted in high contrast brown-red soils with little leaf litter or vegetation. The adult individuals on site appear clustered within three main areas. It is difficult to assess the extent of soil-stored seed, the abundance of individuals outside the survey corridor (none were incidentally noted), and long-term intergenerational site fidelity. As such it is also difficult to determine the relative importance of specific locations identified as habitat (species polygons) whether they are currently occupied or not. Precautionarily, if it is assumed that there is strong fidelity to a location over time then it is likely that significant impacts to the species' breeding cycle. If there were many more individuals present outside the survey corridor such that those individuals and habitat affected in the Development Footprint weren't as important to the population, then there may be less significant disruption to the population's breeding cycle but that is speculative and cannot be ascertained. As such it is likely that the Proposed Action may disrupt the breeding cycle of the population.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
As discussed above, 3.52 ha of habitat would be directly impacted with up to 24% of the estimated national population (Mavromihalis 2010) being impacted, noting the limitation that it is likely that not all plants were identified during the survey. Using number of individuals as a surrogate for habitat area, this would be a significant reduction in habitat such that the species is likely to decline.
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
The National Recovery Plans outlines that grazing from rabbits and livestock and habitat degradation through weed invasion as the main threats to the Winged Peppercress. Rabbits are known to occur across the site, and the project may result in an increase in grazing pressure from rabbits. While the BMP would aim to mitigate impacts from invasive species, the Proposed Action may also increase the extent of exotic annual grasses through colonisation of the disturbed areas during the construction and operation phase. The National Recovery Plan outlined the following management practices to reduce impacts by invasive species: • Weed control. • Controlling grazing pressure, both from livestock and other herbivores. • Burning or light seasonal grazing to reduce plant competition and maintain an open sward. The appropriate management of invasive species detailed in the Recovery Plan should be included in the BMP and CEMP to reduce harmful impacts to Winged Peppercress.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
introduce disease that may cause the species to decline
According to the National Recovery Plan for the Winged Peppercress (Mavromihalis 2010) there are no diseases which the species is susceptible to. It is not anticipated that the proposed works would not result in the introduction of disease, pathogens or parasites that would directly affect the species.
interfere substantially with the recovery of the species
Impact to a critical habitat and population may substantially interfere with the recovery of the species. The Overall Objective of recovery is to minimise the probability of extinction of the Winged Peppercress in the wild and to increase the probability of populations becoming self-sustaining in the long term. One of the specific objectives to achieve this is to "Manage threats to populations". The Proposed Action would interfere with this specific objective as it is clearing relatively large numbers of individuals and habitat and so it is likely to substantially interfere within the recovery of the species.
Conclusion
The Proposed Action would likely: • cause a long-term decrease of a population • reduce the area of occupancy of a population • adversely affect habitat critical to the survival of a species • disrupt the breeding cycle of a population • modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is likely to significantly decline • may result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat • interfere substantially with the recovery of the species. As such the Proposed Action is **likely** to have a significant impact on *Lepidium monoplocoides.*

3.2 Australian Painted Snipe

3.2.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Sustainability, Environment, Water, Population and Communities (2013). Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe).
- Threatened Species Scientific Committee (TSSC) (2013). Commonwealth Listing Advice on *Rostratula australis* (Australian Painted Snipe).
- Department of Climate Change, Energy, the Environment and Water (2022). National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*).
- No Threat Abatement Plan has been identified as being relevant for this species.

3.2.2 Potential Impacts

Potential impacts to this species include:

- The direct removal of 8.88 ha of potential habitat within the Development Footprint.
- Potential vehicle collision, resulting in injury or mortality, along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Australian Painted Snipe to them.
- Noise during construction and/or operation may have a localised effect on remaining habitat in the Subject Land.
- Altered hydrology of sites that are seasonally wet including floodplains through change in flooding regimes through irrigation or draining.
- Moderate risk of being impacted wind turbine blade strike (see BDAR Appendix D).

3.2.3 Significant Impact Criteria Considerations

For the purpose of this assessment the following assumptions have been made:

- The national population of Australian Painted Snipe is considered one population.
- In 2020, the population was estimated in the Recovery Plan to be 340 (range 270-410) mature individuals.
- In 2011 the extent of occurrence was estimated to be 7,100,000 km^2 and stable. The area of occupancy was estimated to be 2,000 km^2 and decreasing. There are not more recent estimates.
- Habitat considered critical to the survival of the Australian Painted Snipe includes:
    - Any natural wetland habitat that is within the area the species is mapped as known or likely to occur. The Subject Land contains known or likely habitat.
    - Any location outside the above area that may be periodically occupied by Australian Painted Snipe when wetland conditions are favourable.

Table 3.2 Assessment of Significance for Australian Painted Snipe

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of a population
There is a small number of mature individuals estimated to be left in the wild. However, only a small amount of potential habitat would be removed, and potential habitat would remain within the Subject Land. Given that the species is mobile, it is very unlikely that injury or mortality would occur during construction, and it is considered to have a moderate risk of being impacted by turbine strike. The Proposed Action is therefore unlikely to lead to a long-term decrease in the size of the population.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
reduce the area of occupancy of a population
The area of occupancy of the Australian Painted Snipe is 2,000 km^2. The removal of 8.88 ha (0.09 km^2) of potential habitat would result in a <0.01% reduction in the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the national population.
fragment an existing population into two or more populations
The removal of such a small amount of habitat is unlikely to fragment the existing population into two, particularly given that suitable habitat would remain within the Subject Land and within the surrounding region. Further, the species is highly mobile.
adversely affect habitat critical to the survival of a species
Potential habitat within the Subject Land is considered critical to the survival of the species, as they are wetlands that occur within mapped likely or known habitat. Therefore, The Proposed Action would adversely affect 8.88 ha of critical habitat.
disrupt the breeding cycle of a population
The Murray-Darling region is a key area for breeding, however the species has quite niche breeding habitat requirements that are unlikely to be present in the Subject Land and Development Footprint. They are known to occasionally nest in flooded grazing land, hence potentially suitable nesting habitat would remain within the region. The Proposed Action is therefore unlikely to disrupt the breeding cycle of the Australian Painted Snipe.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The removal of this small amount of potential habitat is unlikely to lead to a decline in the species. The Proposed Action would however modify the airspace above and around the wind farm such that Australian Painted Snipe may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'moderate' risk of impact to blade strike and barotrauma within Appendix D. No Australian Painted Snipe were recorded during the bird utilisation surveys completed for the Proposed Action, and there are no records for the species within 30 km of the Project Area on BioNet Wildlife Atlas.
result in invasive species that are harmful to a species becoming established in the species' habitat
The Conservation Advice states that predation by cats and foxes is a threat to the Australian Painted Snipe. Also, invasive weeds are considered to be a threat. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
No diseases are listed in the Conservation Advice as a key threat to this species. Further, The Proposed Action is unlikely to introduce any diseases into the Subject Land.
interfere substantially with the recovery of the species
The overarching vision of the Recovery Plan for this species is to increase the population size of the Australian Painted Snipe to an extent that the species is no longer listed as threatened under the EPBC Act. The main objectives are: • Manage and protect known Australian Painted Snipe habitat at the landscape scale. • Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions. • Reduce, or eliminate threats at breeding and non-breeding habitats.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
• Undertake research to improve knowledge of the habitat requirements, biology and behaviour of Australian Painted Snipe. • Engage community stakeholders to improve awareness of the conservation of Australian Painted Snipe. • Coordinate, review and report on recovery progress. The Proposed Action would lead to the removal of 8.88 ha of potential habitat, however it is not known to be utilised by the species. It is unlikely that the Proposed Action would interfere with any of the recovery objectives listed in the Recovery Plan and therefore is unlikely to interfere substantially with the recovery of the species.
Conclusion
The Proposed Action will: • not cause a significant long-term decrease of a population • cause a relatively minor reduction of the area of occupancy of a population • not fragment an existing population into two or more populations • adversely affect habitat critical to the survival of a species, however only a relatively small amount • not disrupt the breeding cycle of a population • not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. Therefore, it is **unlikely** that the Proposed Action would significantly impact the Australian Painted Snipe.

3.3 Pink Cockatoo

3.3.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Lophochroa leadbeateri leadbeateri* (eastern Major Mitchell's cockatoo).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- No Threat Abatement Plan has been identified as relevant for this species.

3.3.2 Potential Impacts

- Removal of 636.40 ha of potentially suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.

- Potential vehicle collision, resulting in injury or mortality, along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Pink Cockatoo to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Noise during construction and/or operation may have a localised effect on remaining habitat in the Subject Land.
- Minor risk of being impacted wind turbine blade strike (see BDAR Appendix D).

3.3.3 Significant Impact Criteria Considerations

For the purpose of this assessment the following assumptions have been made:

- The national population is considered to be one population.
- The population of the Pink Cockatoo was estimated (with low reliability) to be 15,000 mature individuals in 2011, based on the area of occupancy and a density of 1 pair per 30 km^2. There are no more recent estimates.
- The extent of occurrence is 850,000 km^2 (800,000–900,000 km^2) and stable and the area of occupancy is 225,000 km^2 (150,000–300,000 km^2) and contracting.
- Habitat critical to the survival of the Pink Cockatoo consist of:
    - Arid and semi-arid woodlands dominated by *Acacia aneura*, mallee and box eucalypts, *Callitris gracilis*) or *Casuarina cristata*.
    - Known habitat containing suitable attributes, including potential habitat for the subspecies, especially where there are large mature trees with suitable hollows.
    - Surrounding matrix of these areas for the role of providing movement corridors for dispersal across the landscape.

Table 3.3 Assessment of Significance for Pink Cockatoo

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of a population
Only a small amount of potential habitat would be removed in comparison to the amount of potential habitat that would remain within the Subject Land that the Pink Cockatoo can utilise. Given that the species is mobile, it is very unlikely that injury or mortality would occur during construction, and it is considered to have a minor likelihood of being impacted by turbine strike. The Proposed Action is therefore unlikely to lead to a long-term decrease in the size of the population.
reduce the area of occupancy of a population
The area of occupancy of the Pink Cockatoo is 225,000 km^2, the removal of 636.40 ha (6.36 km^2) would lead to a <0.01% reduction in the area of occupancy of this species. This is a negligible reduction in the area of occupancy of the Pink Cockatoo.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
fragment an existing population into two or more populations
Within the Subject Land an extensive amount of suitable habitat for this subspecies would remain. It is therefore unlikely that the removal of 636.40 ha of suitable habitat within the Development Footprint would fragment the population. Further, the species is highly mobile.
adversely affect habitat critical to the survival of a species
Potential habitat within the Development Footprint does contain box Eucalypts as well as suitable hollows. It is therefore considered to conform to critical habitat for the Pink Cockatoo. Hence, 636.40 ha of critical habitat would be adversely affected.
disrupt the breeding cycle of a population
Suitable breeding habitat is present within the Development Footprint for this species. However, two targeted surveys for this subspecies during breeding season were carried out and it was not observed. Given that they tend to nest in the same area each season, it is unlikely the Subject Land and Development Footprint provides important breeding habitat. The Proposed Action is therefore unlikely to disrupt the breeding cycle of the Pink Cockatoo.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
A relatively small amount of potential habitat would be removed, with potential habitat remaining for this species in the Subject Land. The Proposed Action would however modify the airspace above and around the wind farm such that Pink Cockatoo may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'minor' risk of impact to blade strike and barotrauma within Appendix D. No Pink Cockatoo were recorded during the bird utilisation surveys completed for the Proposed Action, and there are 13 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas. It is unlikely that the Proposed Action would decrease the amount of potential habitat to the extent that the species would decline.
result in invasive species that are harmful to a species becoming established in the species' habitat
Grazing by rabbits and feral goats is listed as a key threat to this species in the Conservation Advice. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
Psittacine Beak and Feather Disease (PBFD) is listed as a key threat to this species in the Conservation Advice. It is unlikely that the Proposed Action would result in this disease being introduced into the Subject Land.
interfere substantially with the recovery of the species
There is currently no approved Recovery Plan for this species. However, it is not considered likely that the removal of 636.40 ha of potential habitat would lead to a decline in the species, and therefore would not impact the recovery of the species.
Conclusion
The Proposed Action will: • not cause a significant long-term decrease of a population • cause a relatively minor reduction of the area of occupancy of a population • not fragment an existing population into two or more populations • adversely affect habitat critical to the survival of a species, however only a relatively small amount • not disrupt the breeding cycle of a population

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
• not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is **unlikely** to significantly impact on the Pink Cockatoo.

3.4 Plains-wanderer

3.4.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*), Department of the Environment 2016.
- Conservation Advice *Pedionomus torquatus* plains-wanderer. Department of the Environment 2015.
- Survey Guidelines for Australia's Threatened Birds. EPBC Act survey guidelines 6.2 (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010).
- Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia.
- Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia.
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox. DEWHA, Canberra.

3.4.2 Potential Impacts

Potential impacts to the Plains-wanderer during the Project duration include:

- Direct mortality and destruction of nests during clearing.
- Potential vehicle collision along access tracks throughout the Development Footprint during the construction phase.
- Habitat fragmentation due to infrastructure and access roads; however, habitat fragmentation may reduce rates of movement across the Project Area but it would not totally prevent movement (e.g. access roads would only be several metres wide).

- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Plains-wanderer to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Noise during construction and/or operation may have a localised effect on habitat used by the Plains-wanderer.
- Shadow-flicker from the WTG blades may have a localised effect on habitat used by the Plains-wanderer
- Plains-wanderers have never been recorded within 300 m of a tree taller than 10 m. There is potential that installed turbines associated with the Project could impact the Plains-wanderer in the way that trees over 10 m in height do. Other infrastructure and fences may also provide perches for raptors but due to their lower height may not affect habitat avoidance to the same distance.
- The Proposed Action may alter species interactions through the presence of turbines, noise impacts and partial clearing of adjacent habitat for turbine pads and ancillary structures. The infrastructure may be utilised as perches by raptors and access tracks may affect the presence of feral predators (foxes, cats, dogs). Clearing and construction in ancillary areas could also introduce weeds to the critical habitat zones.
- Increased fire risk associated with construction (short term) and operational phase (long term). Plains-wanderer is sensitive to threats caused by inappropriate burning regimes.

3.4.3 Significant Impact Criteria Considerations

The following assumptions have been made:

- The population size of the Plains-wanderer has substantially decreased. In 2011 it was estimated that the total number of mature individuals was 2000 (low) (Garnett et al 2011). However, in 2015 a submission by the Office of Environment and Heritage (NSW) estimated the total population size to be ≤ 250 birds within the core part of its range (OEH 2015). The estimated number of birds in the Riverina population is 200 (Department of the Environment 2015). A population estimate detailed in WSP (2022) estimated that the population within NSW had declined from approximately 3000 birds to approximately 700 birds over a twenty-year timespan. NSW LLS estimated the population of the species in NSW to be “around 300”, with up to 1000 occurring across Australia (LLS, 2025).The Plains-wanderer population within the Riverina region of NSW was estimated to have decreased by 75% following the 2002 drought. A further population decrease of 93% occurred within the Riverina region during increased rainfall between 2004 to 2010 (Parker & Baker-Gabb, 2013). Population densities reported for the Plains-wanderer are about 0.11 ha^{-1} (Baker-Gabb at al. 1990).
- The Threatened Species Strategy – Year 3 Priority Species Scorecard for the Plains-wanderer states that the total extent of occurrence is estimated to be 526,000 km^2, with an area of occupancy of 330 km^2. The respective values for NSW are 13,000 km^2 (37% of the total) and 650 km^2 (65% of the total) (NSW Scientific Committee 2009), with a continuing declining trend (Garnett et al., 2011).

Table 3.4 Assessment of Significance for Plains-wanderer

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
lead to a long-term decrease of a population
Plains-wanderers may have an increased risk of extinction due their currently historically low population sizes. Species with low population numbers are more susceptible to chance events having significant impacts on population numbers (Caughley 1994). The impacts of windfarms (both construction and operation) on the species are unknown. Populations of Plain-wanderer are known to occur within the Project Area, with 23 individuals including juvenile individuals recorded during targeted surveys carried out in spring 2024. Important Habitat mapping for the Plains-wanderer under the NSW BAM is present within the Project Area and adjacent to the Subject Land. Consultation with Commonwealth DCCEEW in 2023 identified the need for additional survey and assessment of Plains-wanderer in order to meet the assessment requirements under the EPBC Act. Commonwealth DCCEEW noted during consultation that 'habitat critical for the survival of the species' was more broadly defined than Important Habitat mapping, thus mapping of Supplementary Habitat for the species would be necessary. As a result, Umwelt undertook Supplementary Habitat mapping across the Project Area to support the assessment. The method carried out to complete this mapping is detailed within Section 8.4.3.1 of the BDAR. For the purposes of this assessment, Plains-wanderer habitat types have been defined as follows: **Important Habitat:** As defined within the BAM. Specifically, mapping of Important Habitat areas provided by the DPIE for those species for which the habitat constraint in the TBDC refers to a mapped important area. Note that Important Habitat as defined within the BAM is different to 'important habitat' for migratory species as defined within the EPBC Act and discussed elsewhere in this report. **Primary Habitat:** Plains-wanderer primary habitat mapping completed for National Parks and Wildlife Service (NPWS) (TBDC, 2025). Primary habitat of the plains-wanderer typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses. Given that primary habitat mapping informed the mapped Important Habitat, primary habitat is considered to be commensurate to Important Habitat. **Secondary Habitat:** Plains-wanderer secondary habitat mapping completed for NPWS (TBDC, 2025). **Supplementary Habitat:** Supplementary Habitat mapping carried out by Umwelt as described in Section 8.4.3.1 of the Amended BDAR. **Associated PCTs:** PCT considered to be associated with the species based on an analysis to determine the relationship between Plains-wanderer records within the NSW BioNet Atlas of Wildlife (DEECCW, 2025), records of the species identified within the Project Area, and the State Vegetation Type Mapping (DEECCW, 2024). For the purposes of this assessment, the associated PCTs are PCT 44, PCT 46, PCT 26 (derived native grassland condition state only), PCT 28 (derived native grassland condition state only) and PCT 164. The Project design has been altered to avoid all extents of the Important Habitat mapping. However, other areas of potential habitat may occur outside this mapping. Moreover, radio-tracking studies have recently suggested that the Plains-wanderer requires a mosaic of landscape elements including denser grass swards (Nugent et al. 2022). Denser habitats may have previously been overlooked as the detection probability would be lower in these areas relative to open habitats as visual searching (either diurnal searches or nocturnal spotlighting) was used. This suggests that suitable habitat may be more extensive and better connected than previously assumed. There is 1,456.26 ha of mapped Important Habitat within the Project Area. The Proposed Action has avoided all extents of mapped Important Habitat for the species such that no direct impacts to mapped Important Habitat would occur as a result of the Project. Notwithstanding, it expected that the mapped Important Habitat may be subject to indirect and prescribed impacts, such as impacts to connectivity, associated with the construction and operation of the Proposed Action. The Proposed Action would impact of 138.21 ha of secondary habitat. The removal of 138.21 ha of secondary habitat equates to 15% of the available secondary habitat across the Subject Land and 9% of secondary habitat across the Project Area. Based on a density estimate of between 7-108 individuals being supported within the mapped secondary habitat within the Project Area, it is estimated that the Project would impact between <1-4

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

individuals. Based on this estimate, and if considering impacts to mapped secondary habitat, between 0.1% and 0.6% of the NSW population may be impacted.

The Proposed Action would result in the removal of 170.86 ha of Supplementary Habitat. There is 1,148.44 ha of Supplementary habitat mapped across the Subject Land and 4,940.21 ha mapped across the Project Area. The removal of 170.86 ha of Supplementary Habitat equates to 15% of the available habitat across the Subject Land and 3% of habitat across the Project Area. Based on a density estimate of between 9-137 individuals being supported within the Supplementary Habitat within the Project Area, it is estimated that the Proposed Action would impact between 0.3 to 5 individuals. Based on this estimate, and if considering impacts to Supplementary habitat, between 0.1% and 0.7% of the NSW population may be impacted.

The Proposed Action would remove 618.87 ha of PCT 26 DNG, PCT 28 DNG, PCT 44, PCT 46 and PCT 164, which, based on the analysis of the relationship between Plains-wanderer records and the STVTM may be considered potential habitat for the species. There is a total of 1,848,223.03 ha of these PCTs mapped across NSW as per NSW SVTM, comprised of:

- PCT 28: 418,372.27 ha
- PCT 44: 496,463.26 ha
- PCT 46: 386,052.38 ha
- PCT 164: 547,335.11 ha

In addition, there are 18,671.81 ha of these PCTs mapped across the Project Area and 4,062.05 ha mapped across the Subject Land. While not all areas of these PCTs constitute suitable habitat for the species, the removal of 618.87 ha of potential Plains-wanderer habitat within Development Footprint equates to 15% of the available potential habitat within the Subject Land, 3% within the Project Area, and 0.03% of available potential habitat across NSW. Based on a density estimate of between 38-582 individuals being supported within the associated PCT habitat within the Project Area, it is estimated that the Proposed Action would impact between 1 to 19 individuals. Based on this estimate, and if considering impacts to potential habitat associated with PCT 26 DNG, PCT 28, PCT 44, PCT 46, and PCT 164, between 0.1% and 2.5% of the NSW population may be impacted.

The presence of turbines, noise impacts and partial clearing of adjacent habitat for turbine pads, ancillary structures that may be used as perches and access tracks may affect the presence of raptors and feral predators (foxes, cats, dogs) and the vulnerability of the Plains-wanderer to them. The collision risk analysis within Appendix D of the Amended BDAR considered the risk of turbine of the strike to the species to be low, but of high consequence if a collision were to occur. The grassland habitat is already fairly open and feral predators are currently unlikely to have difficulty moving throughout the entire site; the Proposed Action is unlikely to substantially increase the abundance of pest and feral animal species should appropriate pest management be implemented. The Plains-wanderer is vulnerable to death, injury and nest destruction during clearing operations. It is also vulnerable to vehicle strike across the Subject Land, mostly during construction when vehicle movements would be highest. Some residual risk of vehicle strike would remain during the operation of the Proposed Action.

Project infrastructure may fragment individual home-ranges, resulting in reduced rates of movement between habitat with structural variation required for different activities including foraging, roosting and reproduction (see Nugent et al. 2022a). At an intermediate scale, project infrastructure may isolate areas of Important Habitat from BCT conservation areas within the Project Area (refer to Figure 8.5.1 and Figure 8.6.1 of the Amended BDAR). This may potentially isolate and sterilise areas of occupied habitat. At a landscape scale, the project may inhibit or reduce with the movement of the Plains-wanderer between Important Habitat in the Project Area and Oolambeyan National Park. This may interfere with metapopulation dynamics and the ability of the species to move in response to variation in climatic conditions (Nugent et al. 2022b). While fragmentation of suitable habitat would occur, the Project Infrastructure would not be fenced and would experience low levels of regular vehicle movements during operation.

The proposed development may affect fire regimes at a local scale by requiring fire management in the vicinity of turbines (e.g. increased frequency but reduced severity). The formation of pads and access tracks may affect

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
surface water flows and sub-surface hydrology. There may be some risk of pollution during construction (e.g. fuel spills) but this would be minimal during operation. The Proposed Action may alter species interactions (e.g. perch sites for raptors on suitable ancillary structures) (Baker-Gabb 2014). Noise during construction and/or operation may have a localised effect on habitat use by the Plains-wanderer. The preparation and approval of a BMP and a standalone Plains-wanderer Management Plan (PWMP) would be submitted prior to the clearing of native vegetation. The BMP and PWMP will include mitigation measures, and a process for evaluating and monitoring the performance of the proposed measures, informing an adaptive management method for additional offsets, and remedial action to manage potential impact to the Plains-Wanderer and its habitat adjacent to the survey corridor. The loss of between 3-15% of supplementary habitat within the Project Area and potentially 1-19 individuals) due to the Proposed Action has the potential to lead to a long-term decrease in the population of the Plains-wanderer, particularly as the Riverina population is already declining and a number of other wind farm developments are proposed in the region.
reduce the area of occupancy of a population
The Plains-wanderer's total extent of occurrence is estimated to be 526,000 km^2 {52,600,000 ha} (DAWE, 2018). Within this extent, the suitability of habitat changes constantly in response to rainfall, grazing pressure and exotic species invasion. The NSW Threatened Species Scientific Committee (2009) identified the extent of occurrence within NSW as 13,000 km^2 {1,300,000 ha}. The species' area of occupancy (AOO) is estimated at 330 km^2 {33,000 ha} (DAWE, 2018). However, the areas of occupancy constantly fluctuates in response to climatic conditions and grazing pressures. The NSW Threatened Species Scientific Committee (2009) identified the area of occupancy within NSW as 650 km^2 {65,000 ha}. The Development Footprint has completely avoided all extents of mapped Important Habitat for the Plains-wanderer. This habitat would not be directly cleared by the Project but may be indirectly impacted during the construction and operation of the Proposed Action. There is approximately 3,466.43 ha of secondary habitat, in addition to the 1,456.26 ha of primary habitat mapped as the mapped Important Areas for the species across the Project Area. This totals 4,922.69 ha. The Project would not impact any areas of Primary habitat but would impact 138.21 ha of Secondary Habitat. This represents 0.4% of the species national AOO, and 0.2% of the species NSW AOO. The Project would result in the removal of 170.86 ha of Supplementary Habitat. There is 1,148.44 ha of Supplementary Habitat mapped across the Subject Land and 4,382.45 ha mapped across the Project Area. The removal of 170.86 ha of Supplementary Habitat equates to approximately 0.5% of the species national AOO, and 0.2% of the species NSW AOO. In addition, there are 18,671.81 ha of potential habitat associated with PCTs mapped across the Project Area and 4,062.05 ha mapped across the Subject Land. While not all areas of these PCTs constitute suitable habitat for the species, the removal of 618.87 ha of potential Plains-wanderer habitat within Development Footprint equates to 1.7% of the species national AOO, and 0.9% of the species NSW AOO. The Project would require an impact to 0.001% of the DAWE (2018) AOO (52,600,000 ha) and 0.05% of the NSW AOO (1,300,000 ha) to be cleared for turbine pads, access roads and other infrastructure. The Project would require an impact to 2% of the DAWE extent of occurrence (EOO) (33,000 ha), and an impact to 1% of the NSW EOO (65,000 ha) to be cleared for turbine pads, access roads and other infrastructure. The Plains-wanderer appears to avoid trees, generally keeping 300 m away, as trees provide perches for raptors, which prey upon the species (Baker-Gabb 2014). Similarly, the construction of buildings, sub-stations, associated fencing and other infrastructure may provide raptor perches. Thus, the extent of effective habitat loss may exceed the area directly cleared.
fragment an existing population into two or more populations

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
Plains-wanderer populations are currently considered to be severely fragmented (Baker-Gabb et al., 2016). Mature individuals of Plains-wanderer are dispersed across more than 10 locations from eastern south Australia to Central-west Queensland (Garnett et al., 2011). The Threatened Species Scientific Committee (OEH 2015) considers that the species' area of occupancy to be restricted, and the current geographic distribution is crucial for the survival of the species due to this fragmentation. Project infrastructure may fragment individual home-ranges, resulting in reduced rates of movement between habitat with structural variation required for different activities including foraging, roosting and reproduction (see Nugent et al. 2022a). At an intermediate scale, project infrastructure may isolate areas of Important Habitat from BCT conservation areas within the Project Area. This may potentially isolate and sterilise areas of occupied habitat. At a landscape scale, the project may inhibit or reduce with the movement of the Plains-wanderer between Important Habitat in the Project Area and Oolambeyan National Park. This may interfere with metapopulation dynamics and the ability of the species to move in response to variation in climatic conditions (Nugent et al. 2022b). While fragmentation of suitable habitat would occur, the Project Infrastructure would not be fenced and would experience low levels of regular vehicle movements during operation. Notwithstanding, it is unlikely that the Proposed Action would result in the fragmentation of a population of the Plains-wanderer into two or more populations.
adversely affect habitat critical to the survival of a species
The National Recovery Plan for the Plains-wanderer (DoE 2016) lists habitat critical to the survival of the Plains-wanderer as: • Any regions where the species is likely to occur. • Any newly discovered locations that extend the likely range of the Plains-wanderer. Important habitat mapping for the Plains-wanderer under the NSW BAM is present within the Project Boundary and adjacent to the Development Corridor and 23 individuals were recorded within the Project Area during spring surveys in 2024. The design of the Proposed Action has been altered to avoid all extents of the Important Habitat mapping. However, secondary habitat, supplementary habitat, and associated PCT habitat that constitute 'habitat critical to the survival of the species' would be impacted by the Proposed Action. The Project would impact of 138.21 ha of secondary habitat. The removal of 138.21 ha of secondary habitat equates to 15% of the available secondary habitat across the Subject Land and 9% of secondary habitat across the Project Area. The Project would result in the removal of 170.86 ha of Supplementary Habitat. There is 1,148.44 ha of Supplementary Habitat mapped across the Subject Land and 4,940.21 ha mapped across the Project Area. The removal of 170.86 ha of Supplementary Habitat equates to 15% of the available habitat across the Subject Land and 3% of habitat across the Project Area. Based on a density estimate of between 9-137 individuals being supported within the Supplementary Habitat within the Project Area, it is estimated that the Project would impact between 0.3 to 5 individuals. The Project would remove 618.87 ha of PCT 26 DNG, PCT 28 DNG, PCT 44 and PCT 46, which, based on the analysis of the relationship between Plains-wanderer records and the STVTM may be considered potential habitat for the species. There is a total of 1,848,223.03 ha of these PCTs mapped across NSW as per NSW SVTM, comprised of: • PCT 28: 418,372.27 ha • PCT 44: 496,463.26 ha • PCT 46: 386,052.38 ha • PCT 164: 547,335.11 ha In addition, there are 18,671.81 ha of these PCTs mapped across the Project Area and 4,062.05 ha mapped across the Subject Land. While not all areas of these PCTs constitute suitable habitat for the species, the removal of 618.87

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
ha of potential Plains-wanderer habitat within Development Footprint equates to 15% of the available potential habitat within the Subject Land, 3% within the Project Area, and 0.03% of available potential habitat across NSW. The Proposed Action would adversely habitat critical to the survival of the Plains-wanderer.
disrupt the breeding cycle of a population
A total of 23 individual Plains-wanderers including juveniles were recorded during targeted surveys, which determined that the species is breeding within the Project Area. Plain-wanderers are capable of breeding within their first year, and breed in solitary pairs (Baker-Gabb et al.,1990). Baker-Gabb et al. (1990) provide evidence that the species utilises a polyandrous mating system (females mate with more than one male). The nest is a hallow or 'scrape' and is scratched into the ground and lined with grass (Harrington et al., 1988). The nest is concealed amongst native grasses, herbs and sometimes crops. The clearly defined Important Habitat mapping includes suitable nesting habitat for the Plains-wanderer and is to be entirely avoided. There is a risk of nest distance and destruction during clearing for construction in occupied habitat (to be determined) outside the mapped Important Habitat area. The extent of this habitat has not yet been determined. Thus, the breeding cycle of the Plains-wanderer may be progressively disrupted during the construction phase, which would last several years. The impacts on nesting behaviour during the operation phase are unknown. It is unknown whether other factors associated with the operation the Proposed Action such as noise and shadow-flicker would impact the breeding cycle of the population within the Project Area. A BMP and PWMP would be prepared and implemented to manage risks to biodiversity. This would include actions to avoid impacts to nesting Plains-wanderers. The BMP and PWMP would include pre-clearing searches for birds and their nests if clearing is undertaken during the breeding season (spring-summer). Any nests discovered would require relocation to nearby suitable, undisturbed habitat.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
There is 1,456.26 ha of mapped Important Habitat within the Project Area. The Proposed Action has avoided all extents of mapped Important Habitat for the species such that no direct impacts to mapped Important Habitat would occur as a result of the Project. Notwithstanding, it expected that the mapped Important Habitat may be subject to indirect and prescribed impacts, such as impacts to connectivity, associated with the construction and operation of the Proposed Action. The Proposed Action would impact of 138.21 ha of secondary habitat. The removal of 138.21 ha of secondary habitat equates to 15% of the available secondary habitat across the Subject Land and 9% of secondary habitat across the Project Area. Based on a density estimate of between 7-108 individuals being supported within the mapped secondary habitat within the Project Area, it is estimated that the Project would impact between 0.3-4 individuals. Based on this estimate, and if considering impacts to mapped secondary habitat, between 0.1% and 0.6% of the NSW population may be impacted. The Proposed Action would result in the removal of 170.86 ha of Supplementary Habitat. There is 1,148.44 ha of Supplementary Habitat mapped across the Subject Land and 4,940.21 ha mapped across the Project Area. The removal of 170.86 ha of Supplementary Habitat equates to 15% of the available habitat across the Subject Land and 3% of habitat across the Project Area. Based on a density estimate of between 9-137 individuals being supported within the Supplementary Habitat within the Project Area, it is estimated that the Proposed Action would impact between 0.3 to 5 individuals. Based on this estimate, and if considering impacts to Supplementary habitat, between 0.1% and 0.7% of the NSW population may be impacted. The Proposed Action would remove 618.87 ha of PCT 26 DNG, PCT 28 DNG, PCT 44, PCT 46 and PCT 164, which, based on the analysis of the relationship between Plains-wanderer records and the STVTM may be considered potential habitat for the species. There is a total of 1,848,223.03 ha of these PCTs mapped across NSW as per NSW SVTM, comprised of: • PCT 28: 418,372.27 ha

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
• PCT 44: 496,463.26 ha • PCT 46: 386,052.38 ha • PCT 164: 547,335.11 ha In addition, there are 18,671.81 ha of these PCTs mapped across the Project Area and 4,062.05 ha mapped across the Subject Land. While not all areas of these PCTs constitute suitable habitat for the species, the removal of 618.87 ha of potential Plains-wanderer habitat within Development Footprint equates to 15% of the available potential habitat within the Subject Land, 3% within the Project Area, and 0.03% of available potential habitat across NSW. Based on a density estimate of between 38-582 individuals being supported within the associated PCT habitat within the Project Area, it is estimated that the Proposed Action would impact between 1 to 19 individuals. Based on this estimate, and if considering impacts to potential habitat associated with PCT 26 DNG, PCT 28, PCT 44, PCT 46, and PCT 164, between 0.1% and 2.5% of the NSW population may be impacted. It is possible that the Proposed Action would modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the Plains-wanderer is likely to decline.
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
Pest species, including the foxes and ferals cats, and native raptors have previously been recorded within the Project Area. These predators pose a threat to the Plains-wanderer. The Proposed Action entails vegetation clearing for turbine pads, ancillary infrastructure and access tracks. Vegetation clearing for access tracks can often allow predators greater access to native habitat, however, the open grassland habitat would currently do little to impede the movements of predators across the Subject Land. The Proposed Action may alter species interactions through the noise impacts of the turbines, but it is unclear whether the Plains-wanderer would avoid turbines due to the risk of raptor predation. Thus, it is not possible to determine whether this is a relevant concern. To ensure that the direct and indirect impacts to this species from invasive species is minimised, BWF has committed to designing and implementing a comprehensive biodiversity mitigation strategy to minimise unavoidable impacts of the Proposed Action. This would include the preparation of a CEMP with associated biodiversity management measures. With the implementation of these measures, the Proposed Action would not result in an increase in invasive species within Plains-wanderer habitat.
introduce disease that may cause the species to decline
According to the Conservation Advice for Plains-wanderer (DoE 2015) there are no diseases to which the Plains-wanderer is susceptible. The Proposed Action would not result in the introduction of disease, pathogens or parasites harmful to the Plains-wanderer.
interfere substantially with the recovery of the species
The National recovery plan for the Plains-wanderer (*Pedionomus torquatus)* (DoE 2016) lists the following as a key threatening process which may result from the proposed works: • Cultivation of native grasslands. • Overgrazing or insufficient grazing. • The insecticide Fenitrothion (used to treat plague locust, particularly in the NSW Riverina). • European foxes (can be significant predators when crops support high densities of house mouse (*Mus Musculus* occur within 2 km of Plains-wanderer habitat) and cats. • Native birds of prey (including spotted harrier (*Circus assimilis*) and black falcon (*Falco subniger*). • Lack of appropriate burning routines.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
• Planting trees in or near native grasslands (Baker-Gabb, 2014). • Wildfires. • Habitat disturbance by rabbits (*Oryctolagus cuniculus*) (OEH, 2012). • Quail hunting. • Reduced food availability. • Climate change. The Proposed Action is likely to lead to the loss and alteration of habitats and altered predator/prey relationships for the Plains-wanderer to the extent that it may substantially interfere with the recovery of this species.
Conclusion
The known presence of the species and critical habitat within the Subject Land and Development Corridor has resulted in a change in scope of the Proposed Action to entirely avoid all areas mapped as Important Habitat. However, the Proposed Action would: • impact 138.21 ha of secondary habitat. The removal of 138.21 ha of secondary habitat equates to 15% of the available secondary habitat across the Subject Land and 9% of secondary habitat across the Project Area. Based on a density estimate of between 7-108 individuals being supported within the mapped secondary habitat within the Project Area, it is estimated that the Project would impact between <1-4 individuals and between 0.1% and 0.6% of the NSW population. • impact 170.86 ha of Supplementary Habitat. There is 1,148.44 ha of Supplementary Habitat mapped across the Subject Land and 4,940.21 ha mapped across the Project Area. The removal of 170.58 ha of Supplementary Habitat equates to 15% of the available habitat across the Subject Land and 3% of habitat across the Project Area. Based on a density estimate of between 9-137 individuals being supported within the Supplementary Habitat within the Project Area, it is estimated that the Proposed Action would impact between 0.3 to 5 individuals and between 0.1% and 0.7% of the NSW population. • impact 618.87 ha of associated PCTs equating to 15% of the available potential habitat within the Subject Land, 3% within the Project Area. Based on a density estimate of between 38-582 individuals being supported within the associated PCT habitat within the Project Area, it is estimated that the Proposed Action would impact between 1 to 19 individuals and 0.1% and 2.5% of the NSW population. There is a risk of injury, death and nest destruction during the clearing operations. There is an ongoing risk of increase raptor predation due to the presence of additional perching sites (fences, buildings, turbines). These factors may be of sufficient intensity to interfere with the recovery of the Plains-wanderer. It is unknown whether other factors associated with the operation the Proposed Action such as noise and shadow-flicker would impact the breeding cycle of the population within the Project Area. If these impacts were to occur, they would be adaptively managed through the implementation of the PWMP. While any indirect impacts would be mitigated by the detail with the proposed BMP and PWMP, the Proposed Action is **likely** to significantly impact on the Plains-wanderer.

4.0 Vulnerable Species

4.1 Slender Darling-pea

4.1.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of the Environment, Water, Heritage and the Arts (2008b). Approved Conservation Advice for *Swainsona murrayana* (Slender Darling-pea).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits.
- Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017).
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for competition and land degradation by unmanaged goats.

4.1.2 Potential Impacts

Potential impacts to this species include:

- The direct removal of habitat 445.21 ha of suitable habitat in the Development Footprint.
- Direct loss of individuals occurring within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Increased fire risk due to the use of machinery (particularly in summer), the storage and utilisation of flammable materials on site and human-caused fires during the construction and operational phase.
- Pollutant spills during the construction and operational phase may contaminate and change the composition of soils, resulting in detrimental impacts to native vegetation.
- Physical damage by vehicle collision due to increased off-road vehicle movements and livestock trampling due to changes in agricultural practices.

4.1.3 Significant Impact Criteria Consideration

For the purpose of this assessment the following assumptions have been made:

- The most recent review of current information for the species (NSW Scientific Committee, 2008) estimated that up to 200,000 individuals of Slender Darling-pea could occur within 60 estimated populations in NSW and in 28 populations comprising an estimated 94,000 individuals in Victoria. No estimate was given for any Queensland or South Australian populations.
- The individuals occurring within the Subject Land are part of a population that occurs from the South-Western Plains in the Lockhart-Jerilderie-Deniliquin area and further north up to Hay and West Wyalong. The exact number of mature individuals within this population is not known. However, it is considered to be relatively common in the Hay Plain.
- The extent of occurrence and area of occupancy of the population is not known. As of 2008, the national extent of occurrence for Slender Darling-pea is estimated to be approximately 1,200,000 km^2 and the area of occupancy of this species is conservatively estimated at 240 km^2, with an upper limit of 500 km^2. There are no more recent estimates.
- No areas of habitat critical to the survival of the species is defined in the Conservation Advice. Suitable habitat within the Subject Land and Development Footprint is known to support this species and is widespread over much of the Hay Plain. This occurrence within the Hay Plain and more widely across the Riverina is likely necessary for breeding and dispersal, as well as maintaining genetic diversity. Therefore it is considered habitat critical to the survival of the species.
- There are no important populations defined within the conservation advice. The population existing in the Hay Plain is likely to be a key source population for breeding and dispersal, as well as maintaining genetic diversity. It is therefore considered an important population.

Table 4.1 Assessment of Significance for Slender Darling-pea

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
The species was recorded extensively during targeted surveys. Approximately 3,807 individuals were observed in the Development Footprint and would be directly impacted. The Proposed Action would also lead to the removal of a considerable amount of suitable habitat within the Development Footprint. However, the species is known to be common in the region and a large area of suitable habitat would remain in the Subject Land. The Proposed Action may lead to a short-term decrease in the size of the important population, however it is unlikely to be long-term.
reduce the area of occupancy of an important population
The removal of 445.21 ha of suitable habitat would lead to a reduction in the area of occupancy of the important population. The exact reduction in area of occupancy of the important population cannot be calculated, as no area of occupancy for the population is provided.
fragment an existing important population into two or more populations
Suitable habitat would remain within the Subject Land and the surrounding Hay Plains region. While a large amount of suitable habitat would be removed, given the availability of suitable habitat surrounding the Development Footprint, it is unlikely that this would result in fragmentation of the important population.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
adversely affect habitat critical to the survival of a species
Suitable habitat within the Development Footprint is considered to be part of habitat critical to the survival of the species. The Proposed Action would therefore affect 445.21 ha of critical habitat, however large areas of critical habitat would remain in the Subject Land and broader Hay Plain region.
disrupt the breeding cycle of an important population
The Proposed Action would disrupt the breeding cycle of Slender Darling-pea occurring in the Development Footprint, through their direct removal. The Proposed Action is unlikely to disrupt the breeding cycle of individuals occurring within the broader important population as a whole.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
445.21 ha of suitable habitat occurs within the Development Footprint and would be removed. This is a substantial amount of habitat, however a large area of suitable habitat would still remain within the Subject Land. It is unlikely that the removal of this suitable habitat would lead to a decline in the species.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The Conservation Advice for the Slender Darling-pea lists grazing from stock and rabbits and weed invasion as main potential threats. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
According to the Conservation Advice for the Slender Darling-pea (DEWHA 2008) there are no diseases which the species is susceptible. BWF would implement mitigation measures to reduce the risk of pathogens and disease being introduced within the Subject Land. This would include the preparation of a CEMP.
interfere substantially with the recovery of the species
There is currently no approved recovery plan for the Slender Darling-pea. It is considered unlikely that the Proposed Action would interfere substantially with the recovery of the species.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Slender Darling-pea.

4.2 Chariot Wheels

4.2.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Mavromihalis, J. (2010). *National Recovery Plan for the Chariot Wheels Maireana cheelii*. Department of Sustainability and Environment, Melbourne.
- There is no approved Conservation Advice for this species.
- No Threat Abatement Plan has been identified as relevant for this species.

4.2.2 Potential Impacts

Potential impacts to this species include:

- Direct removal of 4.67 ha of suitable habitat within the Development Footprint.
- Direct loss of individuals occurring within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.

Increased fire risk due to the use of machinery (particularly in summer), the storage and utilisation of flammable materials on site and human-caused fires during the construction and operational phase.

Pollutant spills during the construction and operational phase may contaminate and change the composition of soils, resulting in detrimental impacts to native vegetation.

Physical damage by vehicle collision due to increased off-road vehicle movements and livestock trampling due to changes in agricultural practices.

4.2.3 Significant Impact Criteria Considerations

For the purpose of this assessment the following assumptions have been made:

- The Recovery Plan for the species (Mavromihalis, J., 2010a) notes that the species is now extinct in Queensland and northern NSW, and survives only in southern NSW and Victoria, where there are approximately 17 populations containing an estimated 700,000 plants.
- Since 2000, plants have been recorded in about 15 populations, with most plants occurring in just six populations, five in Victoria and one in New South Wales. The largest population in NSW is around East-West Road, between Deniliquin and Hay in the road reserve, with about 250,000 plants noted in 2003.
- No extent of occurrence or area of occupancy is provided for this species.
- No habitat critical to the survival of the species is provided in the Recovery Plan. However, suitable habitat within the Subject Land and Development Footprint is known to support this species and is likely necessary for breeding and dispersal, as well as maintaining genetic diversity. Therefore, it is considered habitat critical to the survival of the species.

- No important populations are defined for this species. The NSW population is likely a key source population for dispersal and maintaining genetic diversity. It is therefore considered to be an important population.

Table 4.2 Assessment of Significance for Chariot Wheels

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Approximately 1,207 individuals were observed in the Subject Land, with fewer than this observed in the Development Footprint. There are estimated to be approximately 250,000 individuals within the important population. The direct removal of fewer than 1,207 individuals would lead to a very minor reduction in the number of individuals within the important population (approximately 0.05% of the total population would be impacted by the Proposed Action). The Proposed Action may lead to a short-term decrease in the size of the important population, however it is unlikely to be long-term.
reduce the area of occupancy of an important population
The removal of 4.67 ha of suitable habitat would lead to a reduction in the area of occupancy of the population. The exact reduction in area of occupancy cannot be calculated, as no area of occupancy is provided for the national population or the important population.
fragment an existing important population into two or more populations
The Proposed Action occurs on the eastern edge the distribution of the important population and suitable habitat would remain within the Subject Land and the surrounding Hay Plains region. It is therefore unlikely that the important population would be fragmented into two.
adversely affect habitat critical to the survival of a species
The Proposed Action would lead to the removal of 4.67 ha of habitat that is considered critical to the survival of this species.
disrupt the breeding cycle of an important population
The Proposed Action would disrupt the breeding cycle of Chariot Wheels occurring in the Development Footprint, through their direct removal. The Proposed Action is unlikely to disrupt the breeding cycle of individuals occurring within the Subject Land. It is unlikely though that it would disrupt the breeding cycle of the important population as a whole.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The National Recovery Plan for Chariot Wheels states that the majority of the remaining sites where Chariot Wheels exist occur in highly fragmented populations and exist in sites are under substantial threat. Most the sites contain small, isolated populations within degraded habitat. Therefore, any impact to suitable habitat containing known populations may result in a species decline.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Weed invasion is considered a threat along roadsides and on private property. Chariot Wheels occur along roadsides and within agricultural land, where pasture grasses and other weed species can readily invade. Problematic weed species include pasture grasses such as *Avena* sp. and *Vulpia* sp. Regeneration of Chariot Wheels is likely to be inhibited by weed invasion in degraded sites and notably narrow roadsides. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
introduce disease that may cause the species to decline
According to the National Recovery Plan for Chariot Wheels (Mavromihalis 2010) there are no diseases to which the species is susceptible.
interfere substantially with the recovery of the species
The overall objective of Recovery Plan is to minimise the probability of extinction of the Chariot Wheels in the wild and to increase the probability of populations becoming self-sustaining in the long term. One of the specific objectives to achieve this is to "ensure that important populations and their habitat are protected and managed." The Proposed Action would interfere with this specific objective. However, it is unlikely to substantially interfere within the recovery of the species given that a relatively small number of individuals would be directly impacted and a large area of suitable habitat would remain within the Subject Land.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Chariot Wheel.

4.3 A Spike-rush

4.3.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- There is no made or approved recovery plan for this species.
- Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for Eleocharis obicis. Canberra: Department of the Environment, Water, Heritage and the Arts.
- Threatened Species Scientific Committee (TSSC) (2012). Commonwealth Listing Advice on Eleocharis obicis (a spike rush). Department of Sustainability, Environment, Water, Population and Communities. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities.

- Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia.
- Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (2017). Canberra, ACT: Commonwealth of Australia.

4.3.2 Potential impacts to this species include:

- Direct removal of 7.31 ha of suitable habitat within the Development Footprint.
- Direct loss of individuals occurring within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.

Increased fire risk due to the use of machinery (particularly in summer), the storage and utilisation of flammable materials on site and human-caused fires during the construction and operational phase.

Pollutant spills during the construction and operational phase may contaminate and change the composition of soils, resulting in detrimental impacts to native vegetation.

Physical damage by vehicle collision due to increased off-road vehicle movements and livestock trampling due to changes in agricultural practices.

4.3.3 Significant Impact Criteria Considerations

For the purpose of this assessment the following assumptions have been made:

- The Conservation Advice for the Species (DEWHA, 2008) notes that the Barrier Range population from which the type specimen was collected from is not considered extinct. The species now only survives in NSW south west plains (the location of the Project Area), as well as north-western Vicotria, and is known to be locally frequent to abundant in western NSW populations.
- No extent of occurrence or area of occupancy is provided for this species.
- No habitat identified as critical to the survival of the species has been identified.
- No habitat critical to the survival of the species has been identified. However, suitable habitat within the Subject Land and Development Footprint is known to support this species and the Subject Land does not occur in the region known to support frequent to abundant populations, as such it is likely that the population present is necessary for breeding and dispersal, as well as maintaining genetic diversity. Therefore, it is considered habitat critical to the survival of the species.
- No important populations are defined for this species. The NSW population is likely a key source population for dispersal and maintaining genetic diversity. It is therefore considered to be an important population.

Table 4.3 Assessment of Significance for a Spike-rush

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Approximately 110 individuals were observed in the Subject Land, with fewer than this observed in the Development Footprint. There is no estimate of the total population size of this species, however it is documented to be locally frequent to abundant in western NSW populations (DEWHA, 2008). The direct removal of fewer than 110 individuals would lead to a very minor reduction in the number of individuals within the important population. The Proposed Action may lead to a short-term decrease in the size of the important population, however it is unlikely to be long-term.
reduce the area of occupancy of an important population
The removal of 7.31 ha of suitable habitat would lead to a reduction in the area of occupancy of the population. The exact reduction in area of occupancy cannot be calculated, as no area of occupancy is provided for the national population or the important population.
fragment an existing important population into two or more populations
The Proposed Action occurs on the northern edge of the distribution of the important population and suitable habitat would remain within the Subject Land and the surrounding Hay Plains region. It is therefore unlikely that the important population would be fragmented into two.
adversely affect habitat critical to the survival of a species
The Proposed Action would lead to the removal of 7.31 ha of habitat that is considered critical to the survival of this species.
disrupt the breeding cycle of an important population
The Proposed Action would disrupt the breeding cycle of a Spike-rush occurring in the Development Footprint, through their direct removal. The Proposed Action is unlikely to disrupt the breeding cycle of individuals occurring within the Subject Land. It is unlikely though that it would disrupt the breeding cycle of the important population as a whole.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
7.31 ha of suitable habitat occurs within the Development Footprint and would be removed. While no total population has been estimated for the species, it is stated in the conservation advice that the species can be locally abundant. The removal of this suitable habitat would lead to a decline in the species.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Weed invasion is considered a threat along roadsides and on private property. Spike-rush occurs along the ephemerally wet roadside ditches, adjacent to private agricultural land, where pasture grasses and other weed species can readily invade. Problematic weed species include pasture grasses such as *Avena* sp. and *Vulpia* sp. Regeneration of Chariot Wheels may inhibited by weed invasion in degraded sites and notably narrow roadsides. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
No diseases are known to impact upon this Spike-rush.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
interfere substantially with the recovery of the species
There is currently no approved recovery plan for the Spike-rush. It is considered unlikely that the Proposed Action would interfere substantially with the recovery of the species.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Spike-rush.

4.4 Blue-winged Parrot

4.4.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Neophema chrysostoma* (blue-winged parrot).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- No Threat Abatement Plan has been identified as relevant for this species.

4.4.2 Potential Impacts

Potential impacts to this species include:

- Removal of 636.40 ha of potentially suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.

- Potential vehicle collision, resulting in injury or mortality, along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Blue-winged Parrot to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Noise during construction and/or operation may have a localised effect on remaining habitat in the Subject Land.
- Minor risk of being impacted wind turbine blade strike (see BDAR Appendix D).

4.4.3 Significant Impact Criteria Considerations

For the purpose of this assessment the following assumptions have been made:

- It is currently estimated that there are 10,000 (range 7,500–15,000) mature Blue-winged Parrots in the wild, with a declining trend.
- The extent of occurrence and area of occupancy of this species are estimated to be 170,000 km^2 (range 155,000–19,000 km^2, stable trend) and 11,000 km^2 (range 9,000–19,000 km^2, contracting trend) respectively.
- Habitat critical to the survival of the Blue-winged Parrot include areas that include:
    - Foraging and staging habitats found from coastal, sub-coastal and inland areas, right through to semi-arid zones including: grasslands, grassy woodlands and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs.
    - Wetlands both near the coast and in semi-arid zones used for foraging and staging.
    - Eucalypt forests and woodlands within the breeding range in Tasmania, coastal southeastern South Australia and southern Victoria.
    - Live and dead trees and stumps with suitable hollows within the breeding range.
    - Further, any habitat mapped as known or likely should be considered critical habitat. The Subject Land and Development Footprint contains known habitat, and therefore should be considered critical habitat.
- There are no important populations defined within the conservation advice. Blue-winged Parrots are widespread across south-eastern Australia and do not breed in NSW, therefore any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Hence, any population occurring within the Subject Land would not constitute an important population.

Table 4.4 Assessment of Significance for Blue-winged Parrot

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Blue-winged Parrots occurring within the Subject Land would not represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population.
reduce the area of occupancy of an important population
Blue-winged Parrots occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The area of occupancy of the national population of the blue-winged parrot is estimated to be 11,000 km^2, hence the removal of 636.40 ha (6.36km^2) of suitable habitat would result in a 0.06% reduction of the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the national Blue-winged Parrot population.
fragment an existing important population into two or more populations
Blue-winged Parrots occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The Proposed Action is unlikely to fragment the national Blue-winged Parrot population given that the species is highly mobile and suitable habitat is present throughout the surrounding region.
adversely affect habitat critical to the survival of a species
Habitat within the Subject Land and Development Footprint is considered critical habitat, as it is mapped as likely habitat for the Blue-winged Parrot. Hence, the Proposed Action would adversely affect 636.40 ha of critical habitat for this species. While the Proposed Action would lead to the removal of a substantial amount of critical habitat, large areas of habitat that is considered critical would remain within the Subject Land and broader Hay Plains region. Much of the habitat throughout the Blue-winged Parrots distribution is considered critical. The removal of 636.40 ha of critical habitat is minor in comparison, and is unlikely to significantly impact on the Blue-winged Parrot.
disrupt the breeding cycle of an important population
Blue-winged Parrots occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not disrupt the breeding cycle of an important population. Further, the species does not breed within NSW, and therefore the Proposed Action would not disrupt the breeding cycle of the national Blue-winged Parrot population.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The Proposed Action would lead to the removal of 636.40 ha of suitable habitat. However, a large amount of suitable habitat would remain in the Subject Land and within the broader Hay Plains regions, that the species can utilise. Hence, it is unlikely that the removal of suitable habitat would lead to the decline of the species. The Proposed Action would however modify the airspace above and around the wind farm such that Blue-winged Parrots may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. Blue-winged Parrots were recorded on four occasions during the bird utilisation surveys completed for the Proposed Action, and there are 27 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas. The species was assessed as having a 'minor' risk of impact to blade strike and barotrauma within Appendix D because based on a Low likelihood and Moderate consequence of collisions.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The Conservation Advice states that predation by cats and foxes is a threat to the Blue-winged Parrot. Also, invasive weeds are considered to be a threat. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
The Blue-winged Parrot is susceptible to PBFD; a transmissible viral disease which impacts parrots. The Proposed Action is unlikely to result in the introduction of PBFD that may cause the blue-winged parrot to decline.
interfere substantially with the recovery of the species
There is currently no approved Recovery Plan for this species. However, it is not considered likely that the removal of 636.40 ha of suitable habitat would lead to a decline in the species, and therefore would not impact the recovery of the species.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species, however it is unlikely that this would significantly impact the species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Blue-winged Parrot.

4.5 Diamond Firetail

4.5.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Stagonopleura guttata* (diamond firetail).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- No Threat Abatement Plan has been identified as relevant for this species.

4.5.2 Potential Impacts

Potential impacts to this species include:

- Removal of 636.40 ha of suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Potential vehicle collision, resulting in injury or mortality, along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Diamond Firetail to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Noise during construction and/or operation may have a localised effect on remaining habitat in the Subject Land.
- Negligible risk of being impacted wind turbine blade strike (see BDAR Appendix D).

4.5.3 Significant Impact Criteria Considerations

For the purpose of this assessment, criteria are assessed under the following assumptions:

- There are currently estimated to be 136,000 (range 68,000–272,000) mature individuals in the wild. However, the reliability of this estimate is low.
- The estimated extent of occurrence and area of occupancy is 1,500,000 km^2 and 25,000 km^2 respectively, and both have contracting trends (DCCEEW, 2023e).
- Habitat that is considered critical to the survival of the Diamond Firetail includes areas of:
    - Eucalypt, Acacia or Casuarina woodlands, open forests and other lightly timbered habitats.
    - Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding.
    - *Allocasuarina verticillata* within the Mt Lofty Ranges.
    - Further, any habitat mapped as known or likely should be considered critical habitat. The Subject Land and Development Footprint contains known habitat, and therefore should be considered critical habitat (DCCEEW, 2023e).
- There are no defined important populations within the conservation advice. Diamond Firetails are widespread and any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Therefore, any population occurring within the Subject Land would not be considered an important population.

Table 4.5 Assessment of Significance for Diamond Firetail

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Any Diamond Firetails occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population. It is currently estimated that there are 136,000 (range 68,000–272,000) mature individuals in the wild. While the Diamond Firetail has been recorded within the Subject Land, the species is highly mobile and there is suitable habitat in the surrounding region. Therefore, it is unlikely that the removal of 636.40 ha of suitable habitat would lead to a long-term decrease in the size of the national population.
reduce the area of occupancy of an important population
Any Diamond Firetails occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The area of occupancy of the national population of the Diamond Firetail is estimated to be 25,000 km^2, hence the removal of 636.40 ha (6.36 km^2) suitable habitat would result in a 0.02% reduction of the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the Diamond Firetail national population.
fragment an existing important population into two or more populations
Any Diamond Firetails occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not fragment an important population into two or more populations. The Proposed Action is unlikely to fragment the national Diamond Firetail population given that suitable habitat is present throughout surrounding region, they have a wide distribution and the species is mobile.
adversely affect habitat critical to the survival of a species
Habitat within the Subject Land and Development Footprint is considered critical habitat, as it is mapped as likely habitat for the Diamond Firetail. Therefore, the Proposed Action would adversely affect 636.40 ha of critical habitat for this species. The Proposed Action would modify the airspace above and around the wind farm such that Diamond Firetail may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'negligible' risk of impact to blade strike and barotrauma within Appendix D. Diamond Firetail were recorded four times during the bird utilisation surveys completed for the Proposed Action, but there are no other records for the species within 30 km of the Project Area on BioNet Wildlife Atlas. While the Proposed Action would lead to the removal of a substantial amount of critical habitat, large areas of habitat that is considered critical would remain within the Subject Land and broader Hay Plain region. Much of the habitat throughout the Diamond Firetail distribution is considered critical. The removal of 636.40 ha of critical habitat is minor in comparison, and is unlikely to significantly impact on the Diamond Firetail.
disrupt the breeding cycle of an important population
Any Diamond Firetails occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not disrupt the breeding cycle of an important population.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
While the removal of 636.40 ha of suitable habitat would reduce the availability of habitat for the Diamond Firetail, the species has broad habitat preferences and is widely distributed. Hence, it is unlikely that this would lead to a decline in the species. The Proposed Action would however modify the airspace above and around the wind farm such that Diamond Firetail may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. Diamond Firetail was recorded on four occasions during the bird utilisation surveys completed for the Proposed Action, and there are 27 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas. The species was assessed as having a 'negligible' risk of impact to blade strike and barotrauma within Appendix D because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and observations from the Project Area.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The Conservation Advice states that Diamond Firetails are threatened by habitat degradation caused by rabbits. Weeds, particularly exotic annual grasses, are also listed as a threat to this species as they may alter the floristic and structural characteristics of suitable habitat. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
No diseases are listed as a threat to this species within the Conservation Advice. The Proposed Action is unlikely to result in the introduction of disease that may cause the Diamond Firetail to decline.
interfere substantially with the recovery of the species
There is currently no approved Recovery Plan for this species. However, it is not considered likely that the removal of 636.40 ha of suitable habitat would lead to a decline in the species, and therefore would not impact the recovery of the species.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species, however it is unlikely that this would significantly impact the species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Diamond Firetail.

4.6 Latham's Snipe

4.6.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Climate Change, Energy, the Environment and Water (2024). Conservation Advice for *Gallinago hardwickii* (Latham's Snipe).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox.

4.6.2 Potential Impacts

Potential impacts to this species include:

- Removal of 8.88 ha of suitable habitat within the Development Footprint.
- Potential vehicle collision, resulting in injury or mortality, along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Latham's Snipe to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Noise during construction and/or operation may have a localised effect on remaining habitat in the Subject Land.
- Altered hydrology of sites that are seasonally wet including floodplains through change in flooding regimes through irrigation or draining.

4.6.3 Significant Impact Criteria Consideration

For the purpose of this assessment, criteria are assessed under the following assumptions:

- There are currently estimated to be 30,000 (range 15,000–37,000) breeding birds in the wild with a continuing declining trend.
- The extent of occurrence is estimated at 3,430,000 km^2 (range 3,350,000–3,500,000 km^2) and area of occupancy is estimated at 13,000 km^2 (range 13,000–20,000 km^2).
- Habitat critical to the survival of the species refers to areas that are necessary:
    - For activities such as foraging, breeding, roosting, or dispersal.
    - For the long-term maintenance of the species (including the maintenance of species essential to the survival of the sharp-tailed sandpiper, such as macrobenthos).

- To maintain genetic diversity and long-term evolutionary development. Or
- For the re-introduction of populations or recovery of the species.

- The National Directory of Important Migratory Shorebird Habitat identifies all known feeding and roosting sites of Latham's Snipe in Australia (Weller et al. 2020). These areas are identified as internationally or nationally important in accordance with the EPBC Act Policy Statement 3.21 – Industry Guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. No known feeding and roosting sites are identified within the Subject Land, therefore no habitat critical to the survival of this species occurs.

- There are no defined important populations within the conservation advice. The species does not breed in Australia. Therefore, any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Hence, any population occurring within the Subject Land would not be considered an important population.

Table 4.6 Assessment of Significance for Latham's Snipe

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
Lead to a long-term decrease in the size of an important population
Any Latham's Snipe occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population
Any Latham's Snipe occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The area of occupancy of the national population of the Latham's Snipe is estimated to be 13,000 km^2, hence the removal of 8.88 ha (0.88 km^2) of potential habitat would result in a <0.01% reduction of the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the national Latham's Snipe population.
Fragment an existing important population into two or more populations
Any Latham's Snipes occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not fragment an important population into two or more populations. The Proposed Action is unlikely to fragment the national Latham's Snipes population given how widespread the population is, that suitable habitat is present throughout surrounding region, and the species is highly mobile.
Adversely affect habitat critical to the survival of a species
No habitat that is considered critical to the survival of the Latham's Snipe occurs within the Subject Land.
Disrupt the breeding cycle of an important population
Any Latham's Snipe occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not disrupt the breeding cycle of an important population. The Latham's Snipe does not breed in Australia and therefore the Proposed Action would not disrupt the breeding cycle of the species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline
No known feeding or roosting sites for this species are identified within The National Directory of Important Migratory Shorebird Habitat. However, it has been conservatively assumed that there is 8.88 ha of potential habitat that would be removed. Given that this species has broad habitat preferences and is very widespread, it is unlikely that the removal of this small amount of potential habitat would result in the decline of the species. The Proposed Action would however modify the airspace above and around the wind farm such that Latham's Snipe may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'negligible' risk of impact to blade strike and barotrauma within Appendix D. No Latham's Snipe were recorded during the bird utilisation surveys completed for the Proposed Action, and there are 7 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas.
Result in invasive species that are harmful to vulnerable species becoming established in the vulnerable species habitat
The Conservation Advice states that predation by cats and foxes is a threat to the Latham's Snipe. Also, invasive weeds are considered to be a threat. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
Introduce disease that may cause the species to decline
No diseases that are harmful to the Latham's Snipe are listed in the Conservation Advice. Further, it is unlikely that the Proposed Action would lead to the introduction disease.
Interfere with the recovery of the species
There is no approved Recovery Plan for this species. However, it is not considered likely that the removal of 8.88 ha of potential habitat would lead to a decline in the species, and therefore would not impact the recovery of the species.
Conclusion.
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • not adversely affect habitat critical to the survival of a species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Latham's Snipe.

4.7 Painted Honeyeater

4.7.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Conservation Advice *Grantiella picta* Painted Honeyeater (DoE 2015a).
- There is no listing advice for this species, listing assessment information may be available in the Approved Conservation Advice.
- National Recovery Plan for the Painted Honeyeater (*Grantiella picta*) (DAWE 2021a).
- There are no adopted/made threat abatement plans, identified as being relevant for this species.

4.7.2 Potential impacts

Potential impacts to this species include:

- Removal of 7.23 ha of potentially suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Potential vehicle collision along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Plains-wanderer to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Minor risk of being impacted wind turbine blade strike (see BDAR Appendix D).

4.7.3 Significant Impact Criteria Consideration

For the purpose of this assessment, criteria are assessed under the following assumptions:

- The total number of individuals at the time of listing was estimated to be <10 000, based on an extrapolation of counts undertaken in areas of NSW and Victoria. The population is suspected to have declined by 20–29 per cent over the last three generations based on monitoring, a reduced area of occupancy and deteriorating habitat quality (DAWE 2015a).
- The extent of occurrence of the Painted Honeyeater is estimated to be 2,800,000 km^2 and area of occupancy is estimated to be 1,000 km^2 (DAWE 2015a).
- The recovery plan (DAWE 2021a) defines habitat critical to the survival of the Painted Honeyeater as:
    - Known or likely breeding habitat in boree/weeping myall, brigalow woodlands, box-gum woodland and box-ironbark forest on the inland slopes of the Great Dividing Range.

- All preferred foraging species particularly mistletoes of the genus *Amyema* growing on forest and woodland eucalypts and Acacias.
- Habitat for long-term survival of the species being all key biodiversity areas with Painted Honeyeater as a trigger species and suitable habitat in future climate niches.

Key considerations in environmental impact assessments are that the Painted Honeyeater occurs across a large area and are known to be highly mobile however knowledge of their movement is not fully understood. Movement may be seasonal linked to plant productivity, food supply and drought impacts (DAWE 2021a).

There are no defined important populations within the conservation advice. Painted Honeyeater are widespread across mainland Australia and any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Therefore, any population occurring within the Subject Land would not be considered an important population.

Table 4.7 Assessment of Significance for Painted Honeyeater

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Any Painted Honeyeater occurring within the Subject Land would not represent an important population, therefore the Project would not lead to a long-term decrease in the size of an important population. The national population of the Painted Honeyeater was estimated to be roughly 3,750 to 15,000 individuals (DAWE 2015a). Due to the species dispersive habits, the species is considered to have a single population (DAWE 2015a) The Proposed Action is unlikely to lead to a long-term decrease in the Painted Honeyeater's national population size given: • The importance of the habitat to be removed for breeding individuals is likely to be low due to the lack of breeding records in the Development Footprint. • The removal of up to 7.23 ha of potential habitat in the Development Footprint is unlikely to have an adverse impact on the survival of Painted Honeyeater utilising foraging resources within, or dispersing through, the greater region, given that the removal of potential habitat within the Development Footprint is minimal and the high mobility of the species.
reduce the area of occupancy of an important population
Any Painted Honeyeater occurring within the Subject Land would not represent an important population, therefore the Proposed Action would not result in a reduction in the area of occupancy of an important population. The extent of occurrence of the Painted Honeyeater is estimated to be 2,800,000 km^2 and area of occupancy is estimated to be 1000 km^2. The removal of 7.23 ha (0.07 km^2) of potential habitat would result in a <0.01% reduction of in the area of occupancy for the national population of this species. This is a negligible reduction in the area of the occupancy of this species.
fragment an existing important population into two or more populations
Any Painted Honeyeater occurring within the Subject Land would not represent an important population, and therefore the Proposed Action would not fragment an important population into two or more populations. The Proposed Action is unlikely to fragment the national population of the Painted Honeyeater into two or more populations given the Painted Honeyeater's mobility.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
adversely affect habitat critical to the survival of a species
Amyema quandang is present within PCT 26 in the Subject Land, which is considered to be critical habitat for this species. 4.92 ha of PCT 26 is within the Development Footprint and would be removed. While critical habitat would be adversely impacted, it is unlikely that this small amount would significantly impact the survival of the species.
disrupt the breeding cycle of an important population
Any Painted Honeyeater occurring within the Subject Land would not represent an important population, and therefore the Proposed Action would not disrupt the breeding cycle of an important population.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The removal of such a small area of potential habitat is unlikely to lead to a decline in the species. The Proposed Action would however modify the airspace above and around the wind farm such that Painted Honeyeaters may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'minor' risk of impact to blade strike and barotrauma within Appendix D. No Painted Honeyeaters were recorded during the bird utilisation surveys completed for the Proposed Action, and there are 60 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The Conservation Advice identifies that predation by invasive species such as the Black Rat (*Rattus rattus*) is a threat to Painted Honeyeater. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action. Native species identified as a threat include the aggressive Noisy Miner (*Manorina melanocephala*). Competition from the Noisy Miner may be exacerbated by clearance and modification of canopy and midstorey.
introduce disease that may cause the species to decline
The Conservation Advice does not identify any disease that is a threat to the Painted Honeyeater. The Proposed Action is unlikely to result in the introduction of disease that may cause the Painted Honeyeater to decline.
interfere substantially with the recovery of the species
The Recovery Plan objectives are that by 2031: • There is a measured and sustained positive population trend in the number of mature individuals. • The extent, condition and connectivity of habitat of the Painted Honeyeater has been maintained or improved. The Proposed Action would lead to the removal of 7.23 ha of suitable habitat for this species, however this minor reduction in suitable habitat is unlikely to substantially interfere with the recovery of the species.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species, however it is unlikely that this would significantly impact the species • not disrupt the breeding cycle of an important population

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
• have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Painted Honeyeater.

4.8 Sharp-tailed Sandpiper

4.8.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Climate Change, Energy, the Environment and Water (2024). Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- No Threat Abatement Plan has been identified as relevant for this species.
- Department of the Environment (2015). Wildlife Conservation Plan for Migratory Shorebirds.

4.8.2 Potential Impacts

Potential impacts to this species include:

- Removal of 8.88 ha of potentially suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Potential vehicle collision along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Sharp-tailed Sandpiper to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Negligible risk of being impacted wind turbine blade strike (see BDAR Appendix D).

4.8.3 Significant Impact Criteria Considerations

For the purpose of this assessment, criteria are assessed under the following assumptions:

- There are currently estimated to be 71,000 (range 9,500–268,900) mature individuals in the wild with a continuing declining trend.
- The extent of occurrence is estimated at 10,900,000 km^2 (range 10,400,000–11,400,000 km^2) and area of occupancy at 13,000 km^2 (13,000–20,000 km^2) within Australia. These are considered to be stable.
- Habitat critical to the survival of the species refers to areas that are necessary:
    - For activities such as foraging, breeding, roosting, or dispersal.
    - For the long-term maintenance of the species (including the maintenance of species essential to the survival of the Sharp-tailed Sandpiper, such as macrobenthos).
    - To maintain genetic diversity and long-term evolutionary development.
    - For the re-introduction of populations or recovery of the species.
- The National Directory of Important Migratory Shorebird Habitat identifies all known feeding and roosting sites of sharp-tailed sandpiper in Australia (Weller et al. 2020). These areas are identified as internationally or nationally important in accordance with the EPBC Act Policy Statement 3.21 – Industry Guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. No known feeding and roosting sites are identified within the Subject Land, therefore no habitat critical to the survival of this species occurs.
- There are no defined important populations within the conservation advice. The species does not breed in Australia and is widespread both globally and in Australia. Therefore, any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Hence, any population occurring within the Subject Land would not be considered an important population.

Table 4.8 Assessment of Significance for Sharp-tailed Sandpiper

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Any Sharp-tailed Sandpipers occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population.
reduce the area of occupancy of an important population
Any Sharp-tailed Sandpiper occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The area of occupancy of the national population of the Sharp-tailed Sandpiper is estimated to be 13,000 km^2, hence the removal of 8.88 ha (0.88 km^2) of potential habitat would result in a 0.01% reduction of the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the national Sharp-tailed Sandpiper population.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
fragment an existing important population into two or more populations
Any Sharp-tailed Sandpipers occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not fragment an important population into two or more populations. The Proposed Action is unlikely to fragment the national Sharp-tailed Sandpiper population given how widespread the population is, that suitable habitat is present throughout surrounding region, and the species is highly mobile.
adversely affect habitat critical to the survival of a species
No habitat that is considered critical to the survival of the Sharp-tailed Sandpiper occurs within the Subject Land.
disrupt the breeding cycle of an important population
Any Sharp-tailed Sandpiper occurring within the Subject Land are not considered to represent an important population, therefore the Proposed Action would not disrupt the breeding cycle of an important population. The Sharp-tailed Sandpiper does not breed in Australia and therefore the Proposed Action would not disrupt the breeding cycle of the species.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
No known feeding or roosting sites for this species are identified within The National Directory of Important Migratory Shorebird Habitat. However, it has been conservatively assumed that there is 8.88 ha of potential habitat that would be removed. Given that this species has broad habitat preferences and is very widespread, it is unlikely that the removal of this small amount of potential habitat would result in the decline of the species. The Proposed Action would however modify the airspace above and around the wind farm such that Sharpe-tailed Sandpipers may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'minor' risk of impact to blade strike and barotrauma within Appendix D. No Sharp-tailed Sandpipers were recorded during the bird utilisation surveys completed for the Proposed Action, and there are 10 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
No invasive species that are harmful to the Sharp-tailed Sandpiper are listed in the Conservation Advice. It is likely however that feral predators, such as cats and foxes, are harmful to this species. The Proposed Action may lead to an increase in invasive species within the Subject Land. Monitoring and management of invasive fauna and flora would be undertaken throughout the construction and operational phases of Proposed Action.
introduce disease that may cause the species to decline
No diseases that are harmful to the Sharp-tailed Sandpiper are listed in the Conservation Advice. Further, it is unlikely that the Proposed Action would lead to the introduction of disease.
interfere substantially with the recovery of the species
There is no approved Recovery Plan for this species. The Proposed Action is unlikely to substantially interfere with the recovery of Sharp-tailed Sandpiper as only a minor amount of potential habitat would be removed.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
• not adversely affect habitat critical to the survival of a species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the Sharp-tailed Sandpiper.

4.9 Southern Bell Frog

4.9.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- There is no approved conservation advice available for this species.
- National Recovery Plan for the Southern Bell Frog *Litoria raniformis* (Clemann, N. and Gillespie, G.R, 2012).
- Draft Southern Bell Frog (*Litoria raniformis*) Recovery Plan (DEC 2005).
- Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (DEE 2016).

4.9.2 Potential Impacts

Potential impacts to this species include:

- The removal of 52.16 ha of suitable habitat within the Development Footprint.
- Injury or mortality during the construction phase.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Potential vehicle collision along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Southern Bell Frog to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.

- Works would also directly impact on two small areas of the Coleambally outfall drain as a result of potential bridge upgrade works.
- Works may also cause indirect impacts, such as a temporary increase in sedimentation within waterways and floodplains as a result of soil disturbance during excavation activities.

4.9.3 Significant Impact Criteria Consideration

For the purpose of this assessment, criteria are assessed under the following assumptions:

- No extent of occurrence or area of occupancy is provided.
- Critical habitat for the Southern Bell Frog within the Riverina region encompasses large, continuous areas containing a mosaic of permanent and ephemeral waterbodies that are subject to regular flooding, as well as an abundance of events at a local and a landscape scale, and also consider non-breeding refugia and habitat along dispersal channels critical habitat. As described in the National Recovery Plan for the Southern Bell Frog (2012), "Critical of these latter habitat types appear to be that they are large, continuous areas containing both permanent and ephemeral waterbodies that undergo regular flooding, and are surrounded by areas containing suitable refugia in the form of ground debris, vegetation cover and cracking soils". The suitable habitat with the Subject Land and Development Footprint is considered critical to this species.
- For the Southern Bell Frog, any viable population is considered to be an important population for the persistence and recovery of the species (Clemann, N. and Gillespie, G.R, 2012). The Coleambally population of Southern Bell Frogs which occur within the subject land are considered to be an important population, as they are the subject of a long-term study that has contributed significantly to the knowledge of the species. As such, any viable population is considered to be an important population for the persistence and recovery of the species.

Table 4.9 Assessment of Significance for Southern Bell Frog

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
The Proposed Action would directly impact 52.16 ha of suitable breeding, foraging and refuge habitat of the Southern Bell Frog habitat. Bridge upgrade works are proposed at two locations along the Coleambally Outfall Drain, the works in this area are the only proposed impacts to permanent water bodies in the Development Footprint. The majority of the direct impacts would be to the species habitat utilised during areas of rainfall and flooding being ephemeral waterbodies that undergo regular flooding, and are surrounded by areas containing suitable refugia. As the species is highly mobile, and many of the direct impacts can be mitigated through the above measures, it is unlikely that the Project is likely to lead to a long term decrease in the size of an important population The Proposed Action would lead to a loss of 13.51% (52.16 ha) of suitable habitat within the Project. This reduction of habitat may lead to a long-term decrease in the population of the Southern Bell Frog.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
reduce the area of occupancy of an important population
The Southern Bell Frog was recorded within almost every permanent waterbody during the period when targeted species surveys were undertaken. Bell frogs are considered to be highly mobile species and are known to use highly disturbed habitat and locally disperse particularly in intermittently flooded landscaped. This species has been recorded extensively throughout the permanent waterbodies of the site, and likely utilises ephemeral wetlands and floodplains for widespread dispersal during rain triggered mass-breeding events. A maximum of 374.05 ha of suitable habitat for the Southern Bell Frog was identified within the Subject Land, 52.16 ha would be directly removed from the Proposed Action. It is likely that the reduction of 52.16 ha of suitable habitat within 374.05 ha of the Proposed Action would reduce the area of occupancy for the important population.
fragment an existing important population into two or more populations
The population which occurs onsite persists predominantly within permanent waterbodies such as farm dams and the Coleambally Outfall Drain. During flooding events the species is known to utilise ephemeral habitats, such as *Eucalyptus camaldulensis*, *Eucalyptus largiflorens* and lignum freshwater wetlands, as well as low grasslands, with some individuals being recorded travelling up to 1 km within a night. Coleambally Outfall Drain provides connectivity for the species throughout the southern portion to the site, and works would only cause a temporary disruption to the water flow within the channel. The species is considered to be highly mobile, and able to utilise dense vegetation, deep soil cracks and woody debris as shelter. As such the Proposed Action would not fragment the important population into two or more populations.
adversely affect habitat critical to the survival of a species
Indirect impacts to habitat may include edge effects, introduction of weeds and changes in hydrology. These potential impacts would be managed through mitigation measures detailed in The Projects Construction Environmental Management Plan (CEMP). Section 6.9 of the EIS indicates that with implementation of mitigation and management measures that impacts to surface water would be adequately managed during construction and impacts during operation would be limited to runoff and associated localised erosion from impervious surfaces, and accidental chemical spills. Impacts to groundwater during construction and operation are assessed as unlikely as groundwater is very unlikely to be intercepted. These potential limited changes to hydrology are unlikely to have a significant impact on abiotic factors necessary for the species survival both within the Development Footprint or more widely. The Proposed Action would have a small direct impact on the Coleambally Outfall Drain with the removal of 1.8 ha of vegetation. Additionally, there would be direct impacts on the remaining 50.36 ha of suitable ephemeral water bodies and surrounding vegetation. The Proposed Action would adversely directly affect 52.16 ha of habitat that is considered critical to the survival of this species.
disrupt the breeding cycle of an important population
The Southern Bell Frog is reliant on aquatic and riparian habitats and, in some areas, specific hydrological regimes, for breeding and the subsequent development of the larval stage. Loss, modification, degradation and fragmentation of aquatic and adjacent terrestrial habitats are likely to have had a considerable adverse impact on the species (Clemann, N. and Gillespie, G.R, 2012). The breeding cycle of the Southern Bell Frog is during warmer months and is also triggered by flooding or a significant rise in water levels. The species is known to breed from September to April following a rise in water levels. Suitable breeding habitat is present within the Development Footprint with the Southern Bell Frog extensively recorded across the whole of the Subject Land, utilising almost all dams and observed breeding (in amplexus). The Proposed Action would create several potential barriers to the species movement through the construction of roads, fences and wind turbines. Barriers to movement are likely to compromise the ability of the species to respond to periodic drought, changed hydrological regimes and fluctuations in water levels (Robertson et al. 2002; Heard et al. 2004 in Clemann, N. and Gillespie, G.R, 2012). Barriers disrupt the movement of frogs and may compromise the viability of many populations, including disruptions to breeding cycles of the species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
Works would directly impact on two small areas of the Coleambally Outfall Drain as a result of potential bridge upgrade works. Works may also cause indirect impacts, such as a temporary increase in sedimentation within waterways and floodplains as a result of soil disturbance during excavation activities. These indirect impacts would be mitigated through measures detailed in The Projects CEMP. Although the species is a highly mobile species and impacts to the permanent water body (Coleambally Outfall Drain) are minor the Proposed Actions overall impacts to 52.16 ha of habitat include direct clearing of habitat and potential increase in barriers throughout the Project Area. This may impact adversely on the species including their breeding cycle. It is therefore likely that the Proposed Action may disrupt the breeding cycle of the Southern Bell Frog.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
For the Southern Bell Frog, 52.16 ha of suitable habitat occurs within the Development Footprint and would be removed, inclusive 4.02 ha of ephemeral wetlands and 1.8 ha of vegetation at the Coleambally Outfall Drain. This is a substantial amount of habitat, however 374.05 ha of suitable habitat would still remain within the Subject Land. Removal of habitat in this area for roads, fences and wind turbines would alter the current landscape and create barriers for the Southern Bell Frogs movement and potential extent in the Project Area. This impact to suitable habitat containing known populations may result in a species decline.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Introduced fish species, cats and foxes are listed as key threats to this species in the Recovery Plan. To ensure that the direct and indirect impacts to this species from invasive species is minimised, BWF has committed to designing and implementing a comprehensive biodiversity mitigation strategy to minimise unavoidable impacts of the Proposed Action. This would include the preparation of a CEMP with associated biodiversity management measures. With the implementation of these measures, it is considered unlikely that the Proposed Action would result in an increase in invasive species becoming established in Southern Bell Frog habitat.
introduce disease that may cause the species to decline
The Proposed Action does not include any activities which are likely to result in the introduction of a disease harmful to Southern Bell Frog that doesn't already occur within the landscape. Chytrid fungus is already present within the landscape, however, is at lower prevalence than in temperate climatic regions (Turner, A., Wassens, S., & Heard, G. 2021). A BMP should be followed during any works within the subject area to control the risk of introducing any new pathogens to the landscape.
interfere substantially with the recovery of the species
Impact to a critical habitat and population may substantially interfere with the recovery of the species. The Long-term Objective of recovery is to achieve a down-listing of the Southern Bell Frog from Vulnerable to a lower threated category achieved within 10 years of the Plan's adoption. One of the specific objectives to achieve this is to "Secure extant populations". The Proposed Action would interfere with this specific objective as it is clearing 52.16 ha of habitat, with potential impacts to water quality and the remaining ephemeral habitat and so it is likely to substantially interfere within the recovery of the species.
Conclusion
The Proposed Action would: • potentially lead to a significant long-term decrease of an important population • cause a reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
• disrupt the breeding cycle of an important population • modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is likely to decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • interfere substantially with the recovery of the species. The Proposed Action is therefore **likely** to significantly impact the Southern Bell Frog.

4.10 Southern Whiteface

4.10.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Aphelocephala leucopsis* (southern whiteface).
- Listing advice is provided in the Conservation Advice.
- There is no adopted or made Recovery Plan for this species.
- No Threat Abatement Plan has been identified as relevant for this species.

4.10.2 Potential Impacts

Potential impacts to this species include:

- Removal of 636.409 ha of potentially suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Potential vehicle collision, resulting in injury or mortality, along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Southern Whiteface to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Noise during construction and/or operation may have a localised effect on remaining habitat in the Subject Land.
- Negligible risk of being impacted wind turbine blade strike (see BDAR Appendix D).

4.10.3 Significant Impact Criteria Consideration

For the purpose of this assessment, criteria are assessed under the following assumptions:

- Currently there are estimated to be 477,000 (range 236,000–954,000) mature individuals in the wild. The extent of occupancy is estimated to be 4,910,000 km^2 with a stable trend and the area of occupancy is estimated to be 70,000 km^2 (range 34,400–140,000 km^2) with a contracting trend.
- Habitat critical to the survival of Southern Whiteface includes areas of:
    - Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both.
    - Habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat.
    - Living and dead trees with hollows and crevices which are essential for roosting and nesting.
    - Further, any habitat mapped as known or likely should be considered habitat critical for the survival of the species. The Subject Land and Development Footprint contains likely habitat, and therefore should be considered habitat critical for the species.
- There are no defined important populations within the conservation advice. Southern Whitefaces are widespread across southern Australia and any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Therefore, any population occurring within the Subject Land would not constitute an important population.

Table 4.10 Assessment of Significance for Southern Whiteface

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Any Southern Whiteface occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population.
reduce the area of occupancy of an important population
Any Southern Whiteface occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The area of occupancy of the national population of the Southern Whiteface is estimated to be 70,000 km^2, hence the removal of 636.40 ha (6.36 km^2) potential habitat would result in a 0.01% reduction in the area of occupancy for this species. This is a negligible reduction in the area of occupancy of the Southern Whiteface national population.
fragment an existing important population into two or more populations
Any Southern Whiteface occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The Proposed Action is unlikely to fragment the national Southern Whiteface population given that suitable habitat is present throughout surrounding region, and the species is mobile.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
adversely affect habitat critical to the survival of a species
Habitat within the Subject Land and Development Footprint is considered habitat critical for the survival of the species, as it is mapped as likely habitat for the southern whiteface. Therefore, the Proposed Action would conservatively directly impact 636.40 ha of habitat critical for this species.
disrupt the breeding cycle of an important population
Any Southern Whiteface occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not disrupt the breeding cycle of an important population.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The removal of 636.40 ha of suitable habitat would reduce the amount of available habitat for the southern whiteface. However, there is a large amount of suitable habitat within the surrounding region that the species can utilise. Hence, it is unlikely that the removal would lead to the decline of the species. The Proposed Action would however modify the airspace above and around the wind farm such that Southern Whiteface may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. Southern Whiteface was recorded 69 times during the bird utilisation surveys completed for the Proposed Action, and there are 191 records for the species within 30 km of the Project Area on BioNet Wildlife Atlas. The species was assessed as having a 'negligible' risk of impact to blade strike and barotrauma within Appendix D because the likelihood of flight at RSA is deemed extremely unlikely based on knowledge of the species' flight behaviour and observations from the Project Area.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
No invasive species are stated as a key threat to the Southern Whiteface in the Conservation Advice. Further, to ensure that the direct and indirect impacts to this species from invasive species is minimised, BWF has committed to designing and implementing a comprehensive biodiversity mitigation strategy to minimise unavoidable impacts of the Project. This would include the preparation of a BMP and CEMP with associated biodiversity management measures. With the implementation of these measures, the Proposed Action would not result in an increase in invasive species within Southern Whiteface habitat.
introduce disease that may cause the species to decline
No diseases are stated as a key threat to the Southern Whiteface in the Conservation Advice. Further, it is unlikely that the Proposed Action would introduce a disease that would cause the species to decline.
interfere substantially with the recovery of the species
There is currently no approved Recovery Plan for this species. However, it is not considered likely that the removal of 636.40 ha of potential habitat would lead to a decline in the species, and therefore would not impact the recovery of the species.
Conclusion
The Project is **unlikely** to significantly impact the Southern Whiteface.

4.11 Superb Parrot

4.11.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Conservation Advice *Polytelis swainsonii* Superb Parrot (TSSC 2016).
- There is no listing advice for this species, listing assessment information may be available in the Approved Conservation Advice.
- National Recovery Plan for the Superb Parrot (*Polytelis swainsonii*) (DAWE 2021).
- There are no adopted/made threat abatement plans, identified as being relevant for this species.

Other policy statements and guidelines: Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (DEWHA 2010).

4.11.2 Potential Impacts

Potential impacts to this species include:

- Removal of 636.40 ha of potentially suitable habitat within the Development Footprint.
- Reduced viability of remaining suitable habitat within the Subject Land as a result of edge effects and transport of weeds.
- Potential vehicle collision along access tracks throughout the Development Footprint during the construction phase.
- Access tracks may increase site access for feral predators (foxes, cats, dogs) and the vulnerability of the Superb Parrot to them; however, the grassland habitat is already fairly open and feral predators are unlikely to have difficulty moving throughout the entire site.
- Minor risk of being impacted wind turbine blade strike (see BDAR Appendix D).

4.11.3 Significant Impact Criteria Consideration

For the purposes of this assessment, criteria are assessed under the following assumptions:

- The extent of occurrence for Superb Parrots was estimated to be approximately 81,200 km^2 and the area of occupancy estimated to be 1000 km^2 in the Bird Action Plan 2000 (Garnett and Crowley 2000). More recent estimates (using the IUCN 2 x 2 km grid method) suggest the AOO is approximately 5,360 km^2 and the EOO (using the convex hull method) is approximately 317,104 km^2 (TSSC 2016b).
- The most recent population estimates in 2020 is 20,000 mature individuals with ongoing decline of the wild population across a substantial portion of their range but increasing numbers in the ACT region (CoA 2021b).

- The habitat critical to the survival of the Superb Parrot includes (DAWE 2021b):
    - Breeding habitat in the riverine forests in the Riverina and box-gum woodlands on the inland slopes and tablelands of Victoria, NSW and ACT.
    - Any known breeding colony (aggregation of at least four adult pairs that attempt to nest in the same year within an 80 ha area where nest sites area separated by one kilometre) with a 10 km buffer area where contiguous habitat.
    - Any potential nest trees with suitable hollows within the buffer zone.
    - Preferred foraging habitat during breeding and non-breeding season.
    - Habitat for the long-term maintenance of the species.
- The Subject Land and Development Footprint does contain potential foraging and breeding habitat, and it is therefore considered critical to the survival of the species.
- Key considerations in environmental impact assessments are that the Superb Parrot occurs across a large area of south-eastern Australia and is highly mobile however knowledge of their exact movements is not fully understood (DAWE 2021b). Seasonal movement is linked to plant productivity, food supply and drought impacts (DAWE 2021b).
- The Conservation Advice does not identify any important populations for the species (TSSC 2016b). It is unlikely that an important population of the Superb Parrot occurs in the Subject Land as it is not at the limit of distribution and there is no evidence of individual or breeding such that it is important for maintaining genetic diversity, or dispersal.

Table 4.11 Assessment of Significance for Superb Parrot

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
Any Superb Parrot occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population.
reduce the area of occupancy of an important population
Any Superb Parrot occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population. The area of occupancy of the national population is estimated to be 1,000 km^2, the removal of 636.40 ha (6.36 km^2) of suitable habitat would lead to a 0.6% reduction in the area of occupancy of the national population.
fragment an existing important population into two or more populations
Any Superb Parrot occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would fragment an important population into two or more populations. The Proposed Action is unlikely to fragment the national population of the Superb Parrot into two or more populations given the Superb Parrot's mobility.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
adversely affect habitat critical to the survival of a species
Habitat critical to the survival of the Superb Parrot does occur within the Development Footprint. Therefore, the Proposed Action would adversely affect 636.40 ha of critical habitat.
disrupt the breeding cycle of an important population
Any Superb Parrot occurring within the Subject Land would not represent an important population, and therefore the Proposed Action would not disrupt the breeding cycle of an important population. A total of approximately 636.40 ha of potential habitat would be impacted by the Proposed Action. There are no breeding records of the Superb Parrot within a 10 km radius of the Development Corridor. The Proposed Action is therefore unlikely to disrupt the breeding cycle of the national population of Superb Parrot.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The Proposed Action would remove 636.40ha of potential breeding and foraging habitat for the Superb Parrot. However, there is a large amount of suitable habitat within the surrounding region that the species can utilise. Hence, it is unlikely that the removal would lead to the decline of the species. The Proposed Action would however modify the airspace above and around the wind farm such that Superb Parrots may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'minor' risk of impact to blade strike and barotrauma within Appendix D. No Superb Parrots were recorded during the bird utilisation surveys completed for the Proposed Action, but there are numerous records for the species within 30 km of the Project Area on BioNet Wildlife Atlas.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The conservation advice does not identify any invasive species that area harmful to the Superb Parrot. Invasive and native species compete for potential nest sites including the common starling (*Sturnus vulgaris*), galah (*Eolophus roseicapilla*), the little corella (*Cacatua sanguinea*) and long-billed corella (*Cacatua tenuirostris*) may become a problem (TSSC 2016b). The Project is unlikely to result in invasive species that are harmful to Superb Parrot becoming established in Superb Parrot habitat.
introduce disease that may cause the species to decline
Superb Parrot is susceptible to PBFD. Stress and the release of infected birds into the wild increase susceptibility to the disease. The Proposed Action is unlikely to result in the introduction of disease that may cause the Superb Parrot to decline.
interfere substantially with the recovery of the species
The overall objectives of the Recovery Plan are that by 2031: • Habitat critical to the survival of the Superb Parrot has been identified, and the extent, condition and connectivity of this habitat has been improved. • Conservation actions have been spatially prioritised to ensure the resilience of Superb Parrot populations under climate change. • The impacts from anthropogenic threats have been reduced. Strategies to achieve the overall objectives are: • Identify, protect, manage and strategically restore Superb Parrot breeding, foraging and movement habitats, at the local, regional and landscape scales. • Define, monitor, reduce and manage threats to the Superb Parrot at the local, regional and landscape scales.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
• Expand and sustain ecologically meaningful monitoring to track changes in Superb Parrot distribution, habitat use and population size, including developing and applying techniques to measure the success of recovery actions. • Improve understanding of Superb Parrot movement ecology across multiple scales to better target protection and restoration measures. • Engage local communities and stakeholders in Superb Parrot conservation. • Coordinate, review and report on Superb Parrot recovery progress. The Proposed Action is considered unlikely to interfere with the recovery of the Superb Parrot.
Conclusion
The Project is **unlikely** to significantly impact the Superb Parrot.

4.12 White-throated Needletail

4.12.1 Relevant Guidelines and Policy Statements

Relevant guidelines and policy statements available for this species include:

- Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC 2019).
- There is no listing advice for this species, listing assessment information may be available in the Approved Conservation Advice.
- There is no Recovery Plan required for this species, the approved Conservation Advice for the species provides sufficient direction to implement priority actions, mitigate against key threats and enable recovery. Management and research activities are being undertaken at international, national, state and local levels National Recovery Plan.
- There are no adopted/made threat abatement plans, identified as being relevant for this species.

Other policy statements and guidelines: Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (DEWHA 2010).

4.12.2 Potential Impacts

Potential impacts to this species include:

- Removal of 636.40 ha of suitable habitat over which it forages.
- Reduction in aerial space due to the presence of wind turbines.
- Moderate risk of turbine strikes (see BDAR Appendix D).

4.12.3 Significant Impact Criteria Consideration

The following assumptions have been made:

- Within Australia, the extent of occurrence is estimated at >20,000 km^2, and the area of occupancy estimated at >18,000 km^2.
- Within Australia, the population size has not been quantified, but it is not believed to approach the thresholds for Vulnerable under the population size criterion (<10,000 mature individuals with a continuing decline).
- There is no defined critical habitat in the Conservation Advice. It is unlikely that the habitat in within the Subject Land and Development Footprint is critical to the survival of this species.
- There are no defined important populations within the conservation advice. The species does not breed in Australia. Therefore, any individuals occurring within the Subject Land would not belong to a key source population for breeding or dispersal, a population necessary for maintaining genetic diversity and are not near the limit of the species range. Hence, any population occurring within the Subject Land would not be considered an important population.

Table 4.12 Assessment of Significance for White-throated Needletail

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
Lead to a long-term decrease in the size of an important population
Any White-throated Needletail occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population
Any White-throated Needletail occurring within the Subject Land would not be considered to represent an important population, therefore the Proposed Action would not reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations
Any White-throated Needletail occurring within the Subject Land would not be considered to represent an important population, therefore the Project would not fragment an important population into two populations. The Proposed Action would not fragment the national population of White-throated Needletails into two or more populations given the species' mobility.
Adversely affect habitat critical to the survival of a species
Due to the dispersive and aerial nature of White-throated Needletails it is unlikely that there is any specific habitat critical for the survival within the Development Footprint. The Project would therefore not adversely affect critical habitat.
Disrupt the breeding cycle of an important population
Any White-throated Needletail occurring within the Subject Land would not be considered to represent an important population, therefore the Project would not disrupt the breeding cycle of an important population. The Project would not disrupt the breeding cycle of the national population of the White-throated Needletail as it does not breed in Australia.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline
The Proposed Action is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the White-throated Needletail is likely to decline. The Proposed Action would however modify the airspace above and around the wind farm such that White-throated Needletails may be at risk of mortality resulting from blade strike while foraging at, or dispersing through, this area. The species was assessed as having a 'moderate' risk of impact to blade strike and barotrauma within Appendix D. No White-throated Needletail were recorded during the bird utilisation surveys completed for the Proposed Action, and there are five records for the species within 30 km of the Project Area on BioNet Wildlife Atlas.
Result in invasive species that are harmful to vulnerable species becoming established in the vulnerable species habitat
The Proposed Action would not result in invasive species that are harmful to White-throated Needletail becoming established in white-throated needletail habitat.
Introduce disease that may cause the species to decline
The Proposed Action is unlikely to result in the introduction of disease that may cause the White-throated Needletail to decline.
Interfere with the recovery of the species
Direct and indirect impacts from wind farms are known threats to White-throated Needletail (TSSC 2019). No individuals were recorded during surveys therefore the Subject Land may only be occasionally used by this species. Therefore, the Proposed Action is unlikely to substantially interfere with the recovery of White-throated Needletail.
Conclusion
The Proposed Action would: • not cause a significant long-term decrease of an important population • cause a relatively minor reduction of the area of occupancy of an important population • not fragment an existing important population into two or more populations • not adversely affect habitat critical to the survival of a species • not disrupt the breeding cycle of an important population • have only minor cause to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent such that the species is not likely to significantly decline • not result in additional invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, nor significantly increase the effects of existing invasive species • not likely introduce disease that may cause the species to decline • not interfere substantially with the recovery of the species. The Proposed Action is therefore **unlikely** to significantly impact the White-throated Needletail.

5.0 Migratory Species

The following migratory species have been assessed due a likelihood of moderate or above and likelihood of wind turbine strike:

- Gull-billed Tern
- Latham's Snipe
- Pacific Swift
- Sharp-tailed Sandpiper
- White-throated Needletail.

In order to assess potential impacts on species listed as migratory under the EPBC Act, consideration of the following classification criteria concerning what is considered important habitat is required.

'Important habitat' for a migratory species is defined in the Matters of National Environmental Significance - Significant impact guidelines (DoE 2013) as:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

The Project Site is located within a region that has the potential to be used by these species during their migration.

Table 5.1 Assessment of Significance for Migratory Species

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
The Proposed Action is unlikely to substantially destroy or isolate an important area of the identified migratory species habitat although it may modify the airspace above the Project Site such that the migratory species may be at risk of mortality resulting from blade strike while foraging at or dispersing through this location.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
The Proposed Action would not result in an invasive species that is harmful to identified migratory species becoming established in an area of important migratory species habitat.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:
seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.
The Subject Land does not support breeding habitat for any of the identified migratory species. Coleambally Outfall Drain within the Subject Land, Oolambeyan National Park to the north and other reserves provide substantial regional foraging and resting habitat. There is potential for these species to be impacted by wind turbine strike while migrating. If the species were to utilise the airspace in the Subject Land the Proposed Action may result in a significant impact to these migratory species due to the risk of wind turbine strike while flying over the Subject Land.
Conclusion
The Proposed Action is unlikely to have a significant impact on the identified migratory species.

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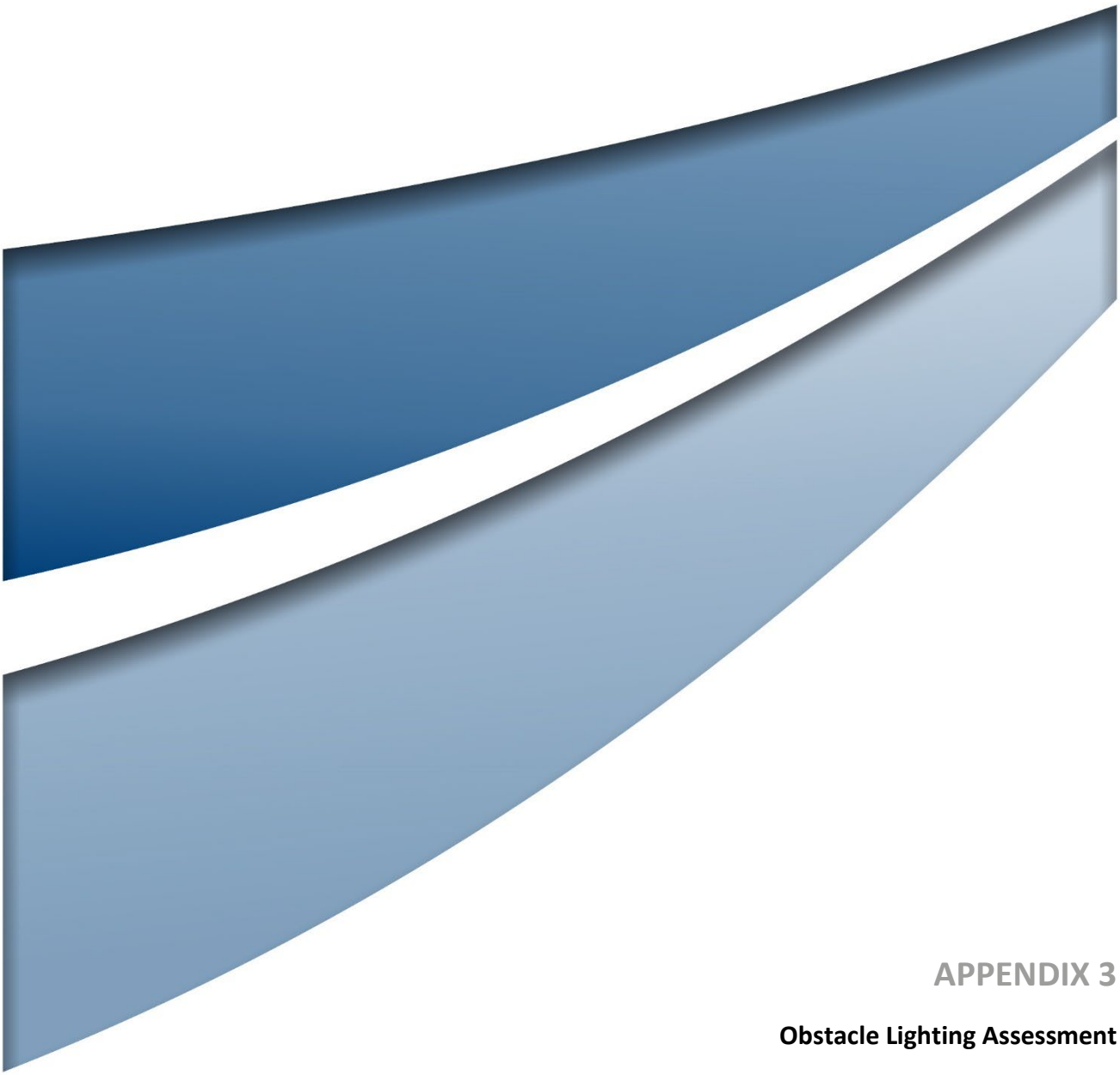

APPENDIX 3

Obstacle Lighting Assessment

Overview

In developing the Project Obstacle Lighting Plan (OLP) BWF has considered the requirements of Australian Government – Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) - National Light Pollution Guidelines for Wildlife (May 2023, V2.0). The implementation of the National Light Pollution Guidelines for Wildlife was supported by Umwelt (Australia) Pty Ltd (Umwelt), an environmental and social consultancy who provided specialist advice for the lighting design and undertook the environmental assessment of potential impacts. Where required, specialist inputs were sought from a Moir Studio a landscape architecture firm with suitable qualifications and experience to undertake landscape character and visual impact assessment.

BWF recognises that natural darkness has conservation value in the same way as clean water, air and soil and should be protected through good-quality lighting design. Accordingly, and in accordance with the National Light Pollution Guidelines for Wildlife, BWF addressed the recommended best practice design principles as outlined below. BWF acknowledges however that the National Light Pollution Guidelines for Wildlife do not provide any specific advice for obstacle lighting associated with wind farms and generally seeks to address issues associated with facility lighting designs at ground or building level, required to reduce safety risks to personnel and to maintain a safe place of work under workplace health and safety requirements e.g. facility, building or walkway lighting at ground level. This is remarkably different to the lighting requirements for wind farm obstacle lighting and the environmental assessment provided herein in scaled as such.

Best Practice Design Principles

The best practice design principles have been addressed by BWF as follows.

Principle	How this has been addressed
1) Start with natural darkness and only add light for specific purposes	• BWF sought to develop the Project without obstacle lighting to wind turbine generators (WTG) however, CASA advised that obstacle lighting was to be implemented for the Project. • CASA's advice is now reflected more broadly in the NSW Government – Renewable Energy Planning Framework – Wind Energy Guideline (DPHI, 2024) that says "…*We acknowledge CASA's expectation to recommend some level of aviation obstacle lighting for tall structures, including wind turbines. For tall structures (including turbines) that are greater than 150 metres above ground level, the most critical structures (turbines at the highest elevations and/or around the project's perimeter) will require lighting.*". It is noted that the 'Wind Energy Guideline' does not apply to the Project (as per transitional arrangements) but is useful for clarify ambiguities such as the need for obstacle lighting on wind farms. • Accordingly, an OLP was developed specifically for the purpose of addressing CASA's advice.

2) Use adaptive light controls to manage light timing, intensity and colour	• *Timing:* the OLP design requires the obstacle lighting operate at night, and at times of reduced visibility. As these time periods will vary during the year, or depending on other circumstances beyond BWF control (e.g., darkness, fog, or atmospheric clarity) a fixed operational time is not proposed.
	• *Intensity:*
	  ○ Individual lights: the OLP identifies the minimum aviation safety light intensity of 200 candela (cd) for the Project. As per CASA's advice international standards require 2,000 candela lighting intensity on the nacelle / generator housing and 200 candelas at the mid-point of the turbine mast. CASA however recommended that 200 cd (as a minimum intensity lighting on the nacelle) would suffice (due mainly to the lack of background lighting in the vicinity of the turbines). BWF are committed to implementing this minimum value to assist reduce impacts to wildlife, reiterating that this 200 cd rating is supported by CASA.
	  ○ Overall Lighting Design: the OLP was designed to have WTG lit in such a manner that aviation light spacing requirements were achieved, while ensuring the overall light intensity of the Project was reduced. This has occurred by only select WTG being lit and hence potential impacts to wildlife minimised, whilst maintaining an acceptable level of aviation safety. Of the proposed 141 WTG only 43 WTG would be lit as per the OLP.
	• *Colour:* There will be two (2) low intensity steady red lights per lit WTG to provide a horizontal beam spread that results in 360° coverage around the obstacle i.e. fixed lights showing red. The frequency range of the red LED light emitted will fall within the range of wavelengths 655 to 930 nanometres (nm). With regards to the National Light Pollution Guidelines for Wildlife, this avoids wavelengths of light considered more sensitive to wildlife (e.g. blue light, 400 nm to 490 nm) and the peak sensitivities identified in *Figure 2 – Comparative light perception among different species groups*.

Principle	How this has been addressed
3) Light only the object or area intended – keep lights close to the ground, directed, and shielded to avoid light spill	The OLP consists of lighting of WTG (or permanent meteorological masts) and the light will be positioned on the hub i.e. on top of the generator housing (or at an equivalent height). For the Project this means that obstacle lights will be fitted at a height of between approximately 133 and 200 m above ground level (AGL). The obstacle lighting is specifically designed for aviation safety and will provide shielding to direct the lights towards aviation operators (i.e. aviation obstacle lighting is designed to focus intensity towards the sky and areas visible to aircraft) and hence minimise artificial light impacting wildlife at ground level. Shielding of the downward component of obstacle lighting is permitted and ensure a) no more than 5% of the nominal light intensity is emitted at or below 5° below the horizontal and b) no light is emitted at or below 10° below horizontal.
4) Use the lowest intensity lighting appropriate for the task	See commentary and commitments above, noting that the minimum aviation safety lighting intensity (200 cd) is appropriate to the Project and will be implemented by BWF.
5) Use non-reflective, dark-coloured surfaces	As noted above, the obstacle lighting is specifically designed for aviation safety and will provide shielding. This will minimise artificial light impacting wildlife at ground level. To minimise the visual impacts of the Project, the WTGs will be finished in matt-white and non-reflective material to reduce visibility. BWF is unable to colour the WTG, or elements of the WTG in “dark-coloured surfaces”.
6) Use lights with reduced or filtered blue, violet and ultraviolet wavelengths	See commentary and commitments above, noting that red obstacle lighting is to be implemented by BWF for the Project.

Environmental Assessment

An environmental assessment of the effects of artificial light on wildlife has then occurred utilising the five (5) steps outlined in the National Light Pollution Guidelines for Wildlife, including the adaptive management of artificial light process. Step 1 to 3 of the process summarised below occurred as early as possible in the Project life cycle, and the resulting information was used to inform the Project design. The outcomes of this assessment are provided below.

Step 1: Describe the Project Lighting

BWF proposes to develop the Project to provide a reliable and affordable source of energy for the people of NSW. The Project is located approximately 36 km south east of the township of Hay, in the Riverina region of south western NSW. The Project is located within the Hay Shire, Murrumbidgee and Edward River LGAs and is within the South West REZ.

As per the Project EIS, the Project Area and its surrounds are characterised by existing agricultural land uses with associated rural residences. Land within and surrounding the Project Area has been subject to extensive historical vegetation clearing associated with agricultural land uses. Agriculture is the predominant land use in the Project Area, primarily sheep grazing, with some limited cattle grazing and smaller mapped areas of cropping. Accordingly, the existing environment does not include any significant sources of artificial light, and at night “skyglow” is not considered to be a dominant feature.

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The Projects obstacle lighting will consist of the following:

- Two (2) low intensity steady red lights, per lit wind turbine, with:
    - fixed lights showing red
    - a horizontal beam spread that results in 360° coverage around the obstacle
    - a minimum intensity of 200 cd
    - vertical beam spread (to 50% of peak intensity) of 10°
    - low-intensity obstacle lights must have a peak intensity of at least 10 cd.
    - a vertical distribution with 50 cd minimum at +6° and +10° above the horizontal

- not less than 10 cd at all elevation angles between –3° and +90° above the horizontal.
- Obstacle lights should operate at night, and at times of reduced visibility.

- Shielding of the downward component of obstacle lighting is permitted, and will be used, such that: a) no more than 5% of the nominal light intensity is emitted at or below 5° below the horizontal, and b) no light is emitted at or below 10° below horizontal. With shielding implemented, two (2) lights must be provided on top of the generator housing in a way that allows at least one of the lights to be seen from every angle in azimuth.
- The frequency range of the LED light emitted will fall within the range of wavelengths 655 nm to 930 nm.
- As per the OLP proposed obstacle lighting layout (see Figure X below), up to 43 of the proposed 141 WTG will be lit, noting that the orange WTG (three (3) WTG in total) are accounted for to allow for Project staging.
- As per the Project EIS, there is minimal elevation change at the Project Area (approximately 94 m Australian height Datum (AHD) along the north western borders to 106 m AHD in central south east area, over approximately 12 km), consistent with the flat nature of the plains which the Project Area lies. In summary, the Project Area is generally level, although it contains minor low rises and depressions. The wider locality is generally flat although it experiences a subtle decrease in elevation from east to west.

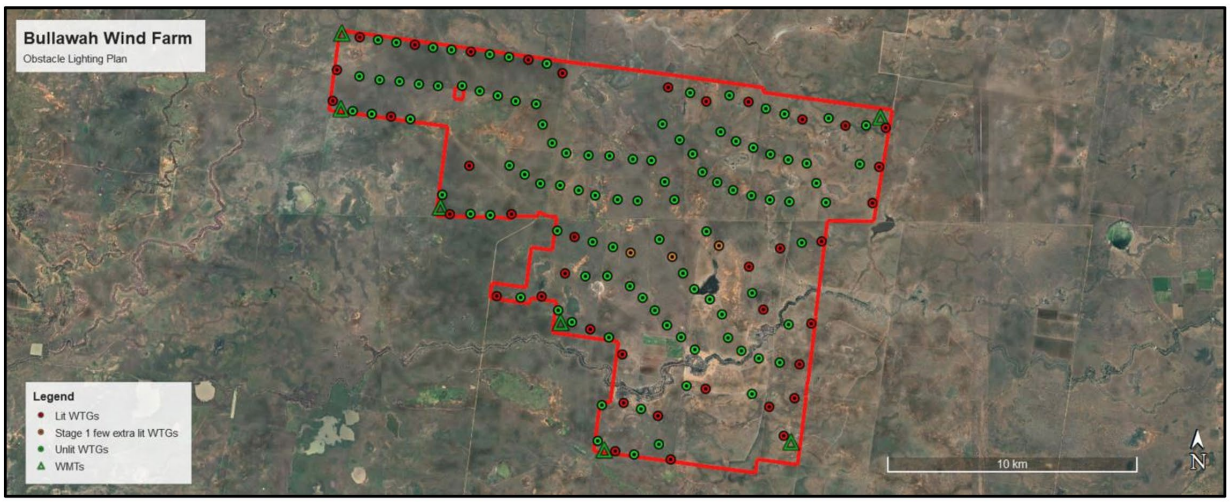

Figure A3.1 Proposed Obstacle Lighting Plan

Source: Aviation Projects.

Light Visibility

Moir Studio was engaged to undertake an assessment of potential obstacle lighting impacts to the Oolambeyan National Park, as documented within the Projects Submissions Report (Umwelt, 2025). This considered a range of matters and provided an evaluation of obstacle lighting visibility with the shielding implemented. It indicates that based on the shielding requirements above and considering a maximum hub height height of 200 m, light spill would not be visible from within 1,130 m of the turbine and only 5% of the nominal light intensity would be visible within 1,130–2,280 m of the WTG. Beyond this distance, light intensity decreases again.

The CASA Advisory Circular AC 139.E-05 v1.1 Obstacles (including Wind Farms) outside the vicinity of a CASA certified aerodrome (October 2022) provides a clear benchmark for visibility distances of aviation lights. It specifies that a 2,000 cd light, which is ten (10) times the intensity of the CASA recommended 200 cd light for the Project, has a visibility range of approximately 4,900 m. Given that the proposed obstacle lighting is one tenth of this intensity, its visibility range would be significantly shorter.

Step 2: Describe wildlife

Section 6.2 of the Project EIS and the associated BDAR (Appendix 6 of the EIS) (Umwelt, 2024) provided a detailed description of biodiversity values. An Amendment Report (and associated Amended BDAR) (Umwelt, 2025) has subsequently been prepared that further details the existing biodiversity values present within the Project disturbance area and surrounding lands. For full details please refer to the Amended BDAR.

However, and in general terms, the Project Area comprises of a mix of native grassland and open woodland in a rural landscape, with off-site road works being within generally disturbed areas of road reserves. No impact to MNES are anticipated at the off-site road works areas.

The main wind farm site i.e. Project Area is located within the Murrumbidgee Interim Biogeographic Regionalisation for Australia (IBRA) Subregion, in the Riverina Bioregion of NSW. The Riverina Bioregion is an ancient riverine plain and alluvial fan composed of unconsolidated sediments with evidence of former stream channels. Vegetation across the bioregion consists of River Red Gum and Black Box forests, box woodlands, saltbush shrublands, extensive grasslands and swamp communities.

The Murrumbidgee Subregion blankets four Mitchell landscapes: Murrumbidgee Depression Plains, Murrumbidgee Scalded Plains, Murrumbidgee Source-bordering Dunes, and Murrumbidgee Channels and Floodplains. The Murrumbidgee Subregion is characterised by alluvial fan with distributary channels and floodplains, undulating plains with depressions. Vegetation consists of River Red gum and River Cooba on channels with Black Box, Lignum, and Old Man Saltbush on floodplains. White Cypress appears on dunes, with Myall, grasses, and saltbush formally being widespread on back plains.

Most of the Project Area is primarily comprised of native grassland and chenopod shrubland, with a smaller proportion of the vegetation consisting of a mosaic of freshwater wetlands and open woodland. River Red Gum – Black Box Woodland wetland of the semi-arid (warm) climatic zone, fringes the Coleambally Outfall Drain that traverses the southern portion of the Project Area. The vegetation within the subject land is subject to ongoing agricultural disturbance, primarily cattle and sheep grazing and low levels of pasture improvement. A small proportion of subject land is comprised of cleared and disturbed land, which is sown with exotic grasses.

No Important Wetlands occur within the disturbance area. The closest wetland areas of significance are the mid-Murrumbidgee Wetlands located approximately 25 km north of the Project. Booligal Swamp is located approximately 130 km north of the Project. One (1) wetland of international importance, NSW Central Murray Forests, is located approximately 80 kms south west of the Project Area. The Coleambally Outfall Drain is an east to west connectivity irrigation drain that provides outflow to creeks south-west of Coleambally. It provides outflow to Eurolie Creek to the west, Carroonboon Creek and Werkenbergal Swap wetland areas to the south-west of the Project Area and traverses through South West Woodland Nature Reserve. It also provides connectivity to Blind Creek to the east of the Project Area and Bowna Swamp, then connecting to Bublebundie Creek. Nyangay Creek and Abercrombie Creek are two (2) other named waterways that occur near the Project Area, and there are several ephemeral first order streams present within the Project Area. Nyangay and Abercrombie Creek are located approximately 10 km north east of the Project.

Oolambeyan National Park is located along the north-eastern boundary of the Project Area. The vegetation along the boundary of the national park is consistent with that within the Project Area, consisting of native grassland and chenopod shrubland.

There are no areas of karst, caves, crevices, cliffs, rocks or other geological features of significance in the Project Area. Soils found within the Project Area are Chromosols and Rudosols, forming scattered patches within the subject land of areas with very severe wind erosion capabilities and moderate to severe acidification hazard capabilities.

The extent of native vegetation cover within the subject land was confirmed and revised where necessary through surveys of the site by Umwelt through 2022 to 2025, as well as through aerial photograph interpretation using ESRI ArcGIS Pro software and the world imagery base map aerial dated 2015 and 2019. There were no differences found between the mapped vegetation extent and aerial imagery utilised by this assessment.

A small proportion of the Project Area land does not contain native vegetation. These areas include land around residential dwellings, access tracks, farm dams, and isolated paddocks where exotic grasses are sown, presumably for livestock feed. In summary and based on the area defined as the Subject Land within the BDAR, native vegetation cover within the project area ranges between 92% and 99%. The vegetation within the Disturbance Footprint is made up of the following five (5) vegetation formations:

- Forested Wetlands.
- Semi-arid Woodlands (Grassy sub-formation).
- Freshwater Wetlands.
- Grasslands.
- Arid Shrublands (Chenopod sub-formation).

Step 3: Risk assessment

Risks were first considered regarding the wildlife categories outlined in the technical appendices of the National Light Pollution Guidelines for Wildlife, the outcomes of which are presented below.

Category	Comment
Marine turtles	Based on a comprehensive biodiversity survey program, there are no marine turtles present within the Project Area, and they are unlikely to be present within 20 km of the Project Boundary. No further assessment required.
Sea birds	Based on a comprehensive biodiversity survey program, there are no sea birds present within the Project Area. Sea birds are not utilising the Project Area and are unlikely to be present within 20 km of the Project Boundary. No further assessment required.
Migratory shorebirds	Migratory shorebirds may traverse the site and utilise habitat both within the Project Area and 20 km of the Project Boundary. However, based on a comprehensive biodiversity survey program, migratory shorebirds birds were not recorded within the Project Area. No further assessment required.
Bats	Based on a comprehensive biodiversity survey program, bats may be present within the Project Area, or within 20 km of the Project Boundary. **Risk assessment undertaken.**
Terrestrial mammals	The OLP is specifically designed to use low intensity, red lights positioned at height e.g. between 148 m AGL and 200 m AGL. They will be fitted to the minimum number of WTG and include shielding to minimise artificial light impacts to wildlife. At ground level emissions from the proposed red LED lights (wavelengths 655 nm to 930 nm) are not expected to dominate the landscape. No further assessment required.
Ecological communities	The OLP is specifically designed to use low intensity, red lights positioned at height e.g. between 148 and 200 m AGL. They will be fitted to the minimum number of WTG and include shielding to minimise artificial light impacts. At ground level emissions from the proposed red LED lights (wavelengths 655 to 930 nm are not expected to dominate the landscape. No further assessment for terrestrial plants, invertebrates, reptiles and amphibians and/or aquatic communities required. Based on a comprehensive biodiversity survey program, terrestrial birds are present within the Project Area, or within 20 km of the Project Boundary. **Risk assessment undertaken.**

Based on this and using information collated in Step 1 and Step 2 of the process, the level of risk to wildlife has been assessed for birds and bats. This has occurred on a case-by-case basis, to address the specific type of wildlife involved, the objectives of lighting and design, and the prevailing environmental conditions.

As is relevant to this risk assessment:

- Consideration of the lighting intensity has occurred with due regard to the Moir Studio lighting visibility analysis summarised above. It is acknowledged that this information is provided regarding human perception of light but in the absence of targeted information, identifies that no significant lighting impacts are anticipated at or near a lit WTG as shielding will prevent any light spill within 1,130 m. Between 1,130 m and 2,280 m of a lit WTG, only 5% of the nominal light intensity would be visible. Beyond 2,280 m, light intensity will decrease with distance. At 4,900 m, any potential spill or glow from a 200 cd light would be negligible, especially when combined with the intervening vegetation.

- The assessment also considers the artificial light selected i.e. the frequency range of the red LED light emitted will fall within the range of wavelengths 655 to 930 nanometres (nm). With regards to the National Light Pollution Guidelines for Wildlife, this avoids wavelengths of light considered more sensitive to wildlife (e.g. blue light, 400 nm to 490 nm) and the peak sensitivities identified in *Figure 2 – Comparative light perception among different species groups* of the National Light Pollution Guidelines for Wildlife.
- Given the intensity and spacing of the proposed obstacle lighting (about 900 m), and shielding, skyglow (i.e. the diffuse glow caused by source light that is screened from view but creates a glow in the atmosphere through reflection and refraction) is not anticipated to occur.
- Light modelling to verify these outcomes with respect to wildlife was not conducted based on the numerous limitations outlined in 'Modelling predicted light' of the National Light Pollution Guidelines for Wildlife.

This risk assessment was undertaken with due regard to Australian Standard AS ISO 31000:2018 Risk Management – Guidelines and in a manner consistent with the Prescribed Impact Assessment already completed for the Project (Appendix D of Amended BDAR). Umwelt's detailed Prescribed Impact Assessments considers the potential impacts from turbine strikes on significant "aerial fauna" i.e. bird and bat species, a key feature of which is the rotor swept area (i.e. the extent of blade area surrounding the hub) associated with the proposed WTG. It therefore provides a consistent and precautionary basis to identify threatened species for consideration in this artificial light risk assessment, being:

- Birds:
    - Barking Owl (*Ninox connivens*)
    - Black Falcon (*Falco subniger*)
    - Blue-winged Parrot (*Neophema chrysostoma*)
    - Diamon Firetail (*Stagonopleura guttata*)
    - Flame Robin (*Petroica phoenicea*)
    - Grey-crowned Babbler (*Pomatostomus temporalis*)
    - Little Eagle (*Hieraaetus morphnoides*)
    - Plains-wanderer (*Pedionomus torquatus*)
    - Southern Whiteface (Aphelocephala leucopsis)
    - Spotted Harrier (*Circus assimilis*)
    - White-fronted Chat (*Epthianura albifrons*)
    - Wedge-tailed Eagle (*Aquila audax*).

- Bats
    - White-striped Freetail-bat (*Austronomus australis*)
    - Inland Free-tailed Bat (*Ozimops petersi*)
    - Southern Free-tailed Bat (*Ozimops planiceps*)
    - Ride's Free-tailed Bat (*Ozimops ridei*)
    - Chocolate Wattle Bat (*Chalinolobus morio*)
    - Gould's Wattle Bat (*Chalinolobus gouldii*)
    - Little Forest Bat (*Vespadelus vulturnus*)
    - Lesser long-eared Bat (*Nyctophilus geoffroyi*)
    - Large Forest Bat (*Vespadelus darlingtoni*)
    - Southern Forest Bat (*Vespadelus regulus*)
    - Little broad-nosed bat (*Scotorepens greyii*)
    - Inland Broad-nosed Bat (*Scotorepens balstoni*)
    - Gould's Long-eared Bat (*Nyctophilus gouldi*)
    - Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)
    - Corben's Long-eared Bat (*Nyctophilus corbeni*)
    - Little Pied Bat (*Chalinolobus picatus*)
    - Inland forest bat (*Vespadelus baverstocki*).

The "likelihood" of impact has not been modified from the detailed Prescribed Impact Assessment (Appendix D of the Amended BDAR) however the "consequence" category has been reduced to account for the indirect nature of impacts from artificial lighting i.e. in rating the artificial lighting risk to wildlife, "consequence" has been utilised evaluate whether wildlife will be disrupted or displaced from important habitat, and whether wildlife will be able to undertake critical behaviours such as foraging, reproduction and dispersal in the vicinity of a WTG; rather than turbine strike. This approach enables a precautionary assessment of risk to threatened bird and bat species and provides consistency with the risk assessment documented in the Prescribed Impact Assessment already undertaken for the Amended BDAR.

The overall risk matrix is provided as follows.

Risk Matrix		**Consequence of artificial lighting impact**		
		Low	**Moderate**	**High**
Likelihood of artificial light impact	**Low**	Negligible	Minor	Moderate
	Moderate	Minor	Moderate	High
	High	Moderate	High	Very High

The resultant risk rating for each bird and bat species provided as follows.

Common Name	Species Name	Likelihood	Consequence	Mitigated Risk Rating
Birds				
barking owl	*Ninox connivens*	Low	Low	Negligible
black falcon	*Falco subniger*	High	Low	Moderate
blue-winged parrot	*Neophema chrysostoma*	Moderate	Low	Minor
diamond firetail	*Stagonopleura guttata*	Low	Low	Negligible
flame robin	*Petroica phoenicea*	Low	Low	Negligible
grey-crowned babbler	*Pomatostomus temporalis*	Low	Low	Negligible
little eagle	*Hieraaetus morphnoides*	High	Low	Moderate
plains-wanderer	*Pedionomus torquatus*	Low	Moderate	Minor
southern whiteface	*Aphelocephala leucopsis*	Low	Low	Negligible
spotted harrier	*Circus assimilis*	Moderate	Low	Minor
white-fronted chat	*Epthianura albifrons*	Low	Low	Negligible
Wedge-tailed eagle	*Aquila audax*	High	Low	Moderate
Bats				
white-striped freetail-bat	*Austronomus australis*	High	Low	Moderate
inland free-tailed bat	*Ozimops petersi*	Moderate	Low	Minor
southern free-tailed bat	*Ozimops planiceps*	Moderate	Low	Minor
Ride's free-tailed bat	*Ozimops ridei*	Moderate	Low	Minor
chocolate wattled bat	*Chalinolobus morio*	Moderate	Low	Minor
Gould's wattle bat	*Chalinolobus gouldii*	High	Low	Moderate
little forest bat	*Vespadelus vulturnus*	Moderate	Low	Minor
lesser long-eared bat	*Nyctophilus geoffroyi*	Moderate	Low	Minor
large forest bat	*Vespadelus darlingtoni*	Low	Low	Negligible
southern forest bat	*Vespadelus regulus*	Low	Low	Negligible
yellow-bellied sheathtail-bat	*Saccolaimus flaviventris*	High	Low	Moderate
Corben's long-eared bat	*Nyctophilus corbeni*	Moderate	Low	Minor
Inland forest bat	*Vespadelus baverstocki*	Moderate	Low	Minor
Little pied bat	*Chalinolobus picatus*	Low	Low	Negligible
Gould's long-eared bat	*Nyctophilus gouldi*	Moderate	Low	Minor
Inland broad-nosed bat	*Scotorepens balstoni*	Moderate	Low	Minor
Little broad-nosed bat	*Scotorepens greyii*	Moderate	Low	Minor

The risk ratings tabulated above are not considered to be significant (no risks above moderate are identified), and no further action is proposed with respect to the assessment of artificial lighting under the EPBC Act and/or relevant state or territory legislation.

These risks are, however, considered further regarding Step 4 to Step 6 of the process, as outlined below.

Step 4: Artificial light management plan

An artificial light management plan is not proposed to be prepared, based on the information and assumptions documented for Step 1 to Step 3.

The preparation and approval of a Biodiversity Management Plan (BMP) will however occur prior to construction. This will be prepared by a qualified ecologist in consultation with relevant State agencies. Prior to clearing, the operational management component will be approved with consultation with relevant State agencies. The BMP will include but not limited to:

- Implementing mitigation measures.
- Evaluating mitigation measures.
- Objectives for monitoring.
- Performance of proposed measures.
- Informing an adaptive management method for additional offsets which further impacts are identified.
- Remedial action.

With respect to the proposed obstacle lighting the BMP will include a requirement for an artificial lighting audit to occur as per select aspects of Appendix D – Artificial light auditing of the National Light Pollution Guidelines for Wildlife.

This will ensure that industry best practice is achieved via an onsite inspection of the built Project (wind farm and obstacle lighting component) to ensure it meets design specifications, and to ensure that no additional impacts to those considered in this environmental assessment occur.

This artificial light audit will include a site visit to:

- confirm compliance with the artificial light management practices outlined in this assessment
- check as-built compliance with engineering design i.e. the OLP
- gather details on each luminaire in place
- a simple visual inspection of the facility lighting from the wildlife habitat.

The audit will not include:

- review the artificial light monitoring at the project site, as no biological light monitoring is proposed
- review artificial light monitoring at the wildlife habitat, as no biological light monitoring is proposed.

The steps to carry out an artificial light audit will therefore include:

- Review the artificial light management plan i.e. confirm compliance with the artificial light management practices outlined in this assessment.
- Review best practice light management or approval conditions.
- Review as-built drawings for the lighting design.
- Check for compliance with the approved pre-construction (front end) lighting design.
- Conduct a simple visual inspection both during the day and at night to visually check the placement, number, rated intensity, orientation and management of each obstacle light.
- A visual inspection of the obstacle lighting from the location of the wildlife habitat and, where feasible, the perspective of the wildlife.
- Record, collate and report on the findings and include any nonconformances. BWF will consider any differences between baseline and post-construction observations.
- Make recommendations for any improvements or modifications to the lighting design that will decrease the impact on wildlife.

The audit would be conducted by an appropriately qualified environmental practitioner/technical specialist during a site visit.

Step 5: Biological and light monitoring and auditing

Biological light monitoring is not proposed to be undertaken, based on the information and assumptions documented for Step 1 to Step 3. A BMP will however be prepared addressing the matters outlined above.

Step 6: Review

Once the above-mentioned artificial light audit has been completed, a review of whether the Project's lighting objectives have been met will be conducted. This review will incorporate any changing circumstances and make recommendations for continual improvement. The recommendations will be incorporated through upgraded mitigations, changes to procedures, and renewal of the OLP and BMP where necessary.

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Appendix F - Fisheries Management Act Assessment of Significance

1.0 Fisheries Management Act Assessment of Significance

1.1 Silver perch (*Bidyanus bidyanus*)

The silver perch (*Bidyanus* bidyanus) is a freshwater fish endemic to the Murray-Darling river system (all states and sub-basins), listed as Vulnerable under the NSW *Fisheries Management Act 1994*. Historically the species was found throughout the river system, however, current population decline means the species is now absent from a majority of its former range, with only one large self-sustaining population remaining in the central Murray River (DPI 2017). The species is subject to an aquaculture industry, and hatchery-bred silver perch are stocked for human consumption in a number of impoundments within east coast river systems, however, these populations are not considered to have high conservation value due to their domesticated behaviour and genetics (Threatened Species Scientific Committee, 2013).

Silver Perch are a highly migratory species, known to move over large distances upstream to find suitable spawning ground in spring and summer (DPI 2017). Silver perch are reported to prefer areas with faster flowing water, including areas of rapids, as well as open sections of river. Spawning is known to occur in habitat where water flows over gravel or rock substrate. Fertilised eggs are free floating, and passively drift with the current for approximately 30 hours before hatching (DPI 2006).

The silver perch was indicated as potential occurring within the Coleambally Outfall drain (NSW DPI 2024a) which resides within the subject land. Targeted surveys for this species were not completed, as such, an assessment of the potential impact on this species has been completed below.

Table 1.1 7-part test for Silver Perch – Vulnerable

The following factors are to be taken into account in making a determination under Section 221ZV of the FM Act as to whether the proposed activity is likely to significantly affect threatened species, populations or ecological communities:
a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,
The Coleambally Outfall Drain has been identified as potential habitat within the subject land for the silver perch. The drain is a highly managed irrigation channel with a number of weirs and levees already in place which already have a significant impact on the water flow and fish passage throughout the irrigation system. The channel is a highly modified, dirt bottomed water way, approximately three metres wide, up to two metres deep, and is subject to regular clearing of vegetation, debris and sediment to ensure consistent flow throughout the system. Silver perch prefer areas with high water flows and rapids, large open areas of water within waterways, and require gravel or rock bottomed waterways to spawn. If the silver perch does occur within the drain, it is likely to only serve as transitional habitat between areas of more suitable breeding or foraging habitat. The proposed crossing upgrade works may result in a small impact to the waterway; however, the impact would largely be confined to the construction phase, which may require disruption to water flows to complete works, and potentially cause temporary increased in sedimentation within the waterway. To stop water flow, a levee occurring approximately 250 m upstream from the bridge occurring on Bullawah Road would need to be closed and would temporarily result in reduced water flow to up to 9 km of the Coleambally Outfall Drain while construction occurred. Once construction was complete, water flow would be restored to levels seen previously. Disruptions to water flow such as this regularly occur within the Coleambally Outfall Drain due to irrigation demands and channel maintenance works.

The following factors are to be taken into account in making a determination under Section 221ZV of the FM Act as to whether the proposed activity is likely to significantly affect threatened species, populations or ecological communities:
It is very unlikely that the short-term impacts to potential transitional habitat within an already highly modified waterway would have a significant impact on the life cycle of the species to the point that the local population would be put at risk of extinction.
b) in the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,
Not applicable.
c) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
Not applicable.
ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable.
d) in relation to the habitat of a threatened species, populations or ecological community:
i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
Removal of habitat as a result of the proposed works would only occur temporarily during the construction phase of the proposed bridge upgrades. Water flow would likely need to be temporarily stopped from an upstream levee to allow construction to take place, however, all available silver perch habitat would be restored at completion of construction. Long term modification of habitat would consist of additional supports potentially within the waterway, which would not impact on fish passage. Short term increase in sedimentation may also occur downstream of the proposed upgrades, however, this is not likely to have an impact on a population using the channel as transitional habitat between more preferable areas.
ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
Temporary fragmentation is likely to occur within the Coleambally Outfall drain during the construction phase of the bridge upgrade, as waterflow will need to cease to allow for additional supports to be built. However, the Coleambally Outfall Drain is subject to continuous disruptions in water flow due to changing requirements of agricultural irrigation, and silver perch that may occur within the channel would be subject to these types of flow disruptions regularly. On completion of works, water flow and connectivity will return to previous levels, ensuring that the works will not cause fragmentation of habitat for any silver perch population within the area.
iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,
As mentioned above, The Coleambally Outfall Drain presents low quality habitat for silver perch, and if used by the species, likely only serves as transitional habitat between areas of more suitable foraging and spawning habitat. Any individuals utilising the channel as a habitat corridor would already be subject to continual changes in water flows, sedimentation levels and are faced with crossing a number of weirs and levees. The area of habitat that will have long term modification comprised approximately 0.1 ha of area within and around the channel, and will not impact on fish passage for any species using the channel.

The following factors are to be taken into account in making a determination under Section 221ZV of the FM Act as to whether the proposed activity is likely to significantly affect threatened species, populations or ecological communities:
e) whether the proposed development or activity is likely to have an adverse effect on critical habitat (either directly or indirectly,
The proposed development is not likely to directly or indirectly impact on any areas that are listed in either the Register of Critical Habitat kept by the Director General, DCCEEW, or the Register of Critical Habitat kept by the Director General, DPI. Critical habitat has not been defined for this species. It is unlikely that Coleambally Outfall Drain contains critical habitat for the Silver Perch, due to there being no known records within 30 km of the channel, and the quality of the habitat itself being so low.
f) whether the proposed development or activity is consistent with a Priorities Action Statement,
The Project will include sedimentation and erosion management measures to minimise potential water quality impacts and ensure that impacts to the habitat and connectivity of potential silver perch habitat is temporary. None of the other priority actions listed in the priority's actions statement for the silver perch apply to the project (DPI 2006).
g) whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of a key threatening process.
Key threatening processes of relevance to silver perch include: • Degradation of riparian vegetation along NSW water courses. • Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams. • Introduction of fish to waters within a river catchment outside their natural range. • Removal of large woody debris from New South Wales rivers and streams. The vegetation along the Coleambally Outfall Drain has largely been mapped as non-native, and is regularly cleared of vegetation and woody debris to maintain irrigation rates. The works will make use of existing structures to manage water flow during the construction phase, and will not implement any new levees or weirs. Their operation may cause alteration to the flow regimes, however, the channel is highly managed, and does not follow natural flow regimes during its general operation. The channel is already occupied by invasive carp (*Cyprinus carpio*) and mosquito fish (*Gambusia holbrookii*), and works are not likely to introduce any out of range to this waterway, nor introduce any fish from this water way to another.
Conclusion
Given that the species has not been recorded within 30 km of the Coleambally Outfall Drain, the drain does not provide quality habitat for the species, and the small-scale nature and extent of the impacts from the proposed activity, the proposed action is considered unlikely to significantly impact on the silver perch (*Bidyanus bidyanus*).

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
lead to a long-term decrease in the size of an important population of a species
The Coleambally Outfall Drain has been identified as potential habitat within the subject land for the silver perch. The drain is a highly managed irrigation channel with a number of weirs and levees already in place which already have a significant impact on the water flow and fish passage throughout the irrigation system. The channel is a highly modified, dirt bottomed water way, approximately three metres wide, up to two metres deep, and is subject to regular clearing of vegetation, debris and sediment to ensure consistent flow throughout the system.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
Silver perch prefer areas with high water flows and rapids, large open areas of water within waterways, and require gravel or rock bottomed waterways to spawn. If the silver perch does occur within the drain, it is likely to only serve as transitional habitat between areas of more suitable breeding or foraging habitat. The proposed crossing upgrade works may result in a small impact to the waterway; however, the impact would largely be confined to the construction phase, which may require disruption to water flows to complete works. During this phase, drilling or excavation may create a temporary increase in sedimentation within the channel while excavation or drilling works precede. As noted previously, the channel is a highly managed waterway and is already subject to consistent water flow disruptions, and increases in sedimentation during vegetation clearance and channel widening works. It is very unlikely that the short-term impacts to transitional habitat would lead to a long term decrease in the size of an important population of silver perch.
reduce the area of occupancy of an important population
As mentioned above, it is unlikely that the Coleambally Outfall Drain provides suitable habitat to support any significant breeding or foraging populations of the silver perch, however, may provide connectivity between more suitable areas for the species. During the construction phase of work, water supply to the section of channel requiring works may be reduced or shut of completely, however, this impact would only be temporary, and is unlikely to be impacting on an important population of silver perch.
fragment an existing important population into two or more populations
As mentioned above, the Coleambally Outfall Drain may provide a source of passage to silver perch travelling between more suitable breeding or foraging habitat. During the construction phase of the bridge upgrades, temporary blockages to fish passage may be required, however, water flow will be restored as soon as construction is completed, causing no long term fragmentation to any silver perch population.
adversely affect habitat critical to the survival of a species
Critical habitat has not been identified for this species, and as such, any potential habitat is treated as important. As mentioned above, Coleambally Outfall Drain likely only provides potential transitional habitat for silver perch between more suitable foraging or spawning habitat. The potential bridge upgrades will likely require a short term water flow stoppage which construction takes place, after which, habitat would return to previous state. The project will not adversely affect habitat critical to the survival of the species.
disrupt the breeding cycle of a population
Silver perch are unlikely to utilise the habitat within the subject land as breeding habitat, due to the lack of fast flowing water and gravel covered substrate, however, may use the drain as transitional habitat between more suitable spawning areas. The potential bridge upgrades may require water flow within the drain to temporarily be disrupted during construction, however, the drain is a highly managed waterway and is subject to consistent disruptions to water flows. Impacts to water flows, and potential movements between breeding grounds, would be short term, and would not cause disruption to the breeding cycle of a population of silver perch.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The Coleambally Outfall Drain is a highly managed irrigation channel, subject to constant disruptions in waterflow, clearance works, and impacts from agricultural population. The Freshwater Fish Community Status of this waterway was identified to be poor, and it has not been identified to be Key Fish Habitat within the Murray Darling South Basin. The invasive Mosquito Fish (*Gambusia holbrooki*) and European Carp (*Cyprinus carpio*) were both seen within the drain during surveys. The habitat provided by the channel is already considered to be poor, and the impacts caused by the bridge upgrade works would be temporary. The works would not impact on the habitat to the extent that the species is likely to decline.
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
The Silver Perch is not listed as endangered or critically endangered.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
introduce disease that may cause the species to decline
Exposure to poor water quality can stress the Silver Perch and result in increased susceptibility to other threats, such as infection by various diseases (DPI 2006). The Project will include sedimentation and erosion management measures to minimise potential water quality impacts. Considering the current poor condition of the habitat and the current alteration to the flow regimes, it is unlikely that the proposed works would introduce a disease that may cause the species to decline.
interfere substantially with the recovery of the species
No National Recovery plan for the Silver Perch has been developed. In the absence of the National Recovery Plan the NSW Silver Perch Recovery Plan (DPI 2006) has been considered while addressing this section. The following recovery actions are identified in the NSW Recovery Plan (DPI 2006): • Actively promote actions to ameliorate the impacts of altered river flows on silver perch, giving priority to areas in the vicinity of remnant natural populations • Continue to work on improving fish passage in the Murray-Darling Basin, encouraging priority to be given to areas that support remnant silver perch populations. • Promote further investigation and action to address the impacts of cold water pollution. • Ensure that management authorities carry out appropriate planning and impact assessment and make management decisions which minimise impacts on silver perch habitats. • Encourage protection and rehabilitation of river reaches known to support important silver perch populations. • Feed information on the location of silver perch populations into State and national pest management programs. • Investigate the potential impacts of diseases on wild silver perch populations. • Improve disease management protocols for aquaculture facilities to prevent transfer of disease agents to wild populations. The Proposal is unlikely to interfere substantially with any of the identified Recovery Actions for the Silver Perch.
The Proposal is considered unlikely to have a significant impact on the silver perch (*Bidyanus bidyanus*)

1.2 Flathead Galaxias (*Galaxias rostratus*)

The flathead galaxias is a small native schooling fish endemic to the southern tributaries of the Murray-Darling River system; the Murray, Murrumbidgee and Lachlan Rivers and their tributaries and the upper Macquarie River catchment. The species is listed as a critically endangered species under the *Fisheries Management Act 1994*. The species has seen significant population declines, and is thought to be locally extinct within the lower Murray, Murrumbidgee, Macquarie and Lachlan River systems, with the confirmed record in the Murrumbidgee occurring in 1971.

The flathead galaxias is generally found in in the mid-water of still or gently moving waters of small streams, lakes, lagoons, billabongs and backwaters (DPI 2014). The species prefers water ways with course sand or mud substrate and is though to associated with aquatic vegetation, like ribbon weed (*Vallisneria* spp.). Spawning for the species occurs in spring, when water temperatures reach above 10.5°C.

The flathead galaxias was indicated as potential occurring within the Coleambally Outfall drain within the subject land by the NSW DPI. Targeted surveys for this species were not completed, as such, an assessment of the potential impact on this species has been completed below.

The following factors are to be taken into account in making a determination under Section 221ZV of the FM Act as to whether the proposed activity is likely to significantly affect threatened species, populations or ecological communities:
a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,
The Coleambally Outfall Drain has been identified as potential habitat within the subject land for the flathead galaxias. The drain is a highly managed irrigation channel with several weirs and levees already in place which already have a significant impact on the water flow and fish passage throughout the irrigation system. The channel is a highly modified, dirt bottomed water way, approximately three metres wide, up to two metres deep, and is subject to regular clearing of vegetation, debris, and sediment to ensure consistent flow throughout the system. The proposed development will predominantly impact on potential flathead galaxias habitat during the construction phase of two potential bridge upgrades to existing crossings of the Coleambally Outfall Drain. This upgrade will at least cause small impacts to the levels of sedimentation within the channel, and at most, require temporary stoppage to water flow within the channel by operating existing levees upstream from the works site. Flathead Galaxias are considered to be regionally extinct from the area, and likely do not perform any part of their life cycle within the extremely modified and degraded habitat of Coleambally Outfall Drain. It is very unlikely that a small increase in sedimentation or short term stoppage of water flow, within low quality habitat will have an adverse effect on the life cycle of the flathead galaxias to the point that the species is likely to be placed at risk of extinction.
b) in the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,
Not applicable.
c) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
Not applicable.
ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable.
d) in relation to the habitat of a threatened species, populations or ecological community:
i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
Removal of potential habitat as a result of the proposed works would only occur temporarily during the construction phase of the proposed bridge upgrades. Water flow would likely need to be temporarily stopped from an upstream levee to allow construction to take place, however, all available flathead galaxias habitat would be restored at completion of construction. Long term modification of habitat would consist of additional supports potentially within the waterway, which would not impact on fish passage or impact on habitat quality.
ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The following factors are to be taken into account in making a determination under Section 221ZV of the FM Act as to whether the proposed activity is likely to significantly affect threatened species, populations or ecological communities:
Temporary fragmentation is likely to occur within the Coleambally Outfall drain during the construction phase of the bridge upgrade, as waterflow will need to cease to allow for additional supports to be built. However, the Coleambally Outfall Drain is subject to continuous disruptions in water flow due to changing requirements of agricultural irrigation, and flathead galaxias that may occur within the channel would be subject to these types of flow disruptions regularly. On completion of works, water flow and connectivity will return to previous levels, ensuring that the works will not cause fragmentation of habitat for any flathead galaxias population within the area.
iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,
As mentioned above, The Coleambally Outfall Drain presents low quality habitat for flathead galaxias, and if used by the species, likely is not suitable breeding habitat. Any individuals utilising the channel would already be subject to continual changes in water flows, sedimentation levels and are faced with a number of weirs and levees. The area of habitat that will have long term modification comprised approximately 0.1 ha of area within and around the channel, and will not change the suitability of the channel to provide habitat for the flathead galaxias.
e) whether the proposed development or activity is likely to have an adverse effect on critical habitat (either directly or indirectly,
The proposed development is not likely to directly or indirectly impact on any areas that are listed in either the Register of Critical Habitat kept by the Director General, DCCEEW, or the Register of Critical Habitat kept by the Director General, DPI. Critical habitat has not been defined for this species. It is unlikely that Coleambally Outfall Drain contains critical habitat for the flathead galaxias, due the species being considered regionally extinct from the Murrumbidgee River and its tributaries, and the quality of the habitat itself being so low.
f) whether the proposed development or activity is consistent with a Priorities Action Statement,
The Project will include sedimentation and erosion management measures to minimise potential water quality impacts and ensure that impacts to the habitat and connectivity of potential flathead galaxias habitat is temporary. None of the other priority actions listed in the priority's actions statement for the silver perch apply to the project (DPI 2006).
g) whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of a key threatening process.
Key threatening processes of relevance to flathead galaxias include: • loss or altered connectivity between rivers and floodplains • loss or degradation of habitats in lakes, wetlands and billabongs • spawning and/or recruitment failure due to river regulation and cold-water pollution from impoundments • predation by, and competition with, introduced species such as carp (*Cyprinus carpio*), redfin perch (*Perca fluviatilis*) and gambusia (*Gambusia holbrookii*) • loss of aquatic vegetation such as ribbonweed (*Vallisneria gigantea*) • habitat changes due to agricultural practices such as loss of riparian vegetation and siltation • construction of barriers to migration and recolonisation such as weirs and dams without fishways • pollution from domestic, agricultural and industrial sources.

The following factors are to be taken into account in making a determination under Section 221ZV of the FM Act as to whether the proposed activity is likely to significantly affect threatened species, populations or ecological communities:
The vegetation along the Coleambally Outfall Drain has largely been mapped as non-native, and is regularly cleared of vegetation and woody debris to maintain irrigation rates. The works will make use of existing structures to manage water flow during the construction phase, and will not implement any new levees or weirs. Their operation may cause alteration to the flow regimes, however, the channel is highly managed, and does not follow natural flow regimes during its general operation. The channel is already occupied by invasive carp (*Cyprinus carpio*) and mosquito fish (*Gambusia holbrookii*). The habitat is already considered to be of low quality to flathead galaxias, and the proposed works are not likely to contribute to any listed key threatening process.
Conclusion
Given that the species has not been recorded in within the Murrumbidgee River system or it's tributaries since 1971, the Coleambally Outfall Drain does not provide quality habitat for the species, and the small-scale nature and extent of the impacts from the proposed activity, the proposed action is considered unlikely to significantly impact on the flathead galaxias (*Galaxias rostratus*).

2.0 References

DPI (2006). *NSW Recovery Plan for the Silver Perch (*Bidyanus bidyanus*)*, NSW Government, Fisheries Management Branch.

DPI (2014). *Primefact: Flathead Galaxias* – Galaxias rostratus, Aquatic Ecosystems Unit, Port Stephens Fisheries Institute.

DPI (2017). *Prime Fact: Silver Perch* – Bidyanus bidyanus, Threatened Species Unit, Port Stephens Fisheries Institute.

DPI (2024a). *Fisheries NSW Spatial Data Portal*.

DPI (2024b). *Priorities Action Statement – Actions for Flathead Galaxias*.

Threatened Species Scientific Committee (2013). *Conservation Advice* Bidyanus bidyanus *(silver perch).*

Threatened Species Scientific Committee (2016). *Conservation Advice* Galaxias rostratus (*flathead galaxias).*

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Appendix G - Fauna species recorded

1.0 Fauna Species Recorded

Table 1.1 Fauna Species Recorded

Class	Scientific Name	Common Name	BC Act	EPBC Act
Aves	*Acanthiza chrysorrhoa*	Yellow-rumped thornbill	-	-
Aves	*Acanthiza uropygialis*	Chestnut-rumped thornbill	-	-
Aves	*Accipiter fasciatus*	Brown goshawk	-	-
Aves	*Aegotheles cristatus*	Australian owlet-nightjar	-	-
Aves	*Anas gracilis*	Grey Teal	-	-
Aves	*Anas superciliosa*	Pacific black duck	-	-
Aves	*Anthus novaeseelandiae*	Australasian pipit	-	-
Aves	*Aphelocephala leucopsis*	Southern whiteface	V	V
Aves	*Aquila audax*	Wedge-tailed eagle	-	-
Aves	*Ardea pacifica*	White-necked heron	-	-
Aves	*Artamus cinereus*	Black-faced Woodswallow	-	-
Aves	*Artamus personatus*	Masked woodswallow	-	-
Aves	*Barnardius zonarius*	Australian ringneck	-	-
Aves	*Cacatua galerita*	Sulphur-crested Cockatoo	-	-
Aves	*Chalcites basalis*	Horsefield's Bronze-cuckoo	-	-
Aves	*Chenonetta jubata*	Australian wood duck	-	-
Aves	*Cincloramphus cruralis*	Brown songlark	-	-
Aves	*Cincloramphus mathewsi*	Rufous songlark	-	-
Aves	*Circus assimilis*	Spotted Harrier	V	-
Aves	*Colluricincla harmonica*	Grey shrike-thrush	-	-
Aves	*Coracina maxima*	Ground cuckoo-shrike	-	-
Aves	*Coracina novaehollandiae*	Black-faced cuckoo-shrike	-	-
Aves	*Corcorax melanorhamphos*	White-winged chough	-	-
Aves	*Corvus bennetti*	Little Crow	-	-
Aves	*Corvus coronoides*	Australian Raven	-	-
Aves	*Corvus mellori*	Little Raven	-	-
Aves	*Coturnix pectoralis*	Stubble quail	-	-
Aves	*Cracticus nigrogularis*	Pied butcherbird	-	-
Aves	*Cracticus torquatus*	Grey butcherbird	-	-
Aves	*Dacelo novaeguineae*	Laughing kookaburra	-	-
Aves	*Dicaeum hirundinaceum*	Mistletoebird	-	-
Aves	*Dromaius novaehollandiae*	Emu	-	-
Aves	*Egretta novaehollandiae*	White-faced heron	-	-
Aves	*Elanus axillaris*	Black-shouldered kite	-	-
Aves	*Entomyzon cyanotis*	Blue-faced honeyeater	-	-
Aves	*Eolophus roseicapilla*	Galah	-	-
Aves	*Epthianura albifrons*	White-fronted chat	-	-
Aves	*Falco berigora*	Brown falcon	-	-

Class	Scientific Name	Common Name	BC Act	EPBC Act
Aves	*Falco cenchroides*	Nankeen kestrel	-	-
Aves	*Falco longipennis*	Australian hobby	-	-
Aves	*Falco subniger*	Black falcon	V	-
Aves	*Gavicalis virescens*	Singing Honeyeater	-	-
Aves	*Geopelia placida*	Peaceful Dove	-	-
Aves	*Gerygone fusca*	Western gerygone	-	-
Aves	*Grallina cyanoleuca*	Peewee	-	-
Aves	*Gymnorhina tibicen*	Australian magpie	-	-
Aves	*Haliastur sphenurus*	Whistling Kite	-	-
Aves	*Hieraaetus morphnoides*	Little Eagle	V	-
Aves	*Hirundo neoxena*	Welcome swallow	-	-
Aves	*Malurus cyaneus*	Superb fairy-wren	-	-
Aves	*Malurus leucopterus*	White-winged Fairy-wren	-	-
Aves	*Manorina flavigula*	Yellow-throated miner	-	-
Aves	*Manorina melanocephala*	Noisy miner	-	-
Aves	*Merops ornatus*	Rainbow bee-eater	-	Listed marine
Aves	*Microcarbo melanoleucos*	Little pied cormorant	-	-
Aves	*Milvus migrans*	Black Kite	-	-
Aves	*Mirafra javanica*	Horsfield's bushlark	-	-
Aves	*Neochmia temporalis*	Red-browed Finch	-	-
Aves	*Neophema chrysostoma*	Blue-winged Parrot	V	V
Aves	*Ninox boobook*	Southern Boobook	-	-
Aves	*Ninox connivens*	Barking owl	-	-
Aves	*Northiella haematogaster*	Blue bonnet	-	-
Aves	*Nycticorcax caledonicus*	Nankeen night-heron	-	-
Aves	*Nymphicus hollandicus*	Cockatiel	-	-
Aves	*Ocyphaps lophotes*	Crested pigeon	-	-
Aves	*Pachycephala pectoralis*	Golden whistler	-	-
Aves	*Pachycephala rufiventris*	Rufous whistler	-	-
Aves	*Pardalotus punctatus*	Spotted pardalote	-	-
Aves	*Pardalotus striatus*	Striated pardalote	-	-
Aves	*Passer domesticus*	House Sparrow	-	-
Aves	*Pedionomus torquatus*	Plains-wanderer	E	CE
Aves	*Pelecanus conspicillatus*	Australian Pelican	-	-
Aves	*Petrochelidon ariel*	Fairy martin	-	-
Aves	*Petrochelidon nigricans*	Tree martin	-	-
Aves	*Petroica phoenicea*	Flame robin	V	-
Aves	*Phalacrocorax carbo*	Great cormorant	-	-
Aves	*Phalacrocorax sulcirostris*	Little black cormorant	-	-
Aves	*Phalacrocorax varius*	Pied cormorant	-	-
Aves	*Phaps chalcoptera*	Common bronzewing	-	-

Class	Scientific Name	Common Name	BC Act	EPBC Act
Aves	*Platalea flavipes*	Yellow-billed Spoonbill	-	-
Aves	*Platalea regia*	Royal Spoonbill	-	-
Aves	*Platycercus elegans*	Crimson Rosella	-	-
Aves	*Plectorhyncha lanceolata*	Striped honeyeater	-	-
Aves	*Podargus strigoides*	Tawny Frogmouth	-	-
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned babbler	V	-
Aves	*Psephotus haematonotus*	Red-rumped parrot	-	-
Aves	*Psephotus varius*	Mulga parrot	-	-
Aves	*Ptilotula penicillata*	White-plumed honeyeater	-	-
Aves	*Rhipidura leucophrys*	Willie wagtail	-	-
Aves	*Stagonopleura guttata*	Diamond firetail	V	V
Aves	*Struthidea cinerea*	Apostlebird	-	-
Aves	*Sturnus vulgaris*	Common Starling	-	-
Aves	*Taeniopygia bichenovii*	Double-barred Finch	-	-
Aves	*Taeniopygia guttata*	Zebra finch	-	-
Aves	*Threskiornis moluccus*	Australian White Ibis	-	-
Aves	*Threskiornis spinicollis*	Straw-necked ibis	-	-
Aves	*Todiramphus sanctus*	Sacred kingfisher	-	-
Aves	*Tribonyx ventralis*	Black-tailed native-hen	-	-
Aves	*Turnix velox*	Little button-quail	-	-
Aves	*Tyto alba*	Barn Owl	-	-
Aves	*Tyto javanica*	Eastern Barn Owl	-	-
Aves	*Vanellus miles*	Masked lapwing	-	-
Aves	*Vanellus tricolor*	Banded Lapwing	-	-
Amphibia	*Limnodynastes tasmaniensis*	Spotted Marsh Frog	-	-
Amphibia	*Litoria raniformis*	Southern bell frog	V	E
Amphibia	*Platypectrum ornatum*	Ornate Burrowing Frog	-	-
Mammalia	*Austronomus australis*	White-striped free-tailed bat	-	-
Mammalia	*Chalinolobus morio*	Chocolate wattled bat	-	-
Mammalia	*Chalinolobus gouldii*	Gould's wattle bat	-	-
Mammalia	*Hydromys chrysogaster*	Rakali	-	-
Mammalia	*Ozimops petersi*	Inland free-tailed bat	-	-
Mammalia	*Ozimops planiceps*	Southern free-tailed bat	-	-
Mammalia	*Scotorepens balstoni*	Inland broad-nosed bat	-	-
Mammalia	*Scotorepens greyii*	Little broad-nosed bat	-	-
Mammalia	*Trichosurus vulpecula*	Brushtail possum	-	-
Mammalia	*Vespadelus darlingtoni*	Large forest bat	-	-
Mammalia	*Vespadelus vulturnus*	Little forest bat	-	-
Mammalia	*Vulpes vulpes*	Red fox	-	-
Reptilia	*Suta suta*	Curl Snakes	-	-
Reptilia	*Pseudonaja textilis*	Eastern Brown Snake	-	-

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Appendix H - Weather Data

1.0 Weather Data

Rainfall observations were drawn from the Hay (Bedarbidgal) AWS(075173) which is located approximately 17 km North from the Subject Land. Temperature, wind, and humidity observations were drawn from the Hay Airport AWS (075019) which is located approximately 40 km Northwest from the Subject Land.

Table 1.1 Weather conditions for Flora Surveys from September 2024 to January 2025

Date	Min Temperature	Max Temperature	Rainfall (mm)
September 2024			
29/09/2024	11.6	20.2	0
30/09/2024	3.2	22.2	0.6
October 2024			
01/10/2024	5.1	23.5	0
02/10/2024	4.5	24.7	0
03/10/2024	9.7	28.6	0
04/10/2024	15.6	31.3	0.2
14/10/2024	15.2	32.4	0
15/10/2024	13.9	28.3	0
16/10/2024	15.8	25.2	8.6
17/10/2024	14.4	27.5	0
18/10/2024	18.5	29.3	-
19/10/2024	13.8	25.7	0
20/10/2024	8.9	28.3	0
28/10/2024	13.0	26.5	0
29/10/2024	7.2	28.3	0
30/10/2024	6.9	30.5	0
31/10/2024	11.4	27.0	0
November 2024			
01/11/2024	6.2	25.4	0
02/11/2024	3.1	30.7	0
03/11/2024	16.4	34.6	0
25/11/2024	20.0	33.6	0
26/11/2024	19.7	36.9	13.8
27/11/2024	20.1	33.1	15.4
28/11/2024	14.5	31.2	0.8
29/11/2024	16.8	34.8	0
30/11/2024	19.5	30.1	3.0
December 2024			
01/12/2024	16.0	31.5	0
16/12/2024	22.4	45.4	0
17/12/2024	22.3	32.4	0
18/12/2024	13.4	31.4	0

Date	Min Temperature	Max Temperature	Rainfall (mm)
19/12/2024	15.9	33.1	0
20/12/2024	14.2	37.3	0
January 2025			
12/01/2025	20.6	37.9	0
13/01/2025	17.7	-	3.4
14/01/2025	19.9	31.5	-
15/01/2025	25.5	33.9	0
16/01/2025	12.2	28.9	0
17/01/2025	14.4	33.2	0

Table 1.2 Weather conditions for Stag Watching from September to November 2024

Date	Min Temperature	Max Temperature	Rainfall (mm)	Wind (km/h)
September 2024				
29/09/2024	11.6	20.2	0	41
30/09/2024	3.2	22.2	0.6	39
October 2024				
01/10/2024	5.1	23.5	0	41
02/10/2024	4.5	24.7	0	24
November 2024				
01/11/2024	6.2	25.4	6.2	39
02/11/2024	3.1	30.7	3.1	35

Table 1.3 Weather Conditions for Plains-wanderer surveys

Date	Min Temperature	Max Temperature	Rainfall (mm)	Wind (km/h)
November 2024				
04/11/2024	13.4	26.6	0	37
05/11/2024	8.4	30.2	0	26
06/11/2024	16.3	40.7	0	59
07/11/2024	16.4	26.0	0	67
08/11/2024	8.4	26.8	0	50
09/11/2024	5.8	27.2	0	28
10/11/2024	8.9	29.7	0	37
11/11/2024	14.5	32.5	0	35
12/11/2024	15.9	33.0	0	50
13/11/2024	16.4	28.8	1.6	57
14/11/2024	9.7	28.4	0.2	41
15/11/2024	6.6	30.9	0	30

Date	Min Temperature	Max Temperature	Rainfall (mm)	Wind (km/h)
December 2024				
02/12/2024	13.8	38.6	0	50
03/12/2024	20.8	35.1	7.4	46
04/12/2024	15.0	33.3	0.2	41
05/12/2024	17.4	39.6	0	35

Table 1.4 Weather conditions for at height analysed bat data from Met mast 1 and 2

Met Mast	Date	Min Temperature	Max Temperature	Rainfall (mm)	Wind (km/h)
Mast-1_100m Mast-1_50m Mast-2_50m	13/02/2024	22.5	40.2	0	65
	14/02/2024	13.5	27.0	0	46
	15/02/2024	9.6	30.4	0	37
	16/02/2024	12.9	35.2	0	28
	17/02/2024	13.8	37.5	0	35
	18/02/2024	13.3	35.8	0	39
	19/02/2024	12.3	34.6	0	31
	20/02/2024	15.7	35.7	0	48
	21/02/2024	19.3	35.9	0	41
	22/02/2024	21.2	40.7	0	43
	23/02/2024	19.2	28.5	0	52
	24/02/2024	9.8	30.6	0	39
	25/02/2024	11.7	35.7	0	33
	26/02/2024	14.4	34.7	0	30
	27/02/2024	17.6	37.1	0	-
	28/02/2024	18.8	42.2	0	33
	29/02/2024	20.9	37.4	0	48
	01/03/2024	17.6	39.0	0	43
	02/03/2024	18.9	30.6	0	39
	03/03/2024	10.6	29.5	0	43
	04/03/2024	8.2	32.4	0	33
	05/03/2024	13.9	36.0	0	33
	06/03/2024	14.4	38.0	0	31
	08/03/2024	17.0	39.0	0	30
	09/03/2024	24.0	39.2	0	39
Met-2_50m	10/03/2024	20.7	36.9	0	39
Mast-1_100m, Met-2_50m	11/03/2024	17.3	37.7	0	37
Mast-1_100m	12/03/2024	21.9	39.7	0	-
	15/03/2024	15.1	32.2	0	33
Mast-1_100m, Met-2_50m	17/03/2024	16.2	29.8	0	30

Met Mast	Date	Min Temperature	Max Temperature	Rainfall (mm)	Wind (km/h)
Mast-1_50m	18/03/2024	16.7	32.2	0	33
Mast-1_100m	19/03/2024	20.7	37.1	0	50
Met-2_50m	21/03/2024	5.3	27.1	0	33
Mast-1_50m	22/03/2024	7.9	30.1	0	26
Mast-1_100m	25/03/2024	9.5	29.3	0	33
Met-2_50m	28/04/2024	5.8	27.5	0	35

Table 1.5 Weather Conditions for the Bush Stone-curlew

Date	Min Temperature	Max Temperature	Rainfall (mm)	Wind (km/h)
04/03/2025	14.8	35.5	0	32
05/03/2025	20.7	35.1	0	28
06/03/2025	16.8	36.1	0	34

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