Appendix A

BDAR requirements compliance

Table A.1 Assessment of BDAR compliance with BAM 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 project	Section 1.1.1 Section 1.1.2 Section 1.1.4
		☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	Section 1.1.3 Figure 14.5
		☒ general description of the subject land	Section 1.1.3 Section 1.1.4
		☒ sources of information used in the assessment, including reports and spatial data	Section 1.5 Chapter 13 (References)
		☒ identification and justification for entering the BOS	Section 1.2
		Maps and tables	
		☒ Map of the subject land boundary showing the final project footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 14.1 Figure 14.2 Figure 14.5 Figure 14.6 Figure 14.14

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
Landscape	Sections 3.1 and 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 3.2.2
		☒ per cent native vegetation cover in the assessment area (as described in BAM section 3.2)	Section 3.3
		☒ IBRA bioregions and subregions (as described in BAM subsection 3.1.3(2.))	Section 3.2.1
		☒ rivers and streams classified according to stream order (as described in BAM subsection 3.1.3(3.) and Appendix E)	Section 3.2.3
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM subsection 3.1.3(3.))	Section 3.2.3
		☒ connectivity of different areas of habitat (as described in BAM subsection 3.1.3(5–6.))	Section 3.2.4
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing projects, soil hazard features (as described in BAM subsections 3.1.3(7.) and 3.1.3(12.))	Section 3.2.5
		☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM subsection 3.1.3(8–9.))	Section 3.2.6
		☒ any additional landscape features identified in any SEARs for the project	Section 3.2.8
		☒ NSW (Mitchell) landscape on which the subject land occurs	Section 3.2.7
		☒ 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 2.1 to Section 2.6

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		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 14.1
		☒ 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 14.2
		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	Figure 14.1 Figure 14.2

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ any additional landscape features identified in any SEARs for the project ☒ NSW (Mitchell) landscape on which the subject land occurs	
		Data	
		☐ All report maps as separate jpeg files	To be submitted once BDAR is finalised
		Individual digital shape files of:	–
		☐ subject land boundary	To be submitted once BDAR is finalised
		☐ assessment area (i.e. subject land and 1500 m buffer area) boundary	To be submitted once BDAR is finalised
		☐ cadastral boundary of subject land	To be submitted once BDAR is finalised
		☐ areas of native vegetation cover	To be submitted once BDAR is finalised
		☐ landscape features	To be submitted once BDAR is finalised
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 4.1 Figure 14.8
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM subsection 4.1.2)	Section 4.1.2
		☒ 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 2.2.1 Section 4.1

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM section 4.2	Section 2.2.3 Section 2.2.4 Section 2.3
		☒ 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 5.6
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	Section 4.2
		☒ vegetation class	Section 4.2
		☒ extent (ha) within subject land	Section 4.2
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM section 4.2(1–3.))	Section 4.2
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	Section 4.2 Appendix D (Vegetation survey data)
		☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM subsection 4.2.2(1–2.))	Section 4.2
		☒ estimate of per cent cleared value of PCT (BAM subsection 4.2.1(5.))	Section 4.2
		Describe the vegetation integrity assessment of the subject land, including:	–
		☒ identification and mapping of vegetation zones (as described in BAM subsection 4.3.1)	Section 4.4 Figure 14.12

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and subsection 3.3.2)	Section 4.4
		☒ area (ha) of each vegetation zone	Section 4.4
		☒ assessment of patch size (as described in BAM subsection 4.3.2)	Section 4.4
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM subsection 4.3.4(1–2.)	Section 4.4 Section 4.5
		☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM subsection 4.3.3(5.))	Section 4.4
		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)	Not applicable.
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	Not applicable.
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	Not applicable.

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		Maps and tables	
		☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 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 14.8
		☒ Map of PCTs within the subject land (as described in BAM section 4.2(1.))	Figure 14.9
		☒ Map of vegetation zones within the subject land (as described in BAM subsection 4.3.1)	Figure 14.12
		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 14.7
		☒ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 14.11 Table 4.72 and Table 4.73
		☒ 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 14.12 Table 4.77, Table 4.78 and Table 4.79
		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 4.5.2 Table 4.80, Table 4.81 and Table 4.82
		Data	
		☐ All report maps as separate jpeg files	To be submitted once BDAR is finalised
		☒ Plot field data (MS Excel format)	Appendix D (Vegetation survey data)

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ Plot field datasheets	Appendix D (Vegetation survey data)
		Digital shape files of:	–
		☐ PCT boundaries within subject land	To be submitted once BDAR is finalised
		☐ TEC boundaries within subject land	To be submitted once BDAR is finalised
		☐ vegetation zone boundaries within subject land	To be submitted once BDAR is finalised
		☐ floristic vegetation survey and vegetation integrity plot locations	To be submitted once BDAR is finalised
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 5.1.3
		☒ 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 2.3.2 Section 2.4.2
		☒ justification for addition of any ecosystem credit species to the list	Not applicable, no ecosystem credit species were added
		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 5.1.4
		☒ 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 2.3.2 Section 2.4.2 Section 5.1.1

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ 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 5.1.4
		☒ justification for addition of any species credit species to the list	Section 5.1.4 Section 5.2
		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 5.1.4 Section 5.2 Section 5.3 Section 5.4 Figure 14.7 Figure 14.13
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM section 5.2.4)	Section 5.2 Section 5.3 Figure 14.7 Figure 14.13
		☒ 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 relevant.

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	Section 2.3 Section 2.4 Section 5.3 Figure 14.7
		☒ 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 2.3 Section 2.4 Section 5.3
		☒ 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
		☒ survey personnel and relevant experience	Declarations ii
		☒ describe any limitations to surveys and how these were addressed/overcome	Section 2.6
		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 relevant.

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		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 relevant.
		☒ provide written confirmation from the decision-maker that they support the use of local data	Not relevant.
		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 5.7
		for species assessed by area:	–
		☒ 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 5.7 Figure 14.13
		☒ 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 5.2 Section 5.7
		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.))	Section 5.2 Section 5.7

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	Section 2.3 Section 5.2 Section 5.7
		☒ 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	Section 2.3 Section 5.2 Section 5.7 Figure 14.13
		☒ 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 5.7
		Maps and tables	
		☒ Table showing ecosystem credit species in accordance with BAM subsection 5.1.1, and identifying:	–
		☒ the ecosystem credit species removed from the list	Table 5.4
		☒ the sensitivity to gain class of each species	Table 5.4
		☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	Table 5.5 and Table 5.6
		☒ 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	Table 5.1, Table 5.2, Table 5.3, Table 5.4, Table 5.5 and Table 5.6
		☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Table 5.7 to Table 5.12
		☒ 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)	Table 5.20 and Table 5.21

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ 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 14.13
		Data	
		☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species	To be submitted once BDAR is finalised
		☐ Survey locations including GPS coordinates of any plots, transects, grids	To be submitted once BDAR is finalised
		☐ Digital shape files of each species polygon including GPS coordinates of located individuals	To be submitted once BDAR is finalised
		☐ Species polygon map in jpeg format	To be submitted once BDAR is finalised
		☒ Expert reports and any supporting data used to support conclusions of the expert report	Not applicable
		☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	To be submitted once BDAR is finalised
Prescribed impacts	Chapter 6	**Information**	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☒ 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)	Chapter 6 (Identifying prescribed impacts)

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ 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)	Not applicable
		☒ 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)	Chapter 6 (Identifying prescribed impacts) 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	Chapter 6 (Identifying prescribed impacts) 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)	Chapter 6 (Identifying prescribed impacts) Table 6.1
		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 subject land (as described in BAM subsection 6.1.5)	Not applicable.
		☒ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM subsection 6.1.5(2–3.)	Not applicable.
		☒ 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.))	Not applicable.
		Where the project 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 project	Chapter 6 (Identifying prescribed impacts Table 6.1

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		Maps and tables	
		☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	Figure 14.1 Figure 14.2
		☒ Map showing location of potential vehicle strike locations	Figure 14.1
		☒ 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)	Not applicable.
		Data	
		☐ Digital shape files of prescribed impact feature locations	To be submitted once BDAR is finalised
		☐ Prescribed impact features map in jpeg format	To be submitted once BDAR is finalised
Avoid and minimise impacts	Chapter 7	**Information**	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the project 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
		☒ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	Section 7.1
		☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	Section 7.1

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ alternative sites within a property on which the project is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	Section 7.1
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through project design (as described in BAM sections 7.1 and 7.2)	Section 7.1 Section 7.2 Section 7.3 Section 7.4 Section 7.5
		☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the project (as described in BAM subsection 7.2.1(3.))	Section 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 7.1 Section 7.2 Section 7.3 Section 7.4 Section 7.5
		Maps and tables	
		☒ Table of measures to be implemented to avoid and minimise the impacts of the project, including action, outcome, timing and responsibility	Table 8.28 Table 7.4
		☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final project footprint, including construction and operation	Figure 14.23 Figure 14.24
		☐ Maps demonstrating indirect impact zones where applicable	Figure 14.14

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		Data	
		Digital shape files of:	–
		☐ alternative and final project footprint	To be submitted once BDAR is finalised
		☐ direct and indirect impact zones	To be submitted once BDAR is finalised
		☐ Maps in jpeg format	To be submitted once BDAR is finalised
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
		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 project	Section 8.2 Table 8.19
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	Section 8.2 Table 8.19
		☒ reporting any limitations or assumptions, etc. made during the assessment	Section 2.6
		☒ identification of the threatened entities and their habitat likely to be affected	Section 8.2 Table 8.19

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		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:	–
		☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	Section 8.3.1 Table 8.23
		☒ human-made structures	Section 8.3.2 Table 8.23
		☒ non-native vegetation	Section 8.3.3 Table 8.23
		☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Section 8.3.4 Table 8.23 Table 8.24 Table 8.25 Table 8.26
		☒ movement of threatened species that maintains their life cycle	Section 8.2 Section 8.3
		☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	Section 8.3.5 Table 8.23
		☒ assessment of the impacts of wind turbine strikes on protected animals	Not applicable

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Section 8.3.6 Table 8.23 Table 8.27
		☒ evaluate the consequences of prescribed impacts	Section 8.3
		☒ describe impacts that are uncertain	Section 8.5
		☒ document limitations to data, assumptions and predictions	Section 2.6
		Maps and tables	
		☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 8.6 Table 8.7 Table 8.8 Table 8.9
		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:	–
		☒ techniques, timing, frequency and responsibility ☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts	Section 8.4 Table 8.28

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ document any adaptive management strategy proposed	Section 8.5
		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 8.4.4 Table 8.28
		☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM section 8.5)	Section 8.5
		Maps and tables	
		☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the project, including action, outcome, timing and responsibility	Table 8.28
		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	Section 9.1
		☒ for each TEC, report the extent of the TEC in NSW	Section 9.1 Section 9.1.1
		☒ addressing all criteria in subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	Sections 9.1.1, 9.1.2 and 9.1.3

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ for each threatened species, report the population size in NSW	Sections 9.1.2 and 9.1.3
		☒ 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 9.1
		☒ Identification of impacts requiring offset in accordance with BAM section 9.2	Chapter 10 (Impact summary)
		☒ Identification of impacts not requiring offset in accordance with BAM subsection 9.2.1(3.)	Chapter 10 (Impact summary)
		☒ 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	Figure 14.15
		☒ Map showing location of threatened species at risk of an SAII within the subject land	Figure 14.15
		Map showing location of:	–
		☒ impacts requiring offset	Figure 14.16
		☒ impacts not requiring offset	Figure 14.16
		☒ areas not requiring assessment	Figure 14.16
		Data	
		Digital shape files of:	–
		☐ extent of TECs at risk of an SAII within the subject land	To be submitted once BDAR is finalised
		☐ location of threatened species at risk of an SAII within the subject land	To be submitted once BDAR is finalised
		☐ boundary of impacts requiring offset	To be submitted once BDAR is finalised

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☐ boundary of impacts not requiring offset	To be submitted once BDAR is finalised
		☐ boundary of areas not requiring assessment	To be submitted once BDAR is finalised
		☐ Maps in jpeg format	To be submitted once BDAR is finalised
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 project on each vegetation zone within the subject land (BAM subsection 10.1.2)	Section 8.1.2 Table 8.6 Chapter 11 (Biodiversity credit report)
		☒ biodiversity risk weighting for each	Chapter 10 (Impact summary)
		☒ number of required species credits for each candidate threatened species that is directly impacted on by the project (BAM subsection 10.1.3)	Chapter 10 (Impact summary) and Chapter 11 (Biodiversity credit report) Section 11.3
		Maps and tables	
		☒ Table of PCTs requiring offset and the number of ecosystem credits required	Chapter 10 (Impact summary) and Chapter 11 (Biodiversity credit report) Table 11.4, Table 11.5, Table 11.6, Table 11.7, Table 11.8, Table 11.9

BDAR section	BAM ref.	BAM requirement	Reference(s) in the BDAR
		☒ Table of threatened species requiring offset and the number of species credits required	Chapter 10 (Impact summary) and Chapter 11 (Biodiversity credit report) Table 11.10, Table 11.11, Table 11.12
		Data	
		☐ Submitted project in the BAM Calculator	To be submitted once BDAR is finalised
Biodiversity credit report	Chapter 11	**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)	Chapter 11 (Biodiversity credit report) Appendix E (BAM-C credit reports)
		☒ BAM credit report in pdf format	Appendix E (BAM-C credit reports)
		Maps and tables	
		☒ Table of credit class and matching credit profile	Appendix E (BAM-C credit reports)
		Data	
		☒ BAM credit report in pdf format	Appendix E (BAM-C credit reports)

Appendix B

Determination of excluded impacts

B1 Determination of excluded impacts

In accordance with section 6.8 (3) of the BC Act, the BAM excludes the assessment of impacts on category 1-exempt land (within the meaning of Part 5A of the *Local Land Services Act 2013* (LLS Act)), other than any impacts prescribed by the regulations under section 6.3.

The LLS Act publishes maps (the 'native vegetation regulatory map) that show areas of the State to which Part 5A of the LLS Act applies, which are designated as Category 1 – exempt land. However, the native vegetation regulatory map is currently incomplete, and Category 1 – exempt land has not yet been mapped within NSW.

Section 60F of the LLS Act provides transitional requirements which identify how the relevant categorisation of land is to be determined pursuant to section 60H of the LLS Act in the absence of a native vegetation regulatory map.

WSP have developed a desktop land characterisation methodology that builds on previous land categorisation assessments and with reference to the Native vegetation regulatory map (NVR): method statement (OEH 2017). A detailed analysis of the background and methodology used by WSP to identify category 1-exempt land within the subject land for this BDAR is provided in Section 4.1.2.

The methodology outlined in the BDAR was determined through consultation with the NSW Department of Planning and Environment (DPE) Conservation Programs, Heritage and Regulation (CPHR). Details of the consultation undertaken between WSP and CPHR to date are outlined in Table B.1, below.

Table B.1 Details of consultation regarding category 1-exempt land

Date of correspondence	Type	Details
September 2024	Meeting	Meeting undertaken with WSP, CPHR, DPE and Energy Co which discussed the current status of the category 1 exemption application and next steps for inclusion of category 1 land within WSP BDAR.
19/11/2024	Letter	Letter from WSP to CPHR outlining how the parts of the project alignment can be considered to be Category 1 – exempt land, as per the NSW Land Management Framework and the *Local Land Services Act 2013* and requesting a determination from the Environment Agency Head to confirm that the land can be classified as exempt land.
10/2/2025	Meeting	Meeting undertaken with WSP, CPHR, DPE and Energy Co which discussed the category 1 exemption application and next steps for inclusion of category 1 land within WSP BDAR.

WSP has included mapping of category 1-exempt land in this BDAR as per the final consultation dated 10/2/2025, however updates may be required in following revisions, pending additional response from CPHR.

Copies of the consultation documents outlined are provided in this Appendix.

Our ref: HTP_ECO-LTR-001 Cat 1 Land v2

By email
Steven.Crick@environment.nsw.gov.au

23 August 2024

Steven Crick
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Hunter Central Coast Branch
Biodiversity, Conservation and Science
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Dear Steven

HTP - Proposed Excluded and Category 1 Exempt Land

1. Introduction

This letter has been prepared by WSP Australia Pty Ltd on behalf of Energy Corporation of NSW (Energy Co) for the proposed Hunter Transmission Project (HTP) (the Project).

WSP Australia Pty Ltd is currently preparing a Biodiversity Development Assessment Report (BDAR) for the Project in accordance with NSW Biodiversity Assessment Method 2020 (BAM). As part of the early planning, large areas of the project alignment were identified as containing highly disturbed environments associated with existing intensive agriculture dominated by exotic grassland and crops, active mining operations, existing transmission easements and hardwood forestry plantations.

The areas of intensive agriculture are considered likely to be Category 1 – exempt land, as per the NSW Land Management Framework and the *Local Land Services Act 2013 (LLS Act)*.

Clause 6.8(3) of the BC Act specifies that the BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (as defined in Part 5A of the LLS Act), other than prescribed impacts (as defined in clause 6.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation).

To assess the application of Category 1 – exempt land within the project, a proposed land categorisation method has been applied that builds on the previously agreed approaches to land characterisation methodology for the approved transmission projects CWO (WSP 2023) and PEC (WSP 2022) and with reference to the *Native vegetation regulatory map: method statement* (OEH 2017) and published draft Native Vegetation Regulatory Map.

In addition to areas of intensive agriculture dominated by exotic grassland, significant portions of the alignment correspond with disturbance areas associated with various approved mining operations and existing transmission infrastructure. These areas are associated with land that was lawfully cleared and as such have been included in the Category 1 – exempt land.

Finally, the letter also identifies lands that are generally excluded from the operation of the rural native vegetation clearing framework under the LLS Act (i.e. 'excluded land'). Excluded land includes land subject to other legislative frameworks, such as national parks and state forests. Of particular relevance to the project are the areas associated with NSW State Forests certified hardwood plantations and subject to the current Coastal Integrated Forestry Operations Approval (CIFOA) under the *Forestry Act 2012*. (https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/forestagreements/18p1177-

coastal-ifoa-conditions.pdf. The CIFOA provided an approved licence for activities impacting biodievristy under the BC Act.

2. The HTP Project

EnergyCo is proposing the construction and operation of new high voltage electricity transmission infrastructure, including new substation infrastructure and ancillary works, required to connect energy generation and storage projects to the existing electricity network within the Hunter. The project will strengthen energy security in New South Wales and the core electricity grid for the Hunter, Sydney, and Illawarra regions for generations to come. The project will achieve this by connecting a new overhead 500 kV transmission line between 2 new 500 kV substations at Bayswater and in Olney State Forest. The new substations will be connected to the existing 500 kV transmission lines near Bayswater and Eraring to unlock electricity supply from the Central West Orana and New England Renewable Energy Zones.

The nominal distance of the new transmission line will be approximately 100 km.

From the new 500 kV Bayswater substation, the line will maximise use of existing disturbed mining areas to run south-easterly to Lemington before making several crossings of the Hunter River to pass through the Hunter Valley Operations (HVO) coal mine between the HVO North and HVO South operational areas. The line then heads south-east crossing Wollombi Brook and avoiding vegetation constraints in Gouldsville. The line continues southward through Mount Thorley, keeping east of Jerrys Plains Road, and into Broke, crossing Putty Road, a rail corridor, and Broke Road. The line navigates around Bulga Coal mine operations, continuing south to cross over the existing 330 kV lines – Lines 81 and 82, and then co-locates for approximately 4.5 km.

The line then continues south to maximise the use of public land into Pokolbin State Forest, emerging just east of Cedar Creek. It then traverses the Corrabare State Forest, Watagan State Forest and Olney State Forest before truncating at a the new 500 kV Olney substation and connection to the existing Eraring-Kemps Creek double circuit 500 kV transmission line.

The transmission line corridor has been developed to avoid and or minimise impacts on important environmental, land use and social values, where practical to do so. The final alignment of the transmission line within the transmission line corridor will be confirmed during detailed design with a view to further minimising environmental impacts, wherever practicable.

An overview of the projects key features include:

- a new double circuit 500 kV above-ground transmission line between Bayswater and Olney State Forest where it will join the existing 500 kV transmission line that connects Eraring and Kemps Creek
- adjustments to existing transmission lines to facilitate construction and operation of the project
- two new 500 kV substations at Bayswater (Bayswater substation) and in Olney State Forest (Olney substation)
- upgrades to the existing substations at Bayswater Power Station and Eraring Power Station
- upgrades to the existing public road network and new and upgraded access tracks for construction and operation of the project
- temporary construction infrastructure including four construction support sites including workforce accommodation, laydown areas, stringing sites, and utility adjustments and connections.

With projected commencement of construction for early 2026 and completion by late 2028 to ensure energy security, the project is subject to NSW Government and Australian Government planning approvals.

The project area includes a transmission line corridor of varying width in which the proposed transmission line and new substations would be located. A refined corridor for the project will be identified in the Environmental Impact Statement (EIS). Additional locations that may be required for specific uses (such as access tracks, construction compounds and workforce accommodation camps) will also be identified in the EIS.

3. Past challenges with application of the Land Categorisation Method for identification of Category 1 Lands under the LLS Act

The published draft Native Vegetation Regulatory Map and particularly areas of Category 1 - Exempt land, is an important resource for consideration of avoidance of biodiversity impacts in the initial steps of a project corridor and alignment identification.

When it comes to the identification of potential Category 1 - Exempt land for exclusion under the BAM, Accredited Assessors are currently required to undertake detailed field surveys and validation of exotic dominance and/or defined 'low conservation grasslands'. This requires significant survey effort in highly disturbed environments, often within limited survey windows.

Many areas of mapped Category 1 - Exempt land are also particularly sensitive to landholders in the initial stages of a projects land access agreements. These areas often represent the most productive lands, or areas of existing operations with sensitivities (biosecurity, lambing, cropping).

In the absence of survey validating potential Category 1 - Exempt land, these areas are often required to be assessed from desktop as native vegetation or Category 2 – Regulated land, with flow on assessment outcomes for assume presence of candidate species under BAM. Perversely, projects assumed liabilities for some species can be higher in these highly disturbance landscapes than the adjoining remnant native vegetation where access if available and species liabilities are excluded through survey.

Furthermore, there remains a stark regulatory inequality being applied to landholders maintaining existing land use practices, including cropping and pasture improvement within areas of the draft Category 1 - Exempt mapping, while the corresponding assessment of projects for ETLs are required to generate significant offset credit liabilities.

Regardless of the contrasting implementation of the LLS Act Native Vegetation Regulatory Map to landholders and transmission proponents, the process and timing of approving proposed Category 1 - Exempt lands by the agency head prior to exhibition is an issue. A determination to approve Category 1 - Exempt lands is regularly deferred until late in the EIS program or RTS. The delayed uncertainty on areas for inclusion in the Category 1 or Category 2 – Regulated land effectively requires projects to assess all areas of land under BAM significantly increasing survey and access requirements and potential for offset liabilities.

To resolve this issue EnergyCo have identified a number of recommendations for further consideration

Recommendations:

- **In line with the Governments response to the review of the BC Act and LLS Act, adopt the commitment 17. "*finalise the draft Native Vegetation Regulatory Map'* incorporating the Category 1 mapping.**
- **Publish, mapping of CEECs within the Renewable Energy Zones (REZ)s suitable for reliance and determination of Category 1 mapping.**
- **In the absence of the above support the early review and determination of Category 1 mapping by projects supported where possible by field verification and/or desktop approaches consistent with the Land categorisation methodology prior to EIS exhibition.**

4. Background to Category 1 – Exempt land

4.1 Overview

Under the NSW Land Management Framework, the categorisation of land determines the native vegetation management options available to landholders. Rural land in NSW is categorised into three main categories:

- **Category 1** – exempt land is land where native vegetation can be cleared without approval from Local Land Services.
- **Category 2** – land is divided into:
  - Category 2 – regulated land is Category 2 land that is not Vulnerable or Sensitive regulated land. You may need authorisation from Local Land Services to clear native vegetation from rural zoned land in this category.
  - Category 2 – vulnerable regulated land is land where clearing of native vegetation may not be permitted under the Land Management (Native Vegetation) Code 2018, and a limited range of allowable activities are permitted.
  - Category 2 – sensitive regulated land is land where clearing is not permitted under the Land Management Code (Native Vegetation) Code 2018, and a limited range of allowable activities is permitted.
- **Excluded land** – is land where the Land Management (Native Vegetation) Code 2018 and allowable activities do not apply.

4.2 Land category criteria

Each land category is determined by various criteria as outlined in the *Local Land Services Act 2013* (LLS Act). Category 1 – exempt land is defined in 60H of the LLS Act as the below:

1. Land is to be designated as Category 1 – exempt land if the Environment Agency Head reasonably believes that:
   a) the land was cleared of native vegetation as at 1 January 1990, or
   b) the land was lawfully cleared of native vegetation between 1 January 1990 and the commencement of this Part.
2. Land is to be designated as Category 1 – exempt land if the Environment Agency Head reasonably believes that:
   a) the land contains low conservation value grasslands, or
   b) the land contains native vegetation that was identified as regrowth in a property vegetation plan referred to in section 9 (2) (b) of the *Native Vegetation Act 2003*, or
   c) the land is of a kind prescribed by the regulations as Category 1 – exempt land.
3. Land is to be designated as Category 1 – exempt land if the land is biodiversity certified under Part 8 of the *Biodiversity Conservation Act 2016* or under any Act repealed by that Act.
4. However:
   a) land described in subsection (1) or (2) is not to be designated as Category 1 – exempt land if section 60I (2) requires the land to be designated as category 2-regulated land, and
   b) land described in subsection (1) (a) is not to be designated as Category 1 – exempt land if the land was unlawfully cleared of native vegetation after 1 January 1990, and
   c) land described in subsection (2) (a) is not to be designated as Category 1 – exempt land if the land was unlawfully cleared of native vegetation after 1 January 1990.

5. The regulations may make provision for the purposes of determining whether grasslands are low conservation value grasslands for the purposes of this Division.

4.3 Determination of mapped category of land

The matters relating to determination of mapped category of land are outlined in 60J of the LLS Act. Section 60J of the LLS Act is reproduced below:

1. This section makes provision relating to the mapping of land under this Division as category 1- exempt land or Category 2 – regulated land.
2. Native vegetation that comprises grasslands or other non-woody vegetation is taken to have been cleared if the native vegetation was significantly disturbed or modified. The regulations may make provision for the purposes of determining whether native vegetation has been significantly disturbed or modified for the purposes of this Division.
3. Determinations may be made by the Environment Agency Head that land was unlawfully cleared of native vegetation only if compliance or enforcement action of a kind prescribed by regulations was taken in relation to the clearing.
4. Determinations may be made by the Environment Agency Head that land was cleared of native vegetation as at 1 January 1990 or between that date and the commencement of this Part only on the basis of the best available aerial photographs or satellite imagery before and after the relevant date, and any evidence provided by the landholder under section 60K (8).
5. Determinations made (or taken on appeal to have been made) by the Environment Agency Head as to whether land was or was not unlawfully cleared of native vegetation does not affect any decision made with respect to compliance or enforcement action taken under this or any other Act in relation to the clearing.

4.4 Assessment of Critically Endangered Ecological Communities and species.

Critically Endangered Ecological Communities (CEECs) and flora species are designated as Category 2 – sensitive regulated land. Therefore areas of potential Category 1 – exempt land require consideration of the potential presence of critically endangered communities and species.

There are no critically endangered flora species predicted by BAM or considered to be affected candidates species likely to occur within the study area. This assessment is supported by detailed seasonal surveys and verified vegetation mapping. Appendix A includes a summary of survey locations and the assessment of low conservation grasslands is provided below in table 5.1.

There are three CEECs within the study area being:

- Central Hunter Valley Eucalypt Forest and Woodland
- Warkworth Sands Woodland of the Hunter Valley
- White Box – Yellow Box- Blakely Red Gum Grassland Woodland and Derived Native Grassland

Of these CEECs, only the Central Hunter Valley Eucalypt Forest and Woodland and Warkworth Sands Woodland of the Hunter Valley were recorded within the study area.

Derived grasslands do not form part of the CEEC, Warkworth Sands Woodland of the Hunter Valley and only Derived grasslands adjoining and within 30 m of remnant patches of the Central Hunter Valley Eucalypt Forest and Woodland from part of the CEEC.

The proposed Category 1- exempt land has excluded all areas of the derived grasslands within 30 m of remnant patches of this CEEC.

4.5 Adoption of existing HVOCP mapping and survey information

The project intersects with areas of the HVO North Open Cut Coal Continuation Project (HVOCP) (Umwelt 2024) currently being assessed for approval. As part of the BCS review and assessment of the HVOCP, an application for land categorisation under the LLS Act has been provided to BCS for approval. To ensure consistency with the HVOCP assessment, HVO have requested that EnergyCo adopt the existing mapping and survey information consistent with the currently exhibited BDAR. The proposed Category 1- exempt land has therefore incorporated the HVOCP Category 1 mapping and this is presented in Appendix A.

4.6 Existing transmission line approvals

The project has specifically collocated the alignment and infrastructure where possible with existing transmission infrastructure to minimise impacts to biodiversity and fragmentation. While some of this infrastructure is zoned SP2 Infrastructure and specifically excluded from the application of the LLS Act, several existing transmission lines extend beyond this zoning and therefore require further assessment.

These existing transmission lines are maintained by Transgrid and are subject to existing approvals, some of which pre-date the EP&A Act. A summary of the relevant transmission lines intersected by the project include;

- *Line 5A3: Bayswater – Mt Piper 500 kV*
- *Line 5A4: Bayswater – Wollar 500 kV*
- *Line 31: Bayswater – Regentville 330 kV*
- *Line 32: Bayswater – Sydney West 330 kV*
- Line 81: 330 kV: Newcastle – Liddell 330 kV
- *Line 5A1 and 5A2: Eraring – Kemps Creek 500 kV*

Many of the above existing transmission lines incorporate areas of Category 1 land exempt as mapped by the draft Native Vegetation Regulatory Map' (refer to blue in Figure 4.1 below) and are consentient with the ALUM Intensive Use Classification -5.6.5.not subject to requirements for rehabilitation/ or conservation obligations.

Given these existing transmission lines are subject to existing approvals they have been incorporated into the area of proposed Category 1 exempt land under 60 H (1) of the LLS Act.

Figure 4.1 Mapped areas of Category 1 exempt land associated with existing transmission lines.

5. Proposed assessment methodology for identifying Category 1 exempt land on HTP

The LLS Act publishes maps (the 'native vegetation regulatory map') that show areas of the State to which Part 5A of the LLS Act applies, which are designated as Category 1 – exempt land. The published draft native vegetation regulatory map is currently available, including Category 1 – exempt land within NSW.

Section 60F of the LLS Act provides transitional requirements which identify how the relevant categorisation of land is to be determined pursuant to section 60H of the LLS Act in the absence of a native vegetation regulatory map.

WSP has developed a desktop land characterisation methodology that builds on advice and consultation with BCS and previous land categorisation assessments and with reference to the Native vegetation regulatory map (NVR): method statement (OEH 2017).

In defining the area of Category 1 – exempt land, an initial analysis of the following spatial datasets will be undertaken:

- Land use: NSW Land Use 2017 v1.2, published June 2020.
- NSW Native Vegetation Extent 5m raster v1.2 dataset
- State-wide Landcover and Tree Survey (SLATS) clearing for NSW
- NVR: Transitional Native Vegetation Regulatory Map,
- Zoning: EPI LEP LZN Land Zoning, current at 23 April 2021.
- State Vegetation Type Map (SVTM).
- Aerial photos (to determine areas that were/are obviously under cultivation or improved pasture or otherwise disturbed).

- information and records, including current and historical photographs of the subject land and current and historical high resolution
- In areas of conflicting data, or potential derived native grasslands characteristic of a CEEC, a site-based verification undertaken to confirm Category 1 or precautionary approach adopted and Category 2 assigned.

Each of these datasets were used to determine whether native vegetation has been significantly disturbed or modified (and therefore cleared) in accordance with 60J of the LLS Act.

The steps in identifying Category 1 – exempt land include the following;

1. Adoption published draft Native Vegetation Regulatory Map, incorporating the mapping of Category 1 - Exempt land
2. The land use classification was subsequently overlayed with the Transitional Native Vegetation Regulatory Map, version 3.0, published 26 March 2021 and any areas of the subject land mapped as Category 2 lands were excluded. This is followed by the exclusion of areas of extant remnant vegetation as published within the Woody vegetation: NSW Woody Vegetation Extent 2011, (OEH, 2015), NSW Native Vegetation Extent 5m raster v1.2 dataset, State-wide Landcover and Tree Survey (SLATS) clearing for NSW and areas of SVTM mapped native derived grassland potentially corresponding with a Critically Endangered Ecological Community (CEEC) will be included within the Category 2 lands.
3. Additional analysis of historical aerial imagery is used to further classify areas as cleared/highly disturbed, resulting from significant disturbance associated with cultivation and/or improved pasture.
4. In areas of conflicting data with areas accessible for field verification, or potential derived native grasslands, a site-based verification undertaken to confirm 'Low conservation grasslands' in accordance with the Interim Grasslands and other Groundcover Assessment Method (IGGAM).
5. Review of local development approvals (such as for the approved mine disturbance areas, existing transmission line easements) was also undertaken and where clear evidence existed for approved vegetation clearing within the project these areas were also included within Category 1 lands.

The outcome of native vegetation regulatory mapping category 1-exempt land is presented in illustrated in attached Appendix A. These areas have been identified through a combination of desktop modelling and field survey (where possible). The results of IGGAM sampling that show clear evidence for categorisation of land to Category 1 are provided in Table 5-1.

Table 5-1 Summary of native and exotic species cover from plots undertaken in areas of Category 1 land.

PCT	PLOT	EASTING	NORTHING	POTENTIAL TEC OR CEEC[1]	% NATIVE SPECIES COVER	% EXOTIC COVER	VI SCORE UNDER BAM
PCT 3431	DR-01	305244	6408008	No	82.9	5.8	2
	DR-04	305840	6409510	No	84.6	7.1	
	DR-05	305961	6409872	No	79	5.6	

PCT	PLOT	EASTING	NORTHING	POTENTIAL TEC OR CEEC[1]	% NATIVE SPECIES COVER	% EXOTIC COVER	VI SCORE UNDER BAM
PCT 3314	NE-02	305271	6405658	No	55.5	1.3	4.5
	TS-12	306998	6403151	No	15.7	14.7	
PCT 0	MS-29	321271	6391997	No	9.7	38.4	
PCT 0	MS-30	321111	6392263	No	35.2	49	
PCT 3636	MS-33	318188	6395970	No	55.2 (35.2)	8.7(28.7)	0.6
	MS-36	319845	6394924	No	49.2(29.2)	3.5(23.5)	
	MS-37	319471	6395631	No	48.8(28.8)	16.9 (36.9)	
	MS-38	319145	6395977	No	39.8(19.8)	7(27)	

Notes 1 TEC (Threatened Ecological Community) listed as Critically Endangered Ecological community (CEEC) under the BC Act.

6. Other Excluded land

6.1 Coastal Integrated Forestry Operations Approval

The eastern section of the project is located within NSW State Forests associated with areas of certified hardwood plantations defined under the *Plantations and Reafforestation Act 1999* and *Plantations and Reafforestation (Code) Regulation 2001* as "an area of land on which the predominant number of trees or shrubs forming, or expected to form, the canopy are trees or shrubs that have been planted"

These plantations are subject to existing and current Coastal Integrated Forestry Operations Approval (CIFOA) under the *Forestry Act 2012*. (https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/forestagreements/18p1177-coastal-ifoa-conditions.pdf.

The CIFOA provided an approved licence for activities impacting biodiversity under the BC Act and includes biodiversity related conditions and commitments for conservation outcomes.

The approved hardwood plantation areas are currently subject to active clear-felling for timber extraction and would be considered complete loss under the BAM.

Given these areas of approved hardwood plantations impacts on biodiversity are subject to an existing project approval and have been offset under the existing Regional Forestry Agreements and CIFOA, it is proposed that the areas of Hardwood plantation are identified as excluded land not to be subject to further assessment under the BAM and BC Act. A map of the verified Hardwood plantation (in purple) proposed for exclusion from the assessment are provided below Figure 1and in Appendix A.

Figure 6.1 Area of State Forest Hardwood plantation within the project area

7. Conclusion

7.1 Exclusion of Category 1 land

In accordance with section 6.8 (3) of the BC Act, when applying the BAM, the assessor is to exclude the assessment of impacts of any clearing of native vegetation and loss of habitat on Category 1 – exempt land.

The project has initially adopted the currently drafted Native Vegetation Regulatory Map Category 1 - exempt land in accordance with Section 60F of the LLS Act. This has been further supported by a desktop assessment supported by field verification of the project alignment to provide sufficient evidence that the areas significantly disturbed or modified (and therefore cleared) areas likely to form Category 1 – exempt land.

In particular, areas of the draft Native Vegetation Regulatory Map Category 1 - exempt land, previously mapped by the HVOCP (Umwelt 2024), existing transmission lines and land use classifications 3, 4 and most of 5 by the Land use: NSW Land Use 2017 v1.2, published June 2020 are either under regular rotational cropping or have been subject to pasture improvement, or are disturbed industrial land, land with residential or farm infrastructure, mining land, or sections of disturbed infrastructure corridors.

The areas of Category 1 - exempt land within this assessment have also been subject to field verification and survey and confirmed to be exotic dominated or representative of low conservation grasslands.

With approval of this assessment and application of Category 1 – exempt land, the BDAR will exclude these areas of Category 1 – exempt land, from further assessment.

In addition to the request for consideration of Category 1 – exempt land, the project is proposing to identify the areas of the State Forest Hardwood plantation subject to existing CIFOA approvals are also identified as excluded land not to be subject to further assessment under the BAM and BC Act

We would appreciate the opportunity to meet and discuss this application and potential timing for any determination.

Yours sincerely

Alex Cockerill
Ecology National Team Executive

List of attachments

Attachment A Spatial datasets used in Category 1 – exempt land assessment

Attachment A

Spatial datasets used in Category 1 – exempt land assessment

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

Legend

- Biodiversity study area
- 500 kV transmission line
- Local government area
- WSP proposed category 1 - exempt land

0 60 120
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:5,000 Date: 15/07/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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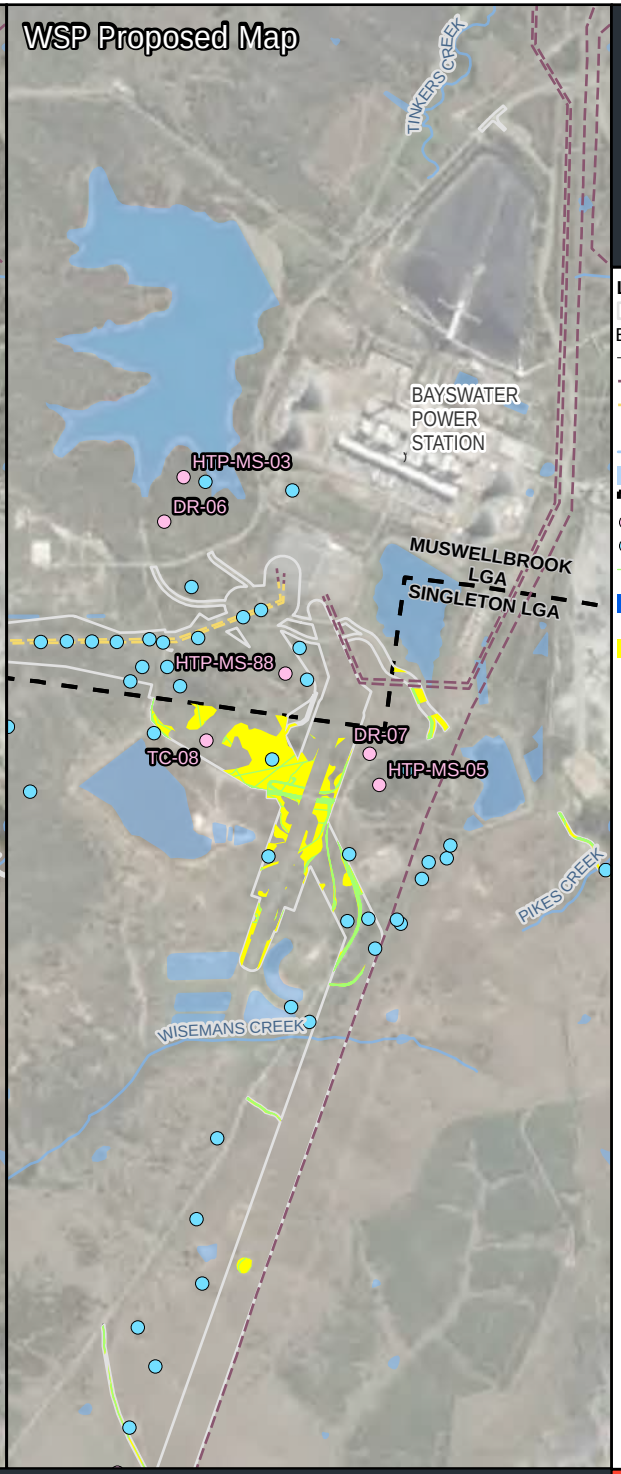


Hunter Transmission Project
Biodiversity Development Assessment Report

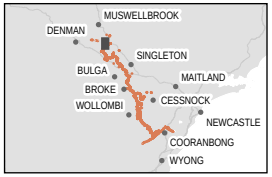
Appendix A
Proposed category 1 mapping

Legend

- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- 500 kV transmission line
- Power station
- Named watercourse
- Waterbody
- Local government area
- BAM plot
- Rapid data point
- Flora GPS tracks
- NVR map category 1 - exempt land (draft)
- WSP proposed category 1 - exempt land



0 380 760
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:30,000 Date: 15/07/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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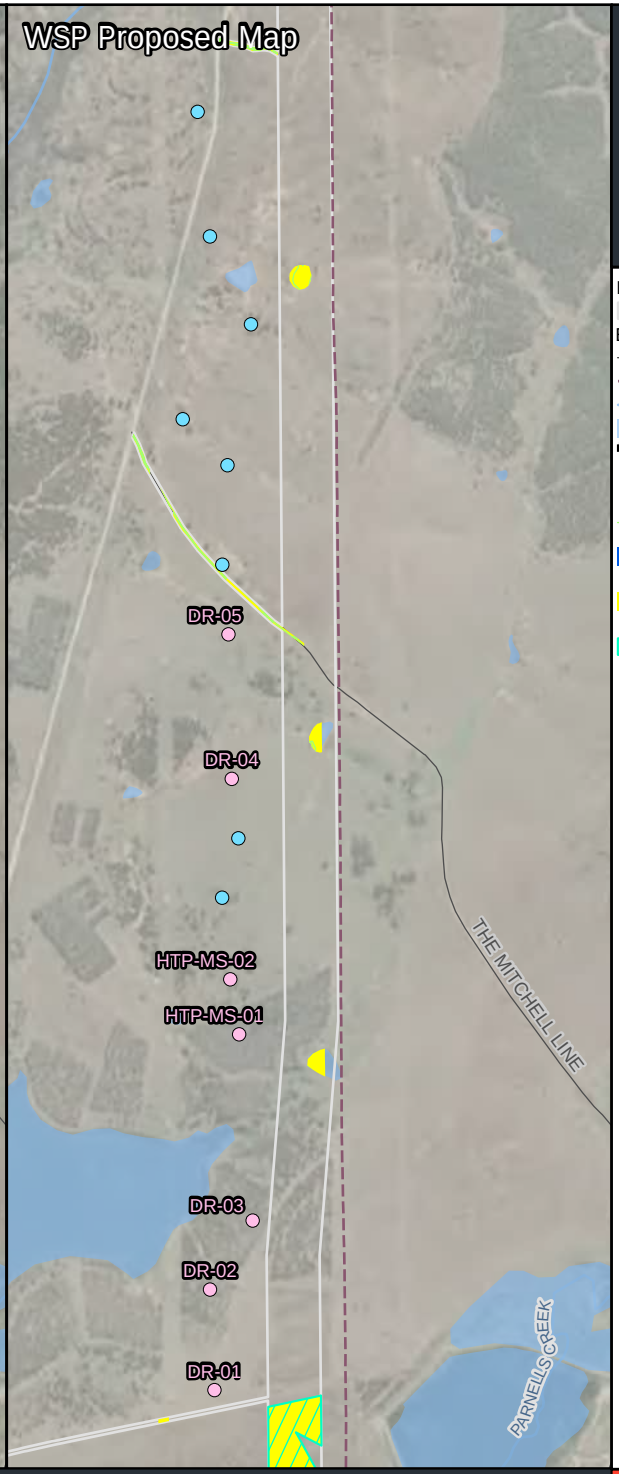

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

Legend

- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- Named watercourse
- Waterbody
- Local government area
- BAM plot
- Rapid data point
- Flora GPS tracks
- NVR map category 1 - exempt land (draft)
- WSP proposed category 1 - exempt land
- HVOCP proposed category 1 - exempt land

0 250 500
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:20,000 Date: 15/07/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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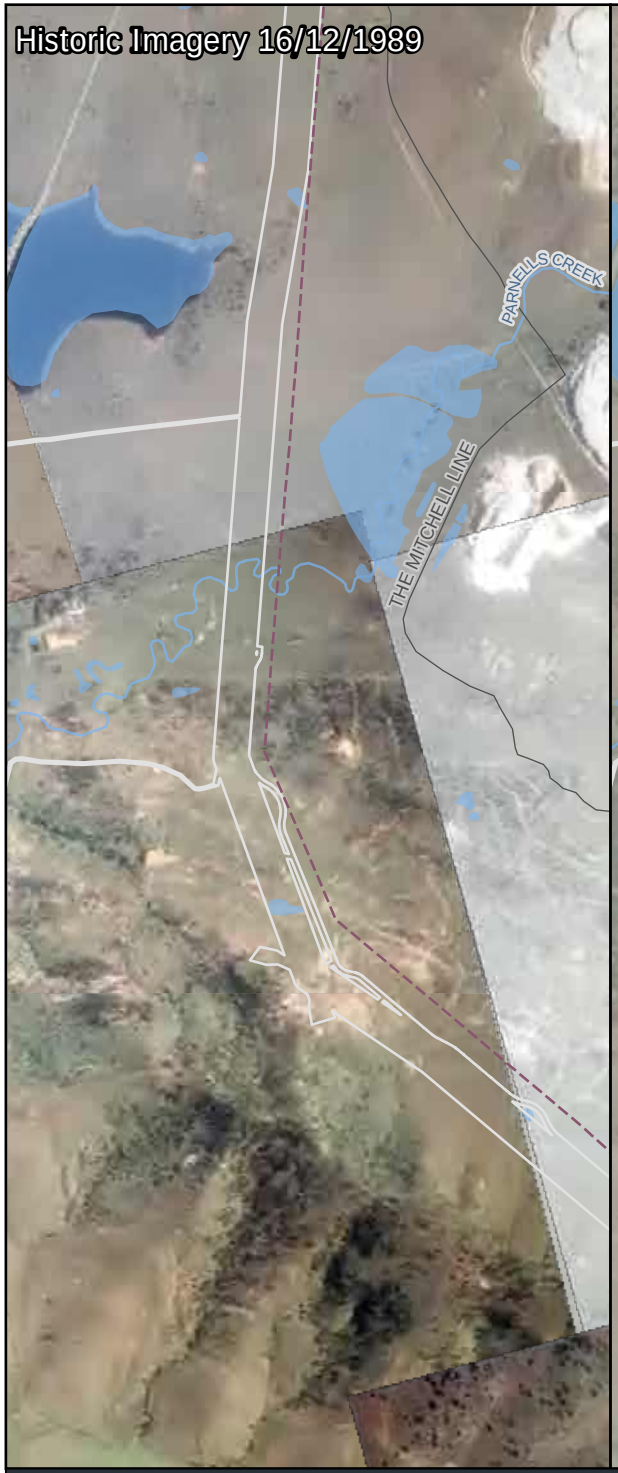

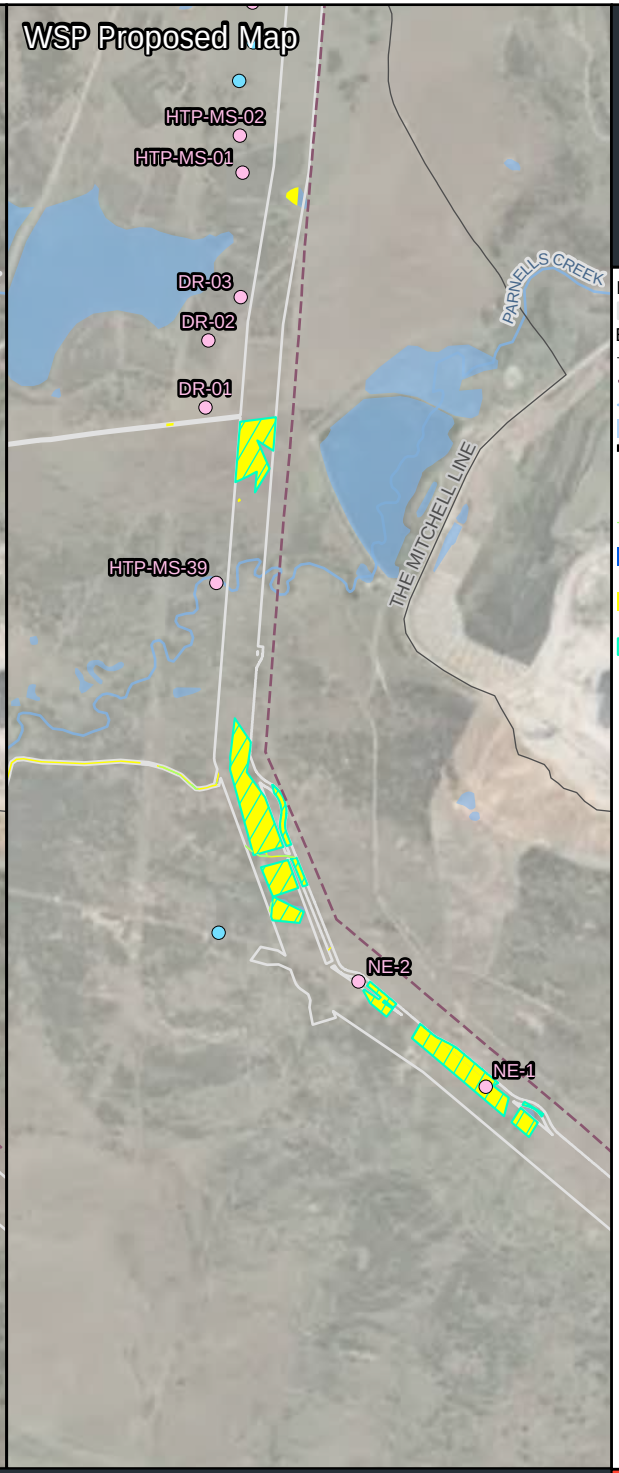

Hunter Transmission Project
Biodiversity Development Assessment Report

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0 380 760
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:30,000 Date: 15/07/2025

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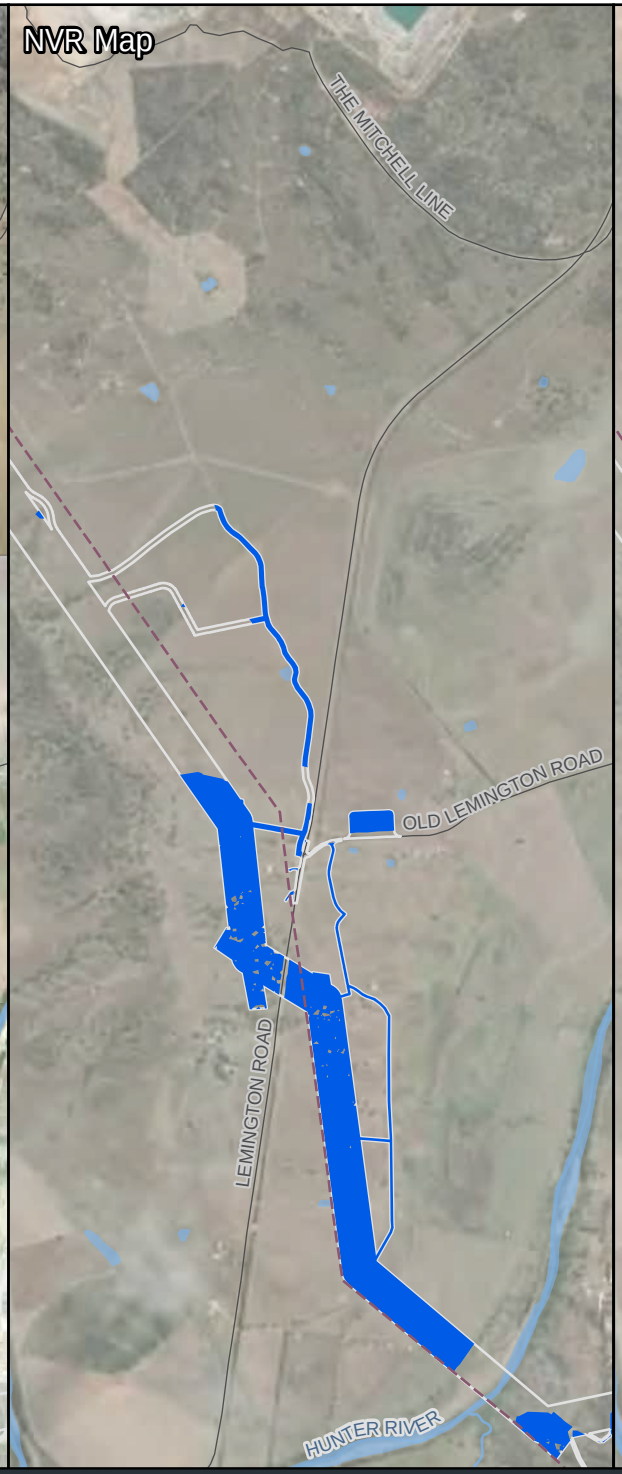

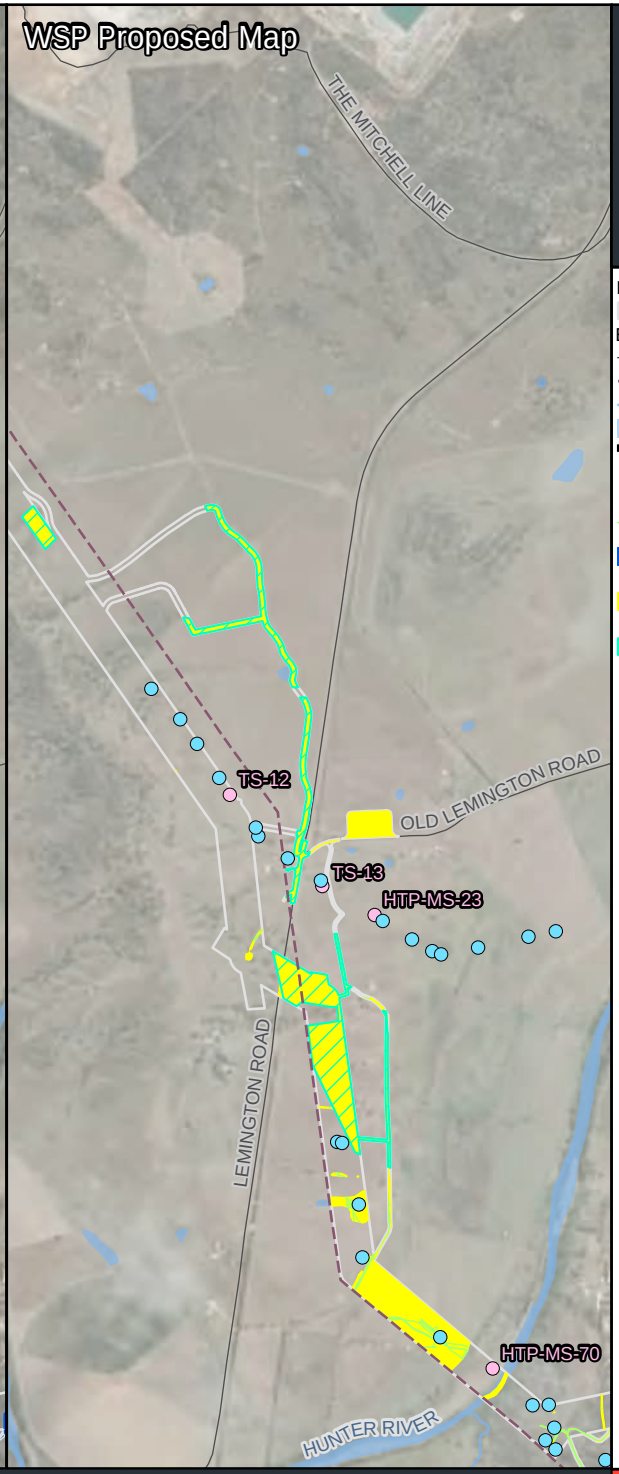

Hunter Transmission Project
Biodiversity Development Assessment Report

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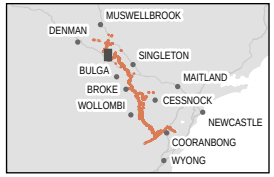

0 380 760
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:30,000 Date: 15/07/2025

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Hunter Transmission Project
Biodiversity Development Assessment Report

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0 60 120
Metres

Coordinate system: GDA2020 MGA Zone 56

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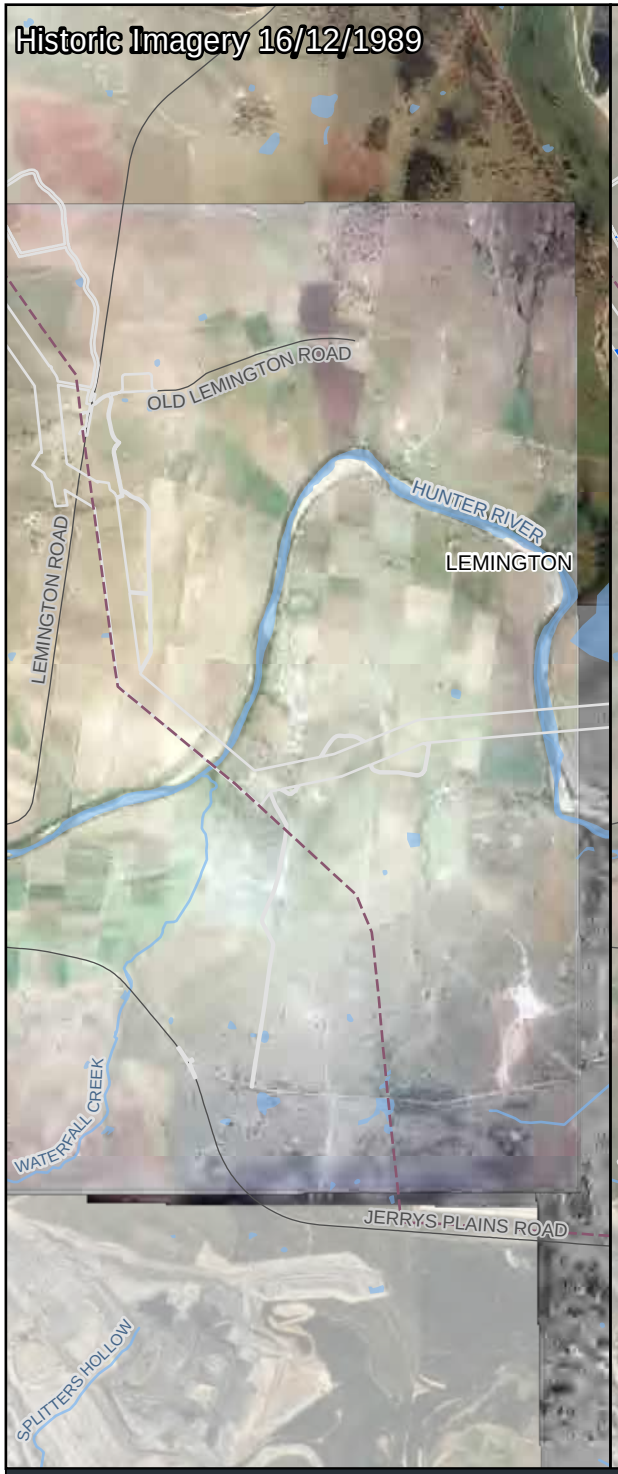

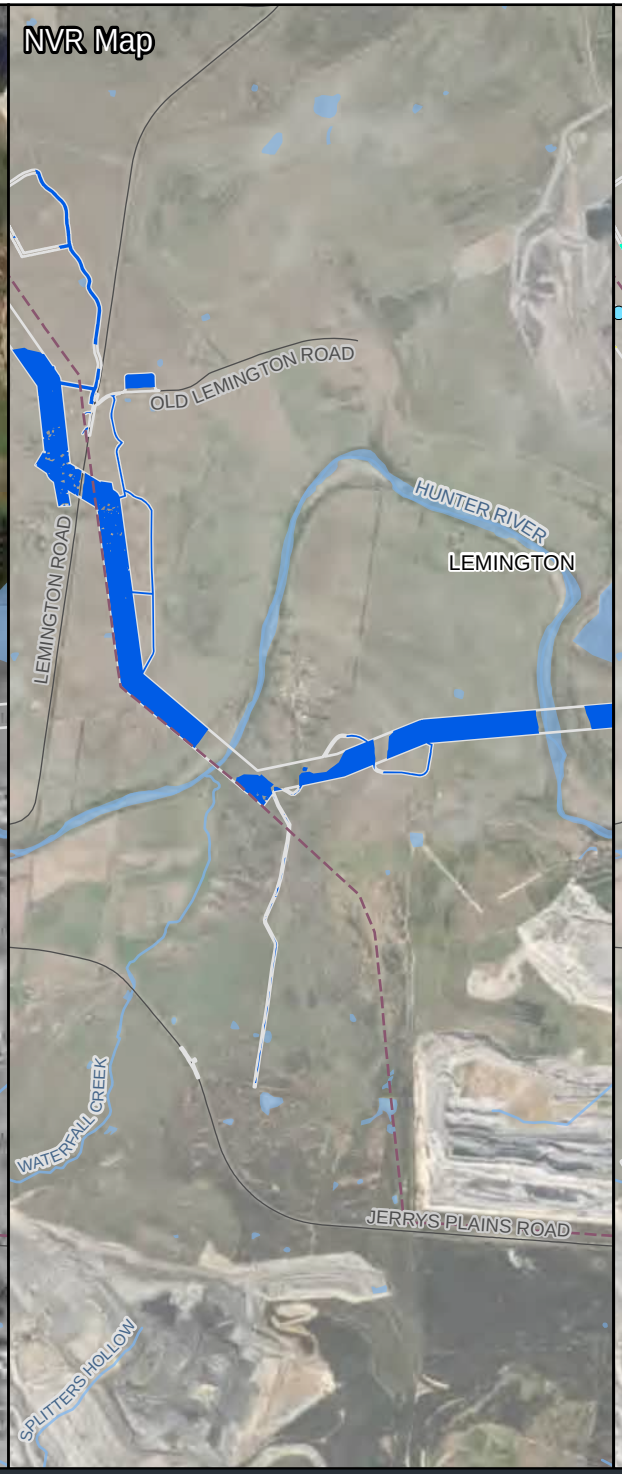

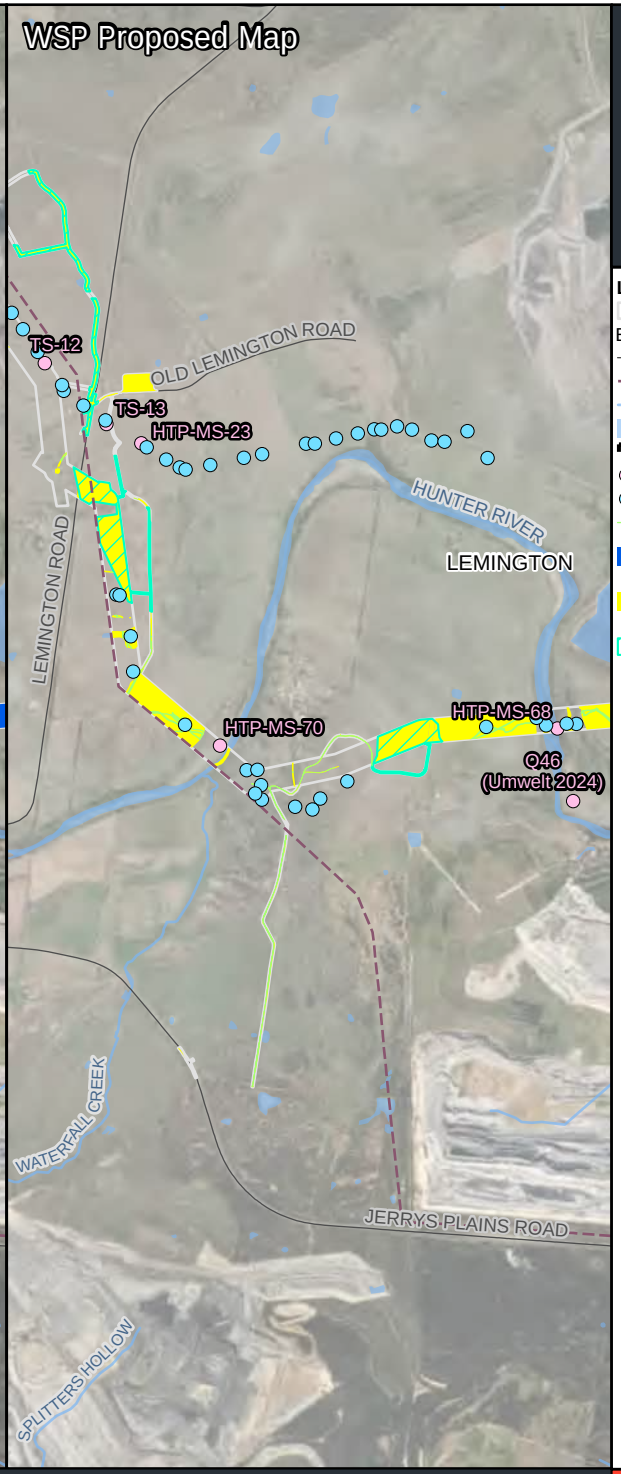

Hunter Transmission Project
Biodiversity Development Assessment Report

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0 560 1,120
Metres

Coordinate system: GDA2020 MGA Zone 56

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GDA 2020 1:45,000 Date: 15/07/2025

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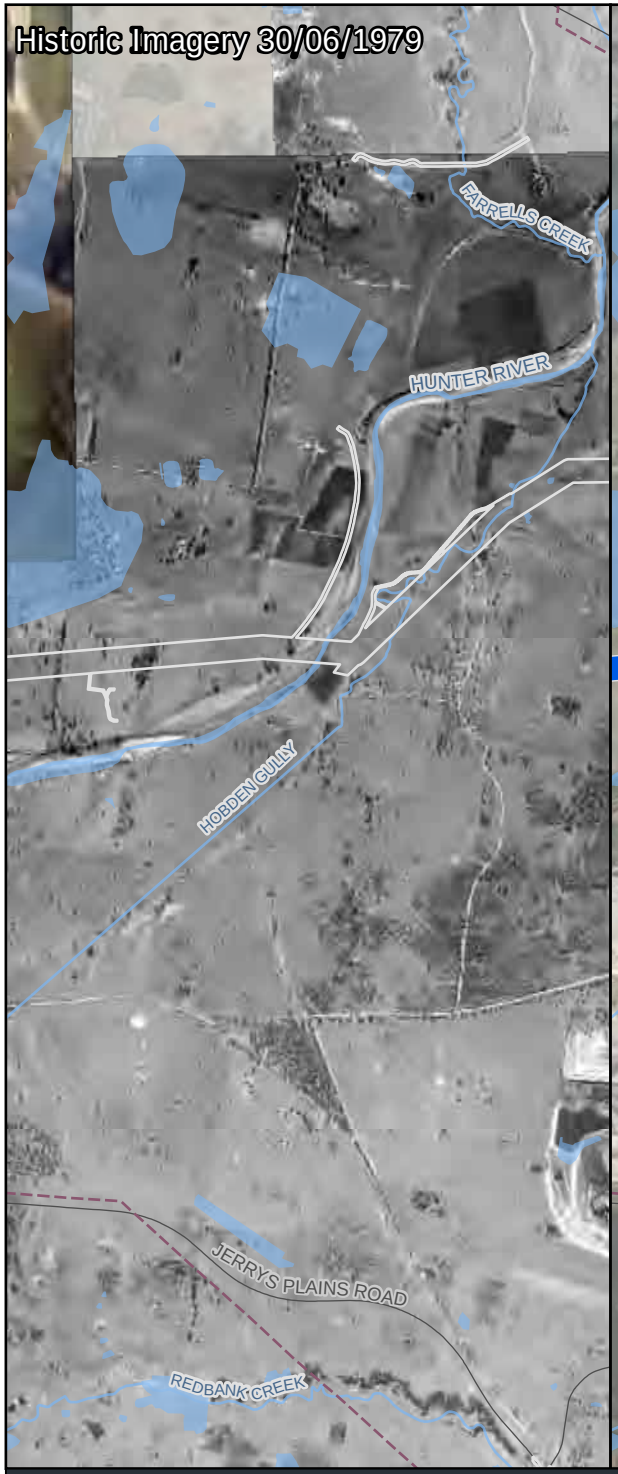

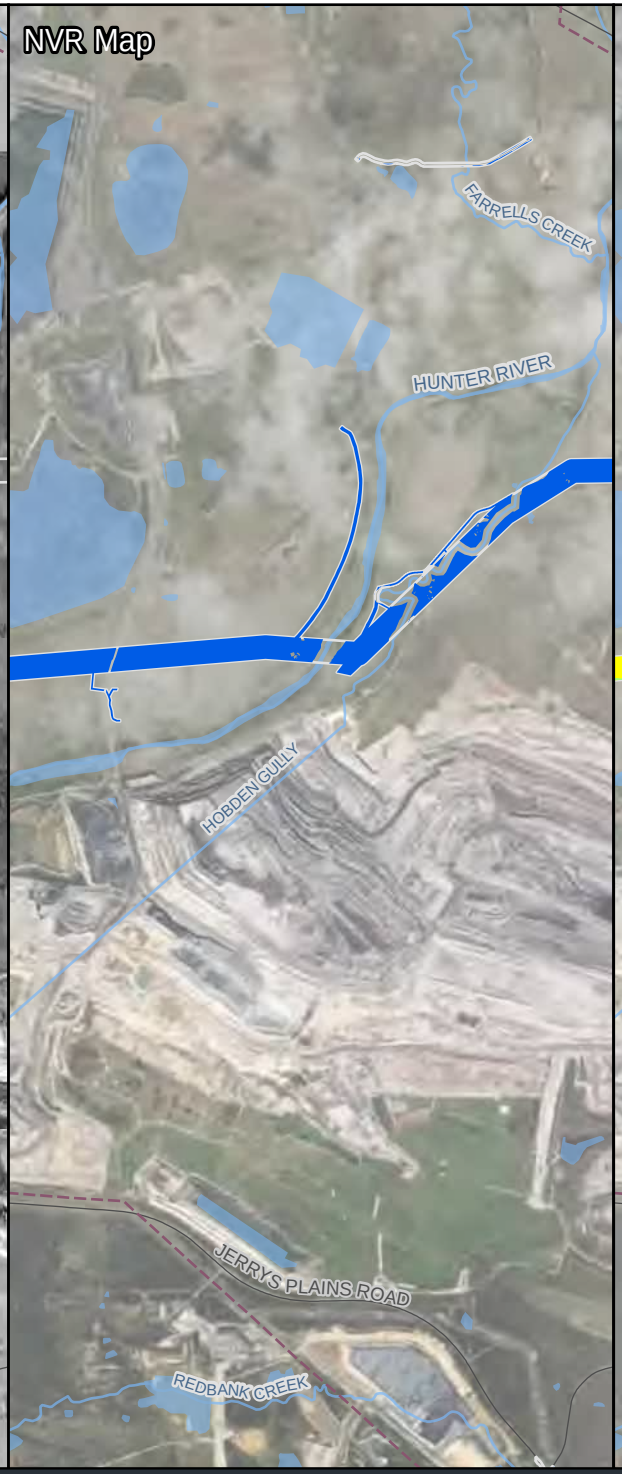

Hunter Transmission Project
Biodiversity Development Assessment Report

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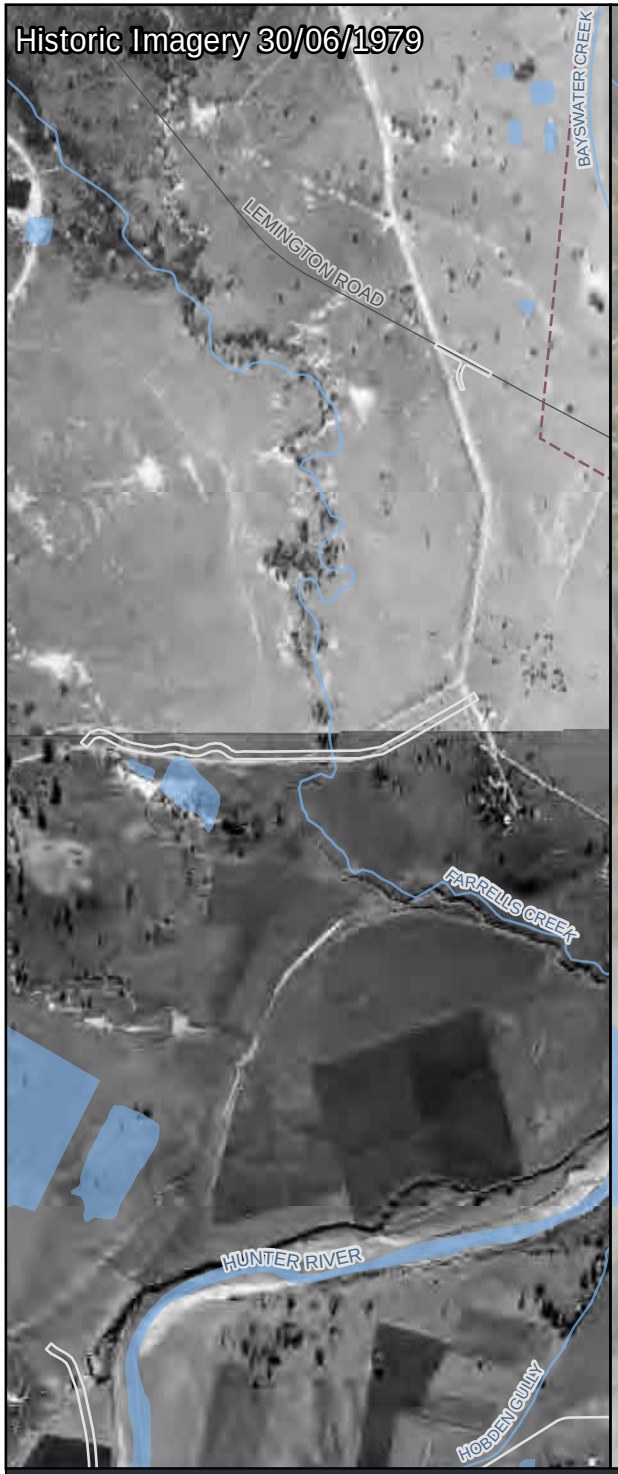

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
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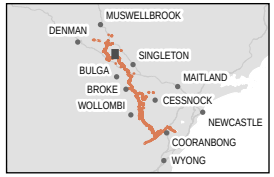

0 250 500
Metres

Coordinate system: GDA2020 MGA Zone 56

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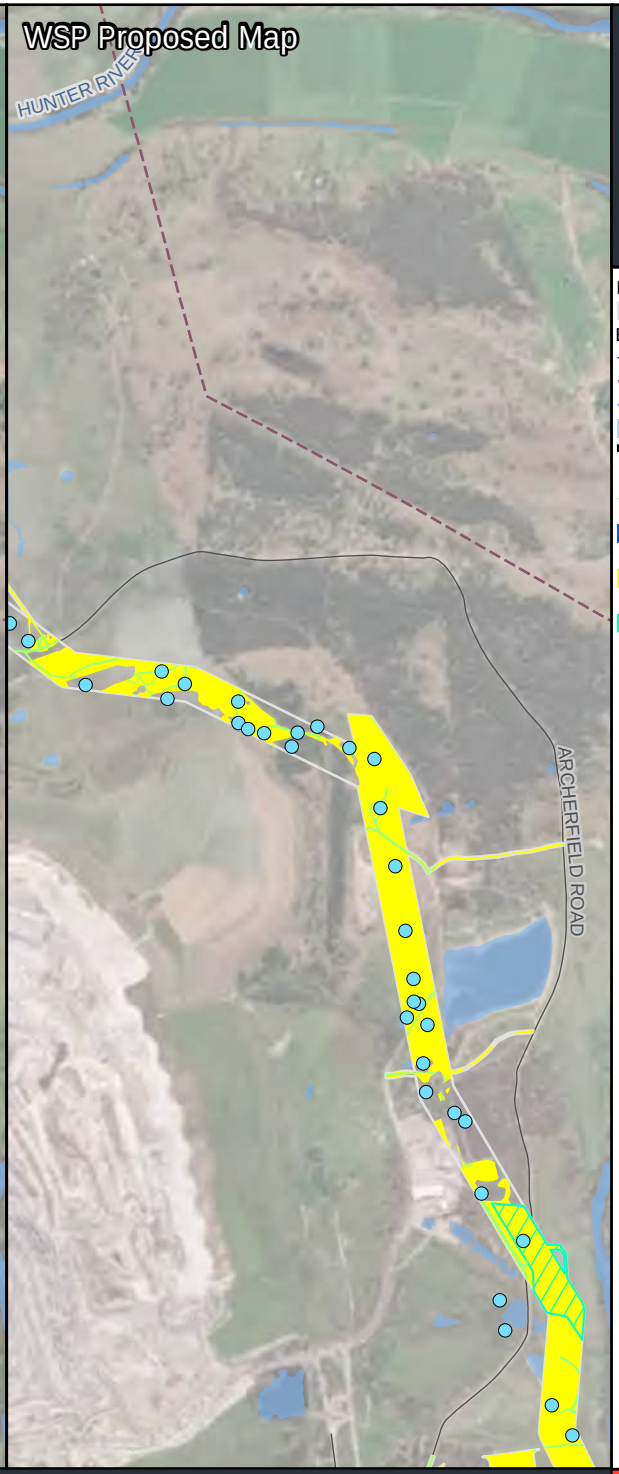

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping
Page 10 of 25

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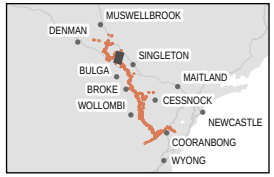

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Metres

Coordinate system: GDA2020 MGA Zone 56

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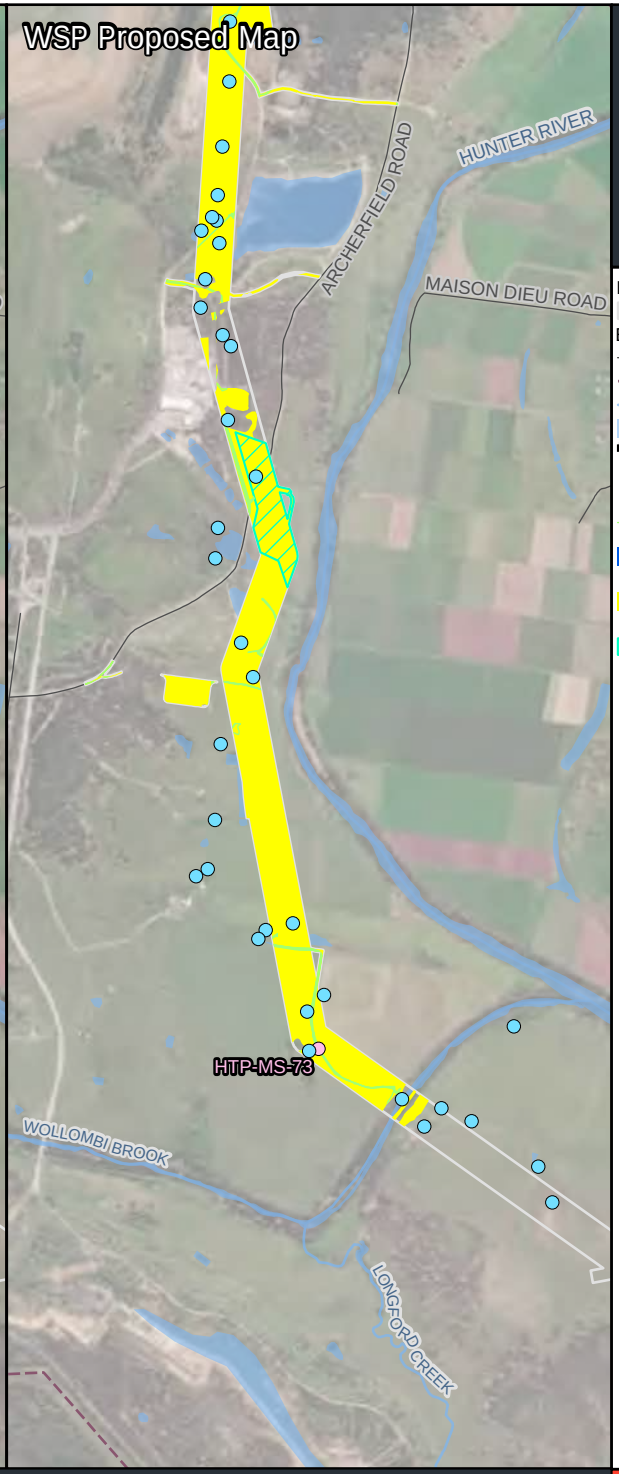

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping
Page 11 of 25

Legend

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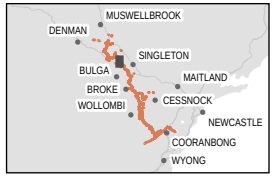

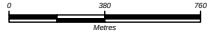

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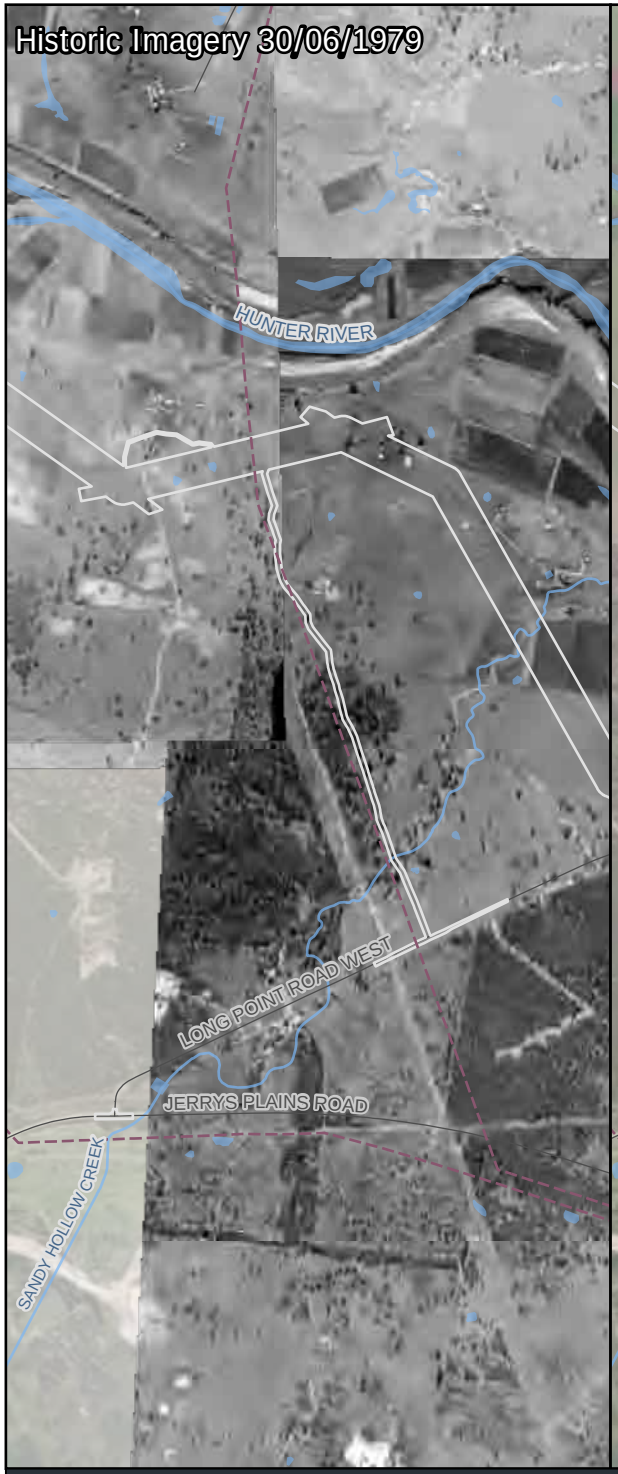

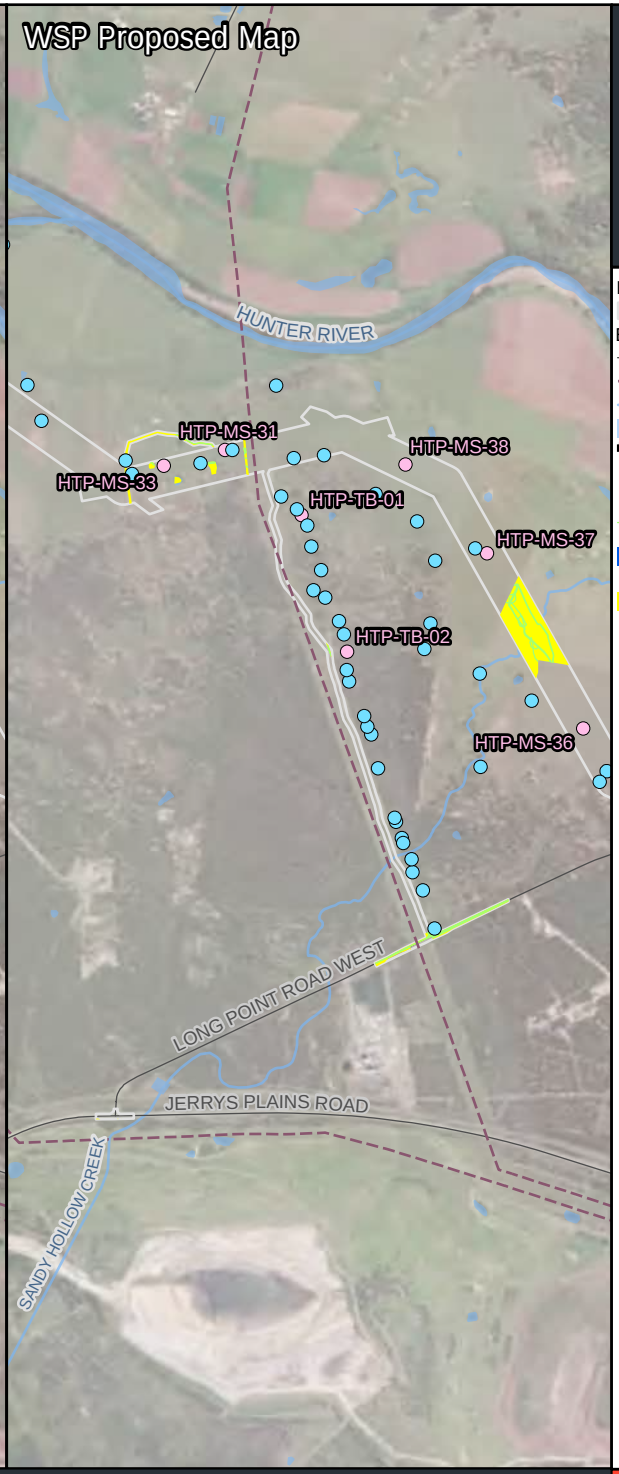

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Biodiversity Development Assessment Report

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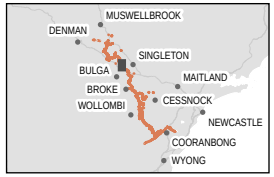

0 380 760
Metres

Coordinate system: GDA2020 MGA Zone 56

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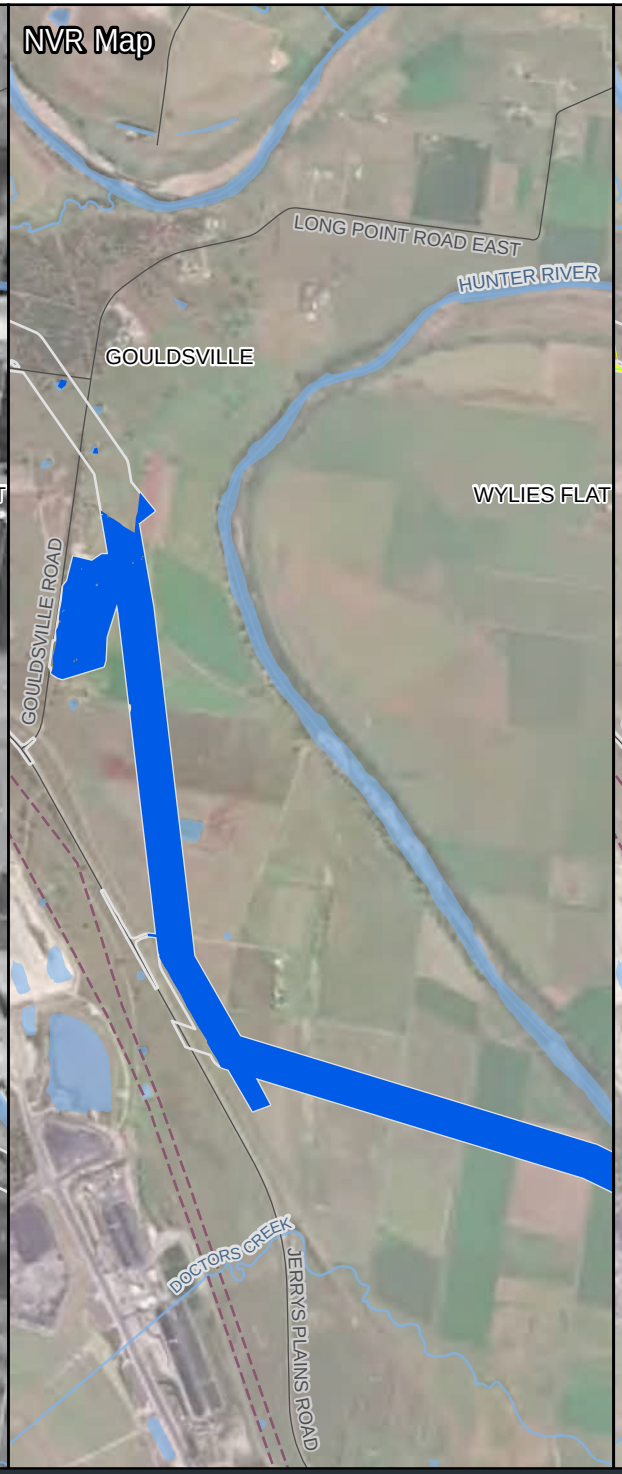

Hunter Transmission Project
Biodiversity Development Assessment Report

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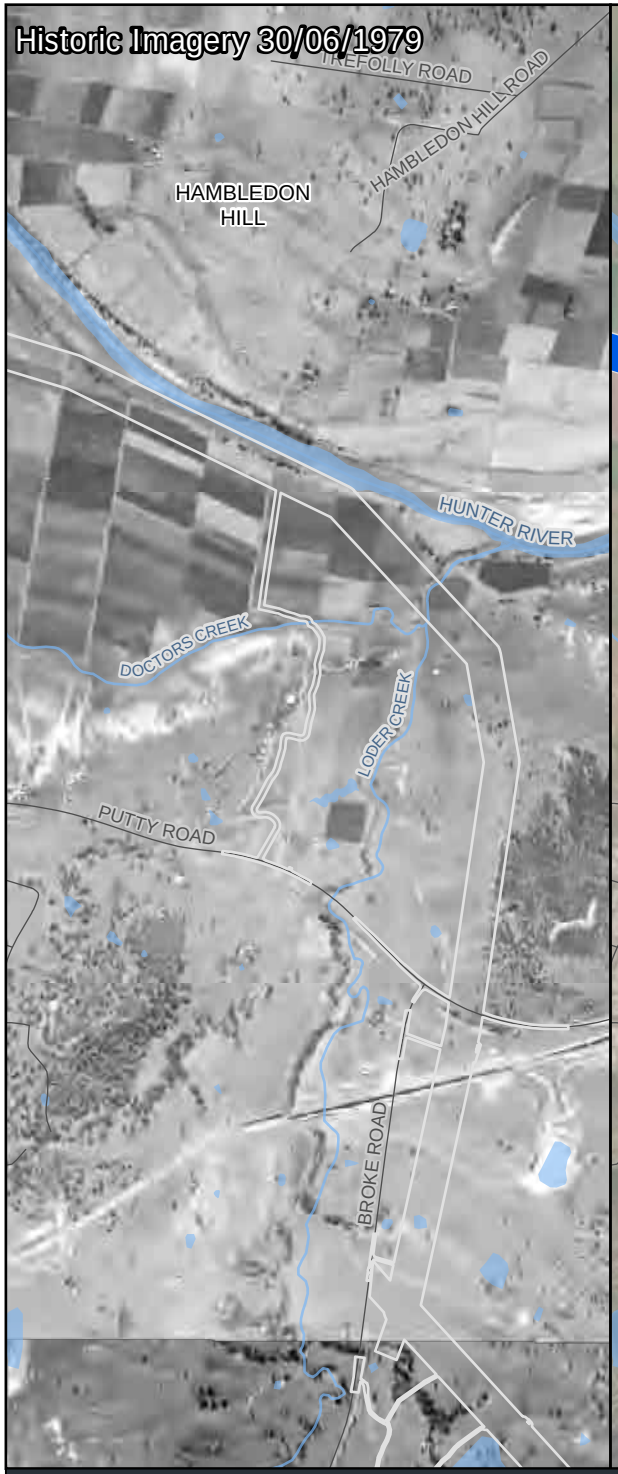

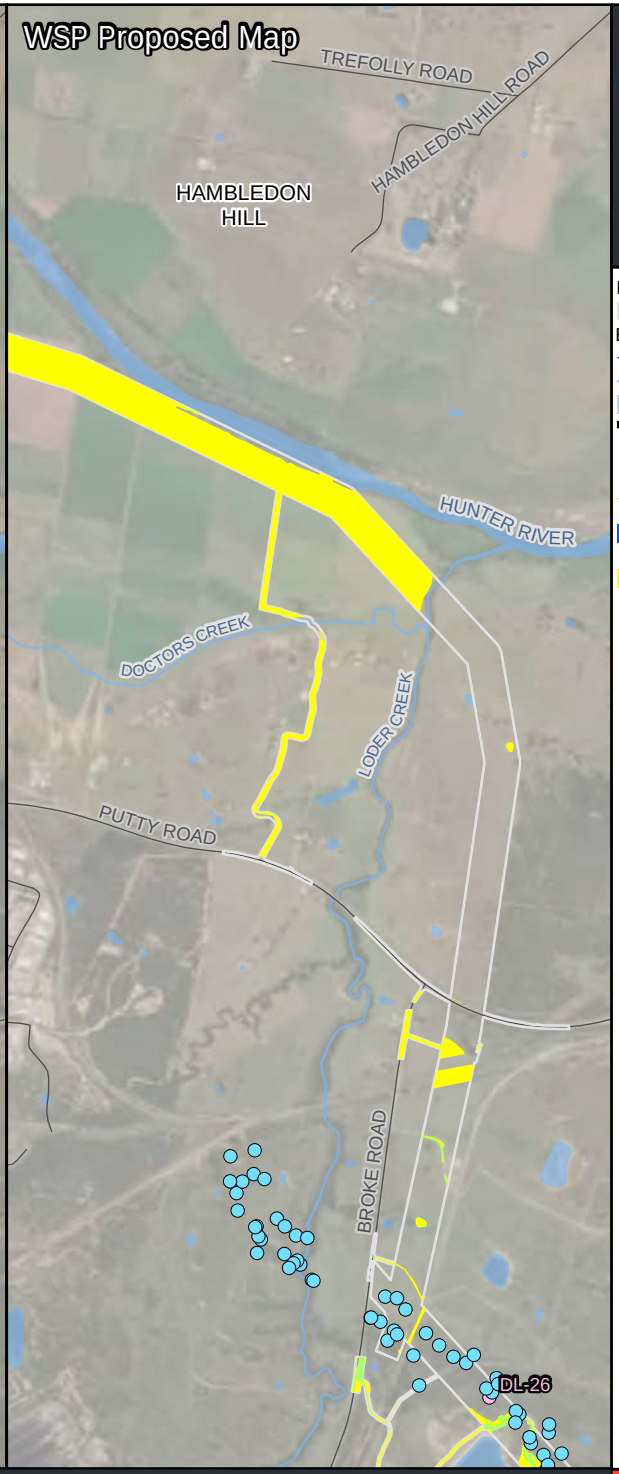

Hunter Transmission Project
Biodiversity Development Assessment Report

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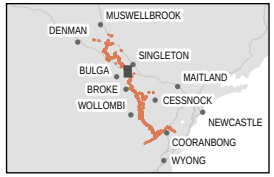

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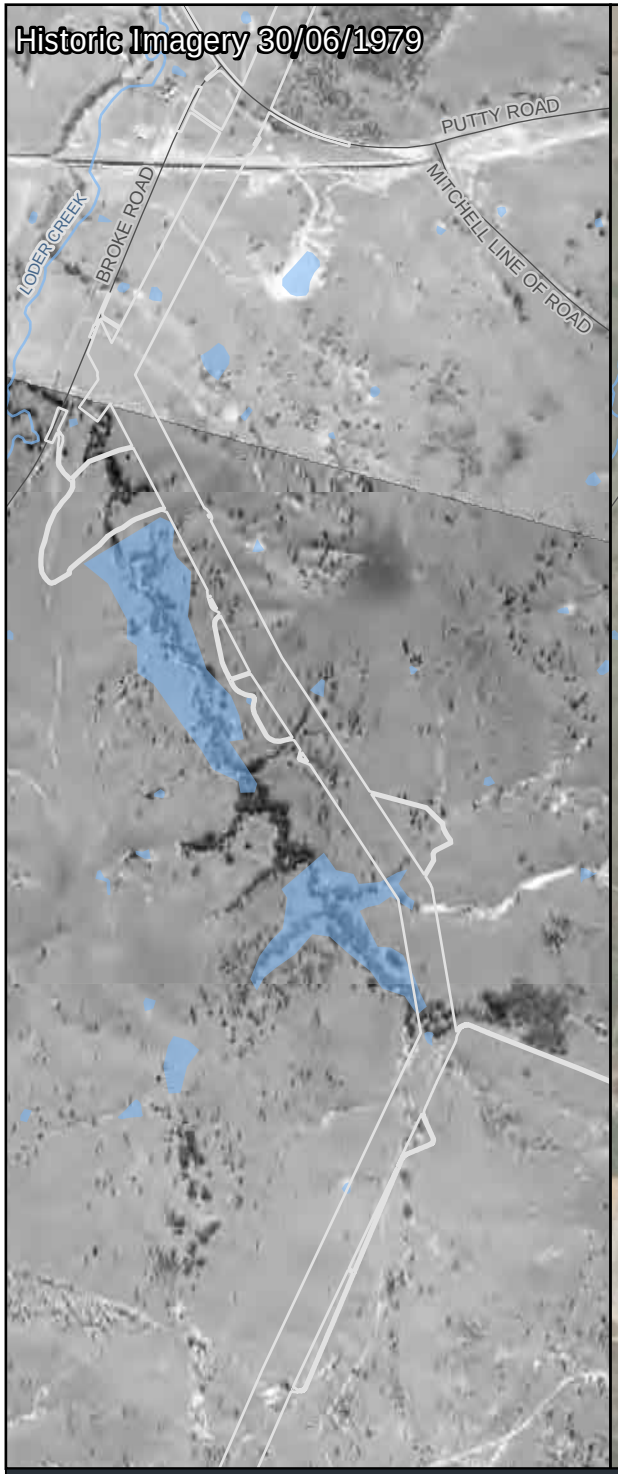

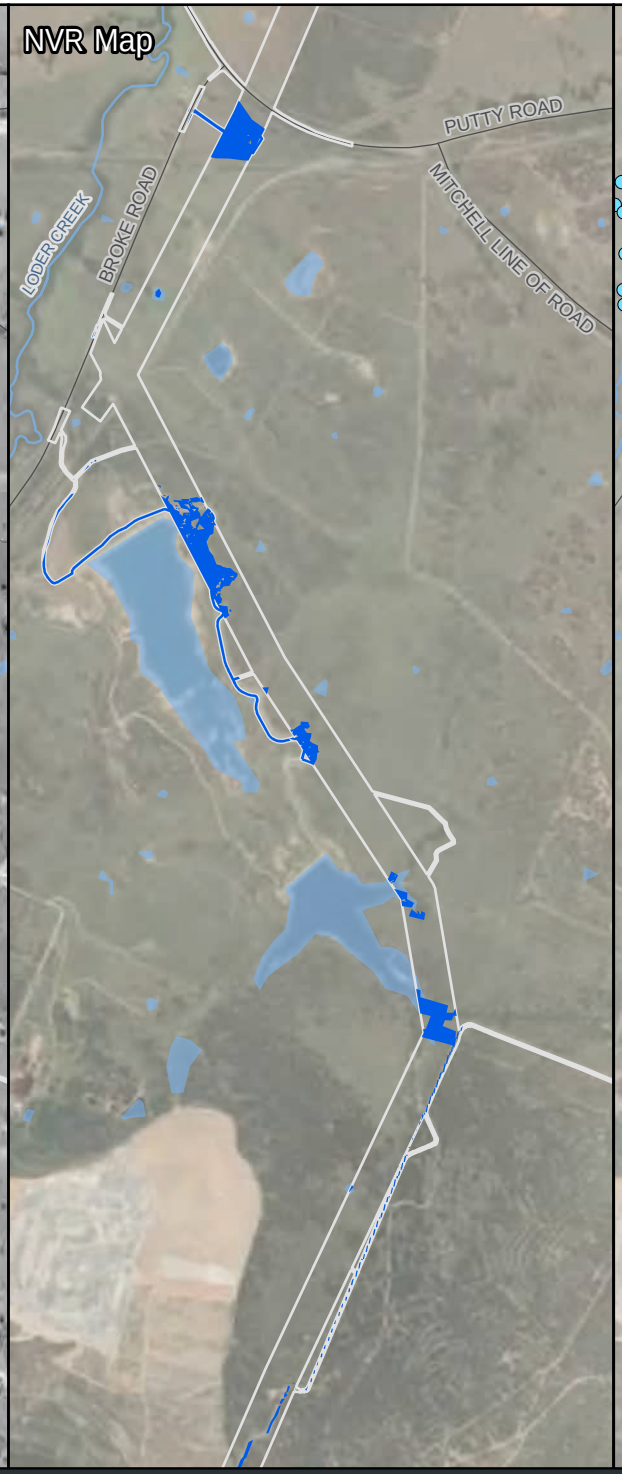

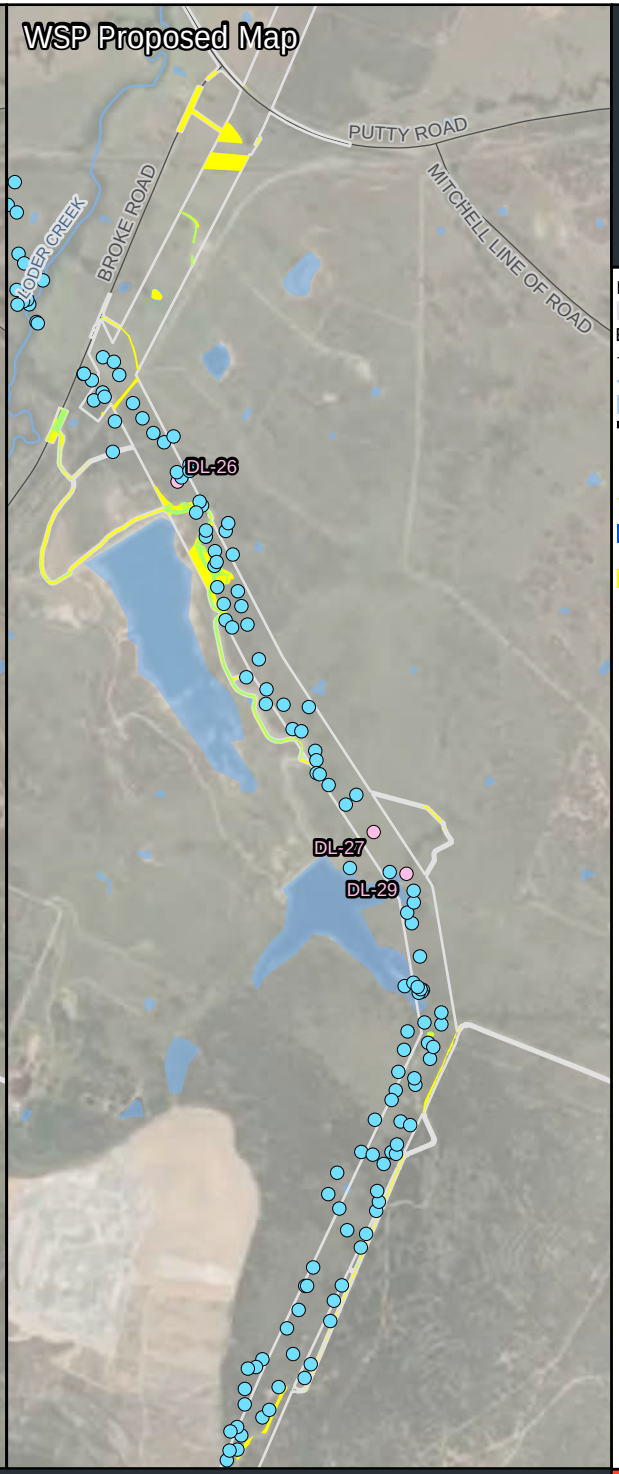

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping
Page 15 of 25

Legend

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0 380 760
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:30,000 Date: 15/07/2025

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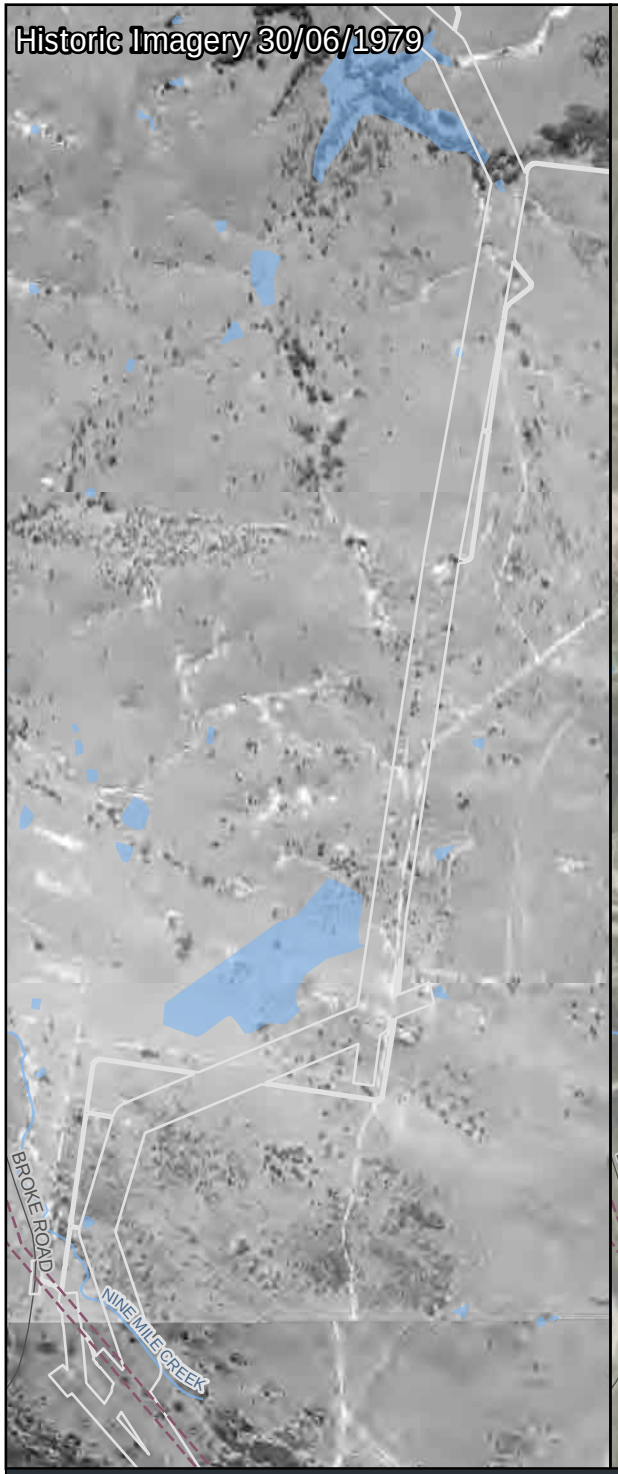

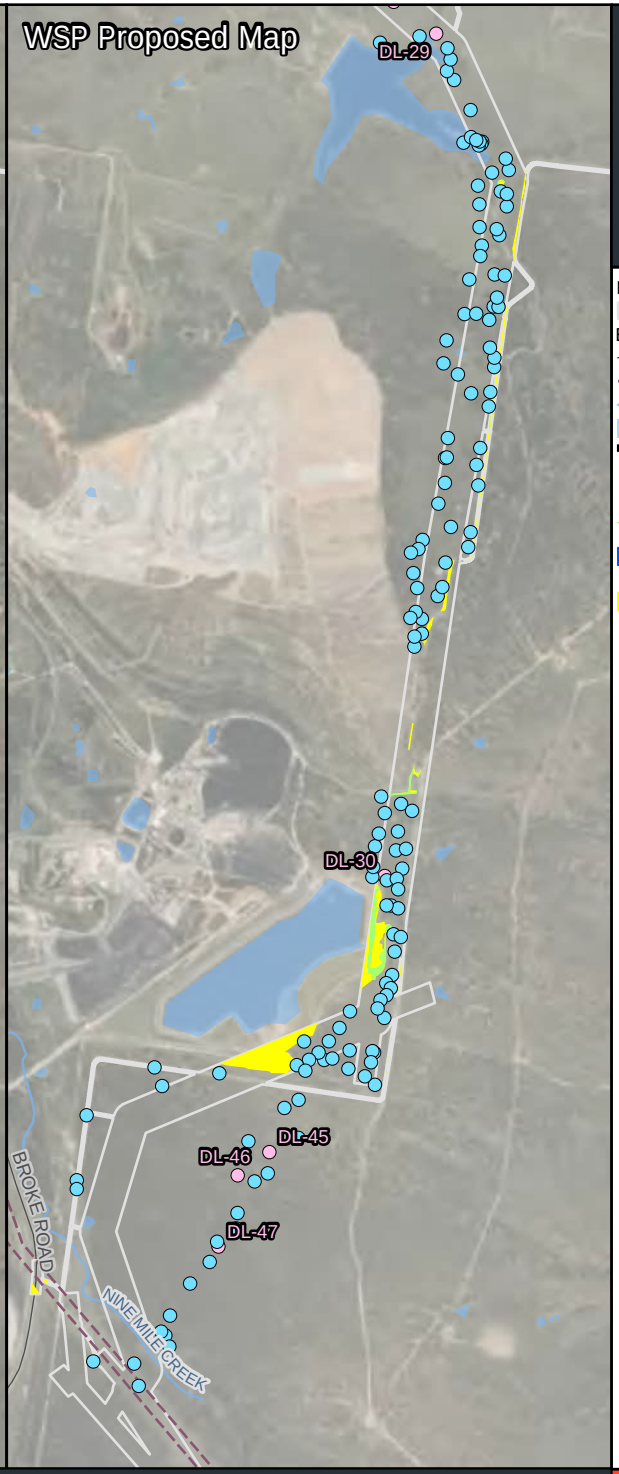

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

Legend

- Biodiversity study area

Existing environment

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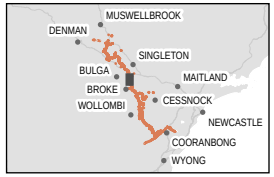

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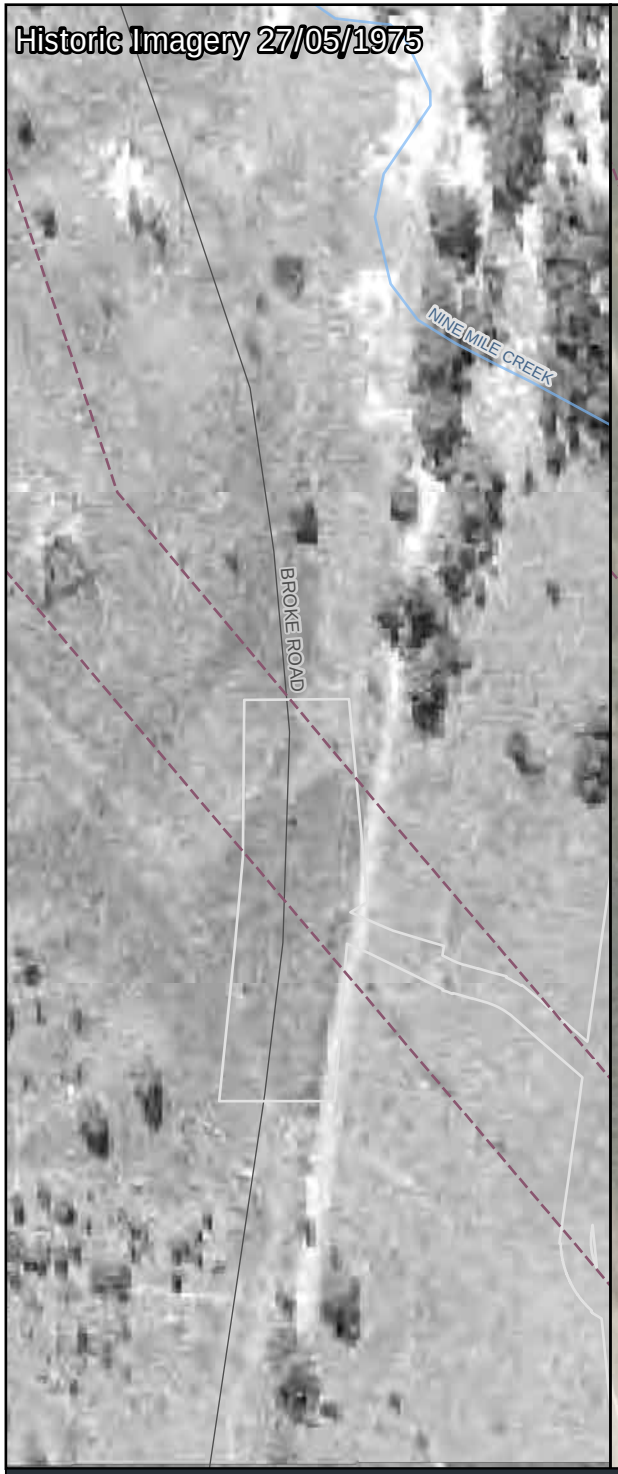

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

Legend

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Existing environment

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- 330 kV transmission line
- Named watercourse
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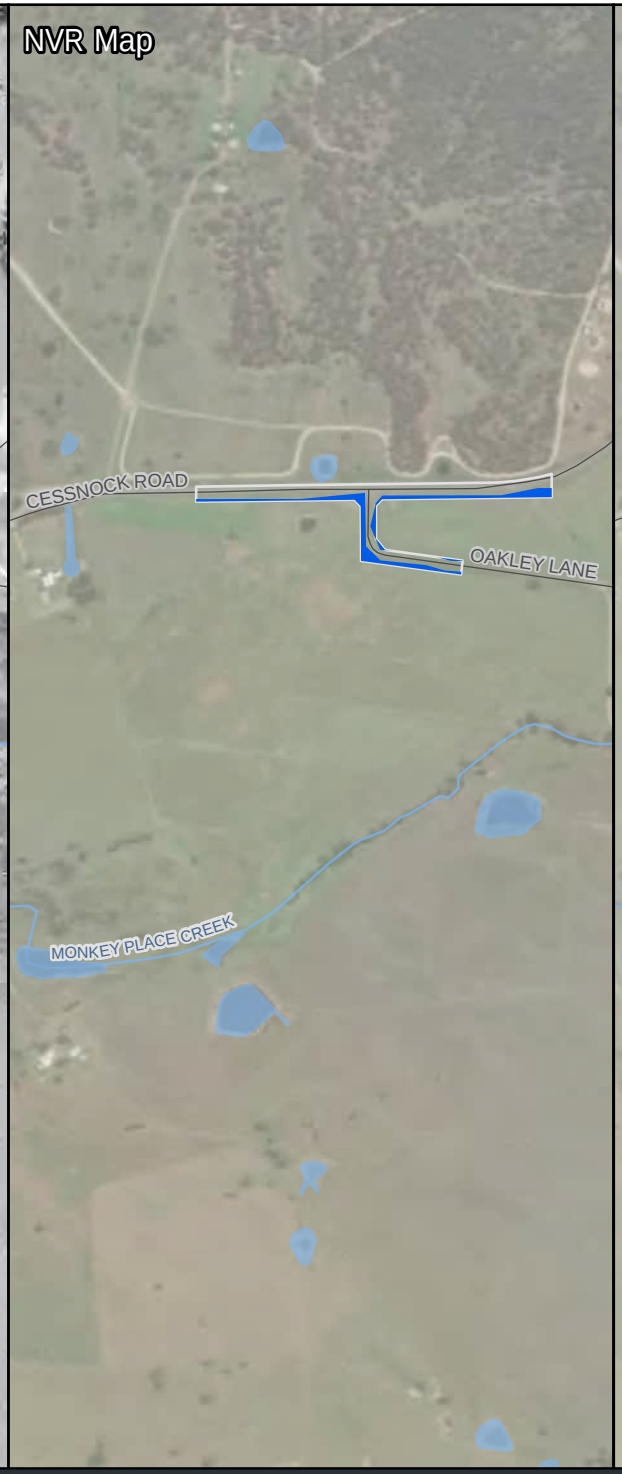

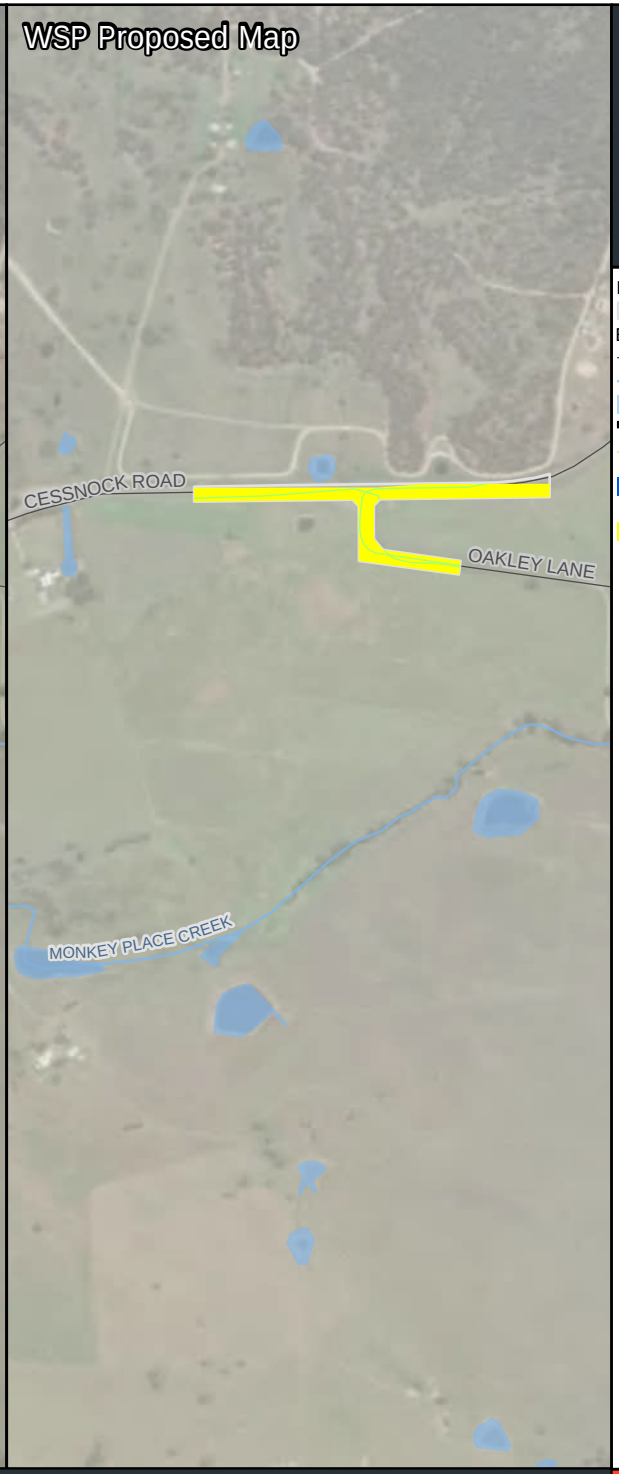

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

Legend

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- Waterbody
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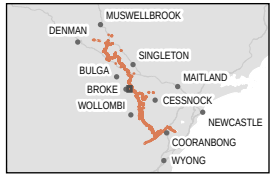

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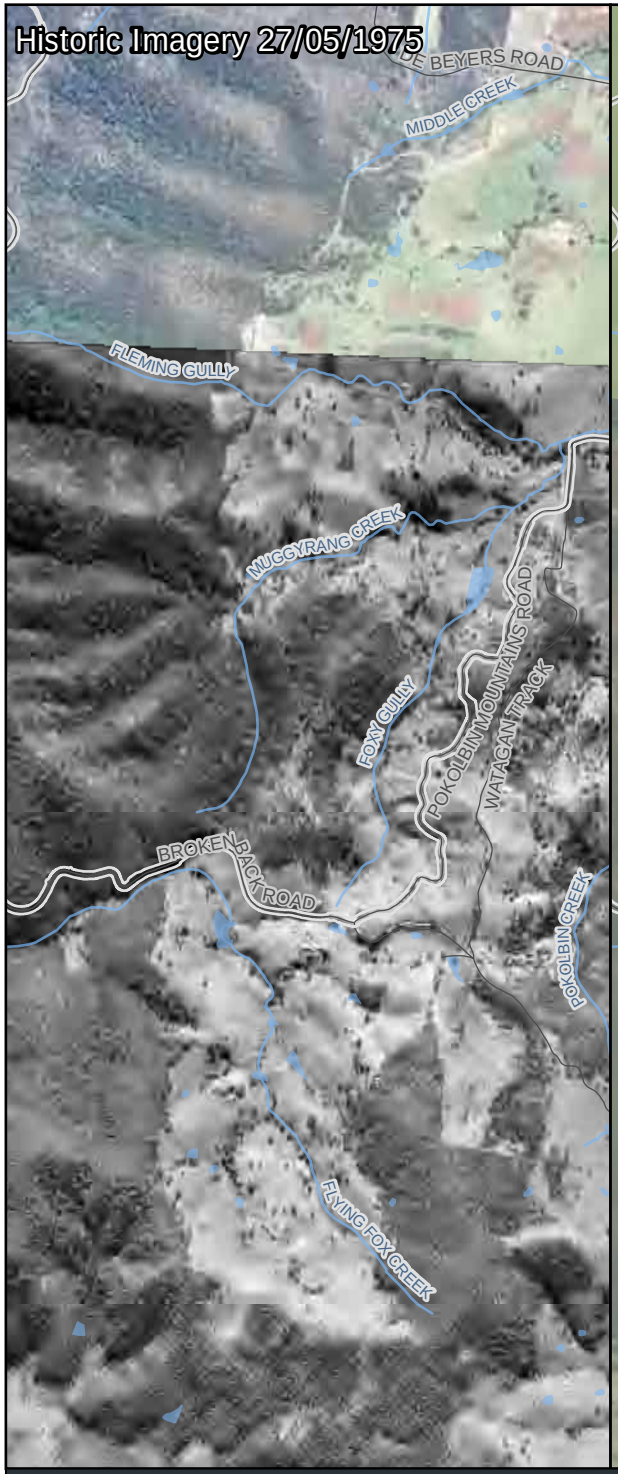

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
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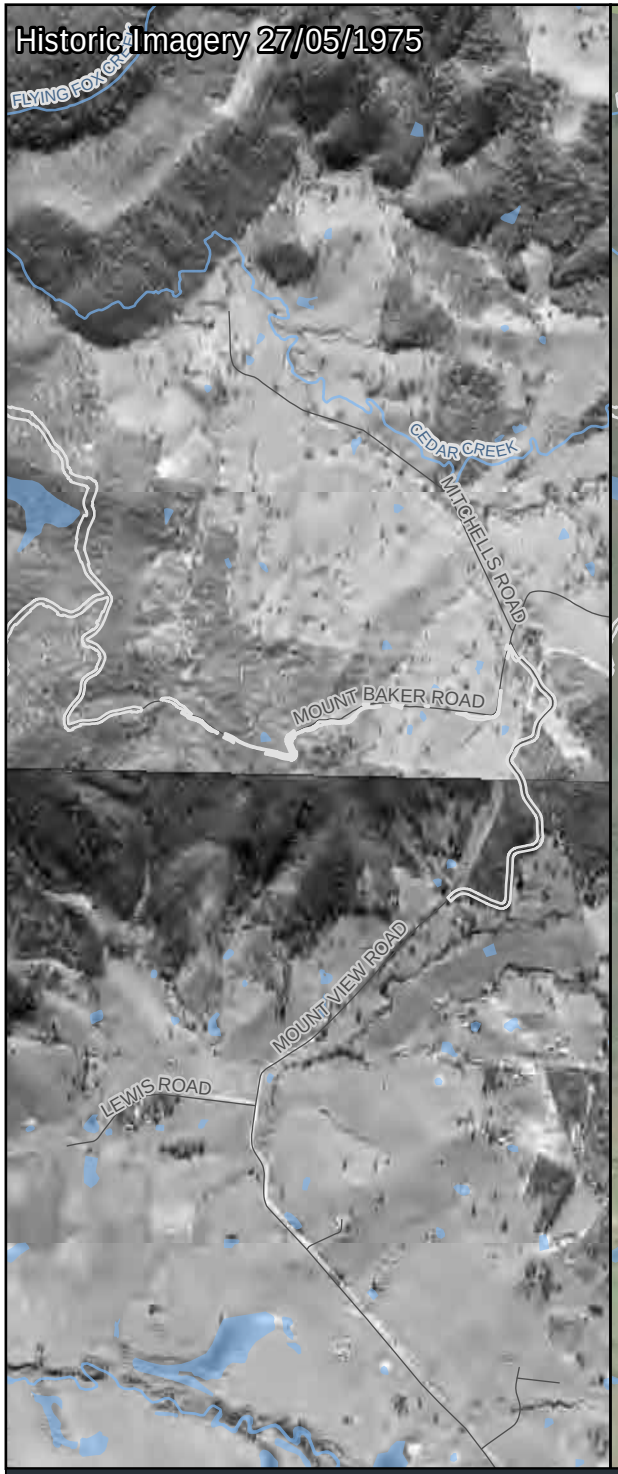

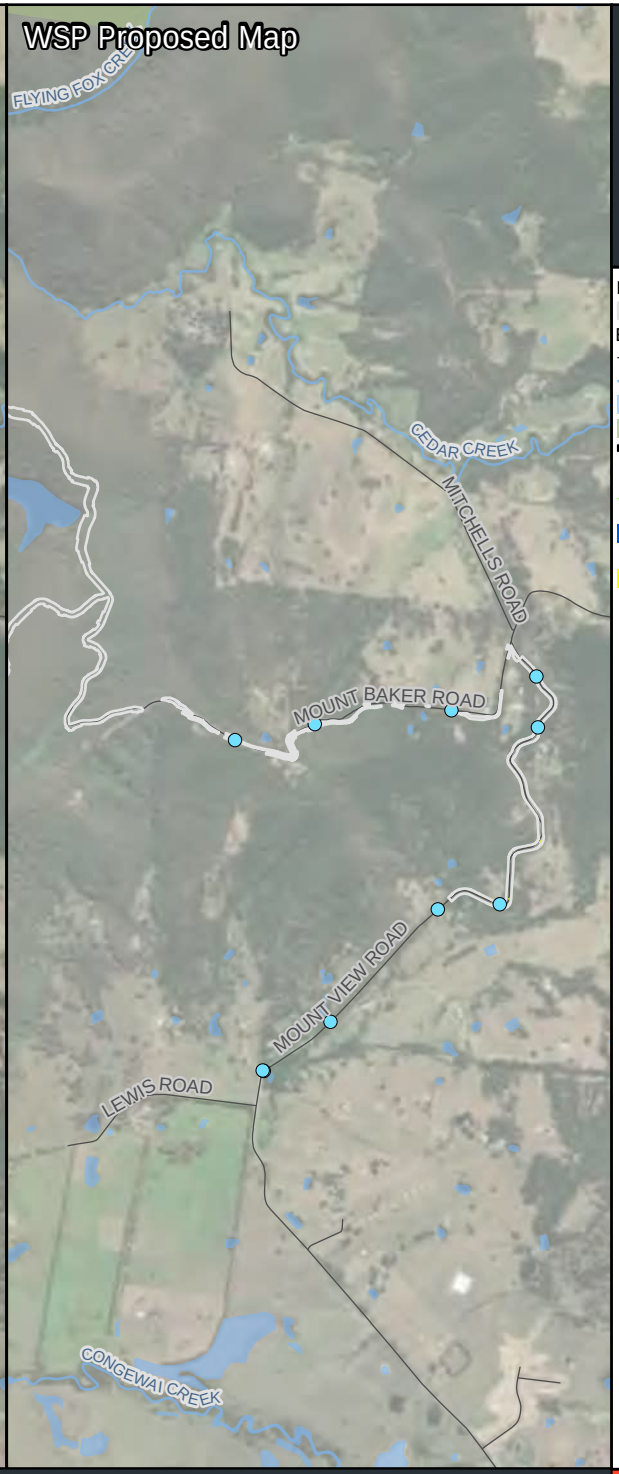

Hunter Transmission Project
Biodiversity Development Assessment Report

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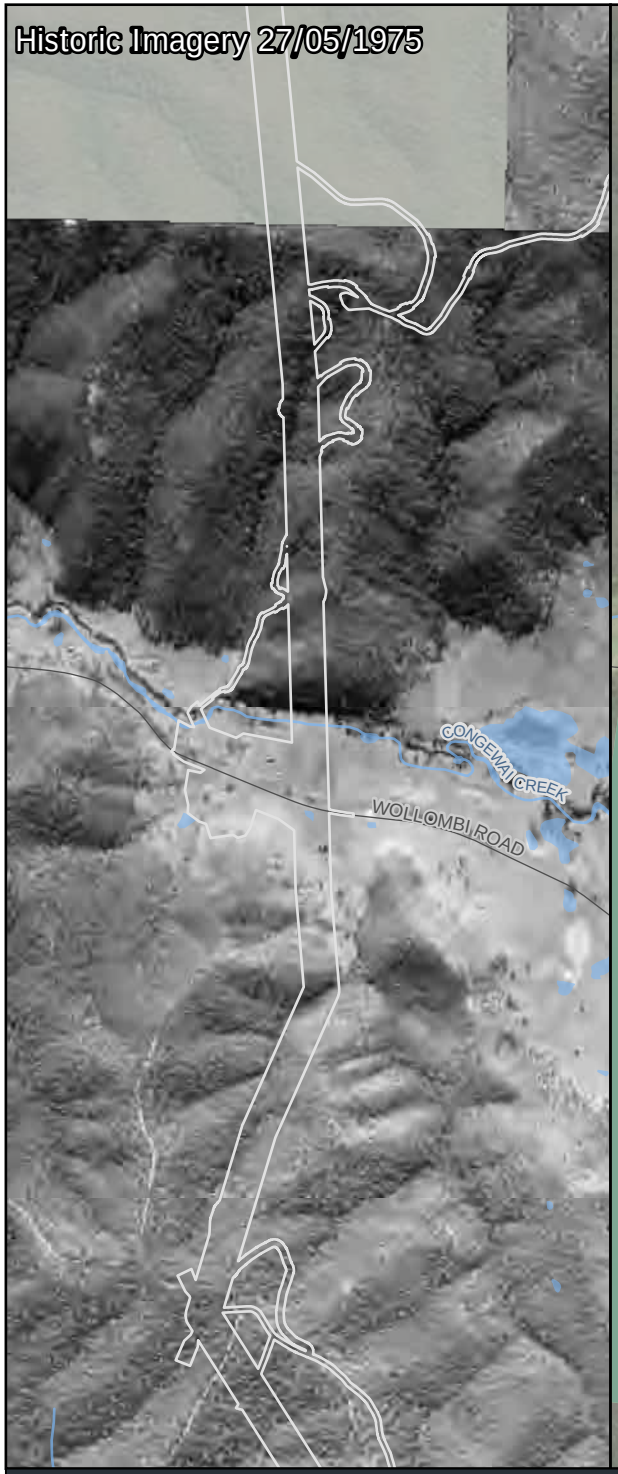

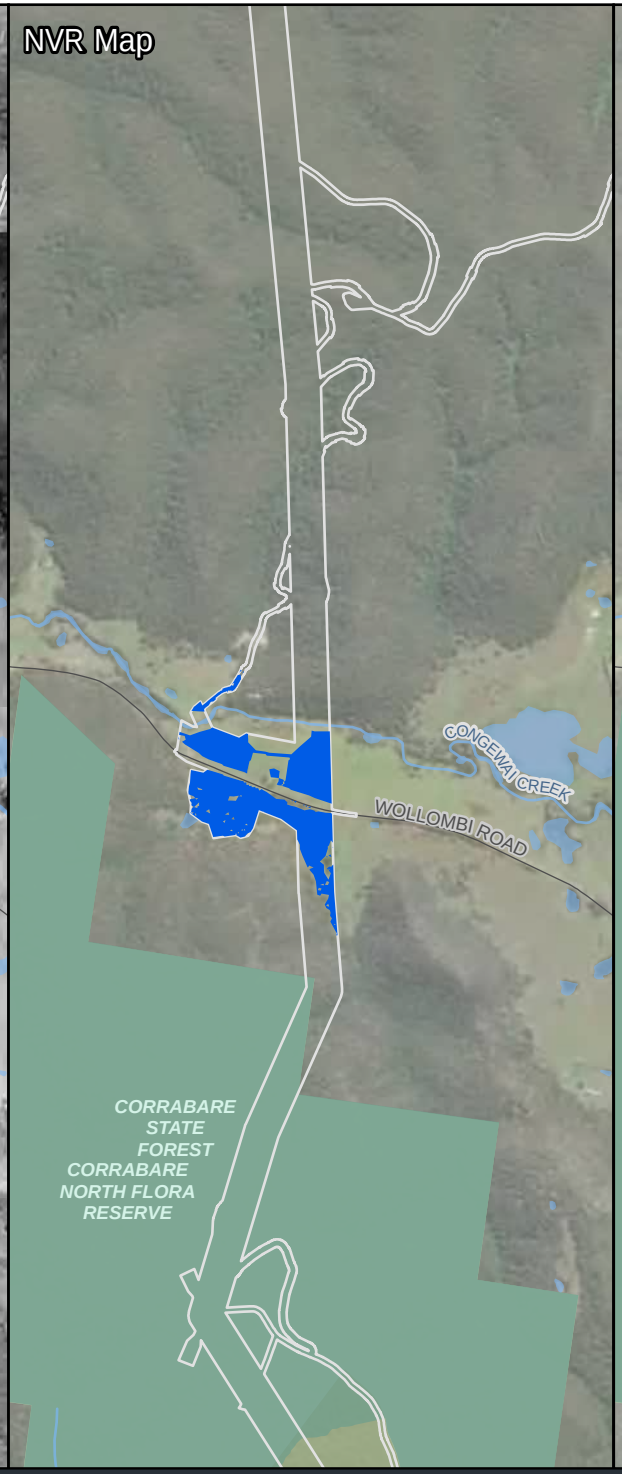

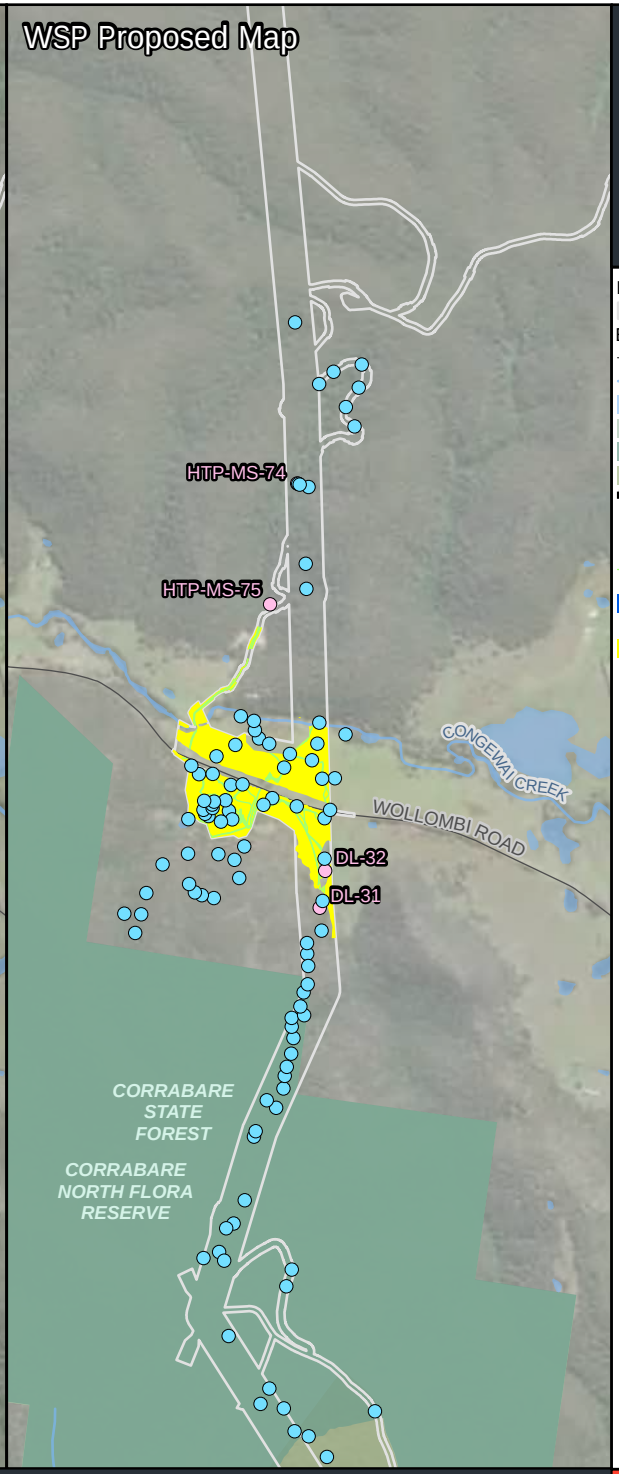

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

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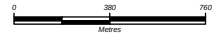

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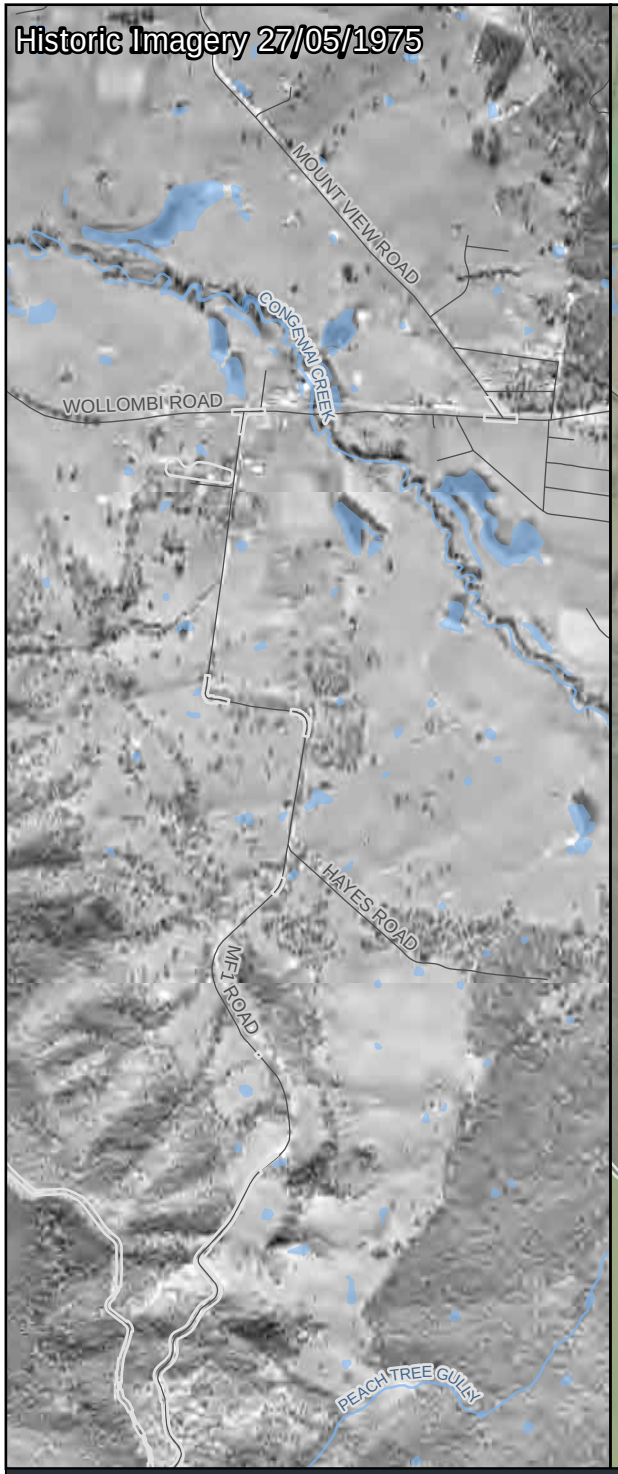

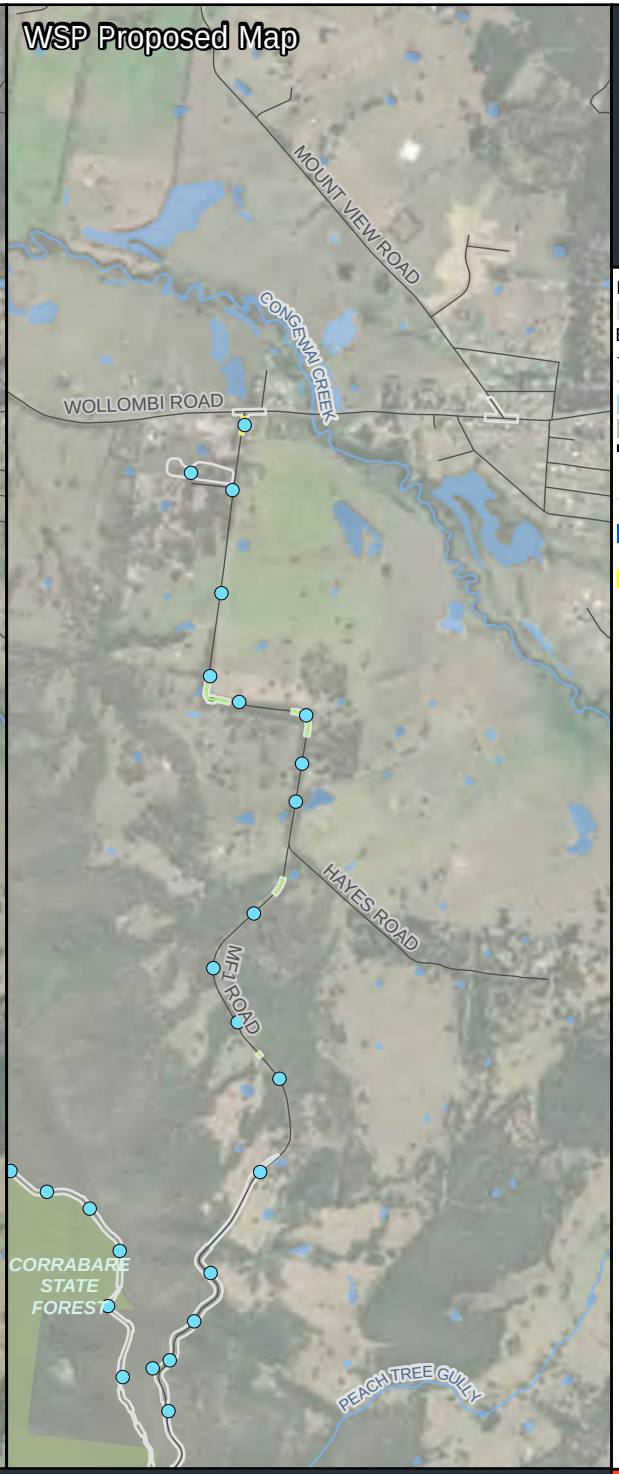

Hunter Transmission Project
Biodiversity Development Assessment Report

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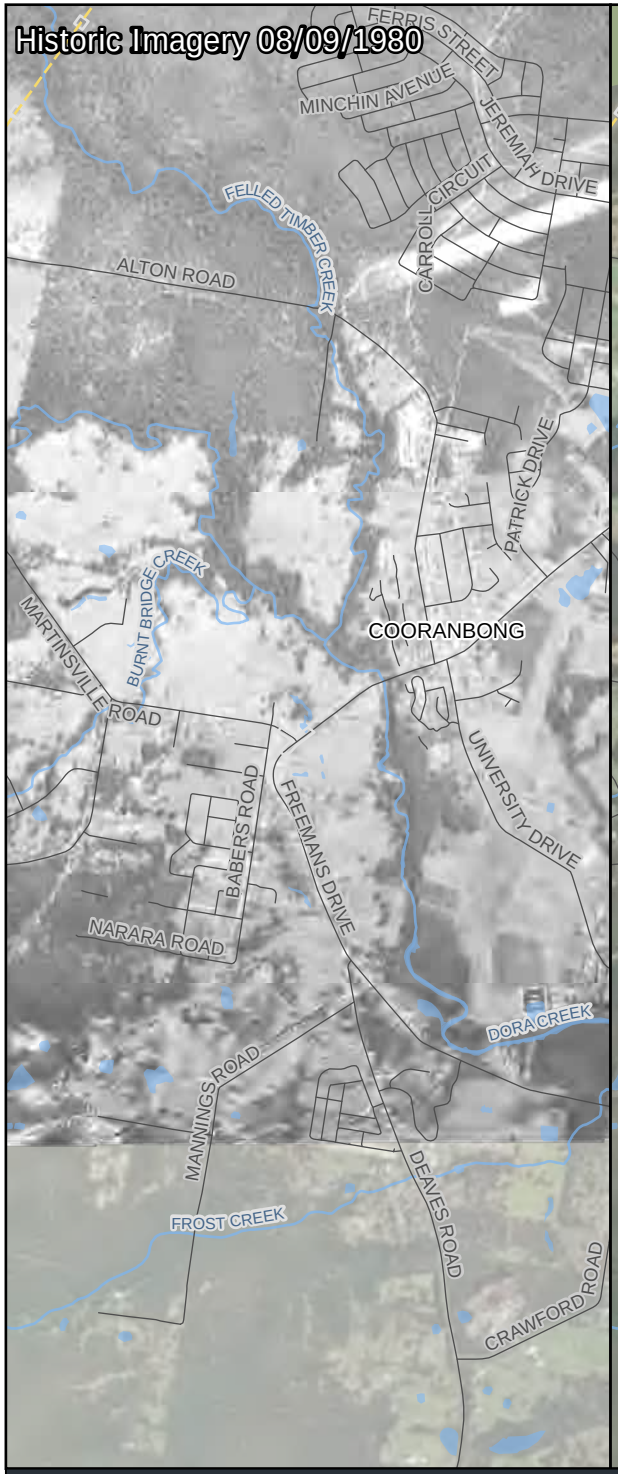

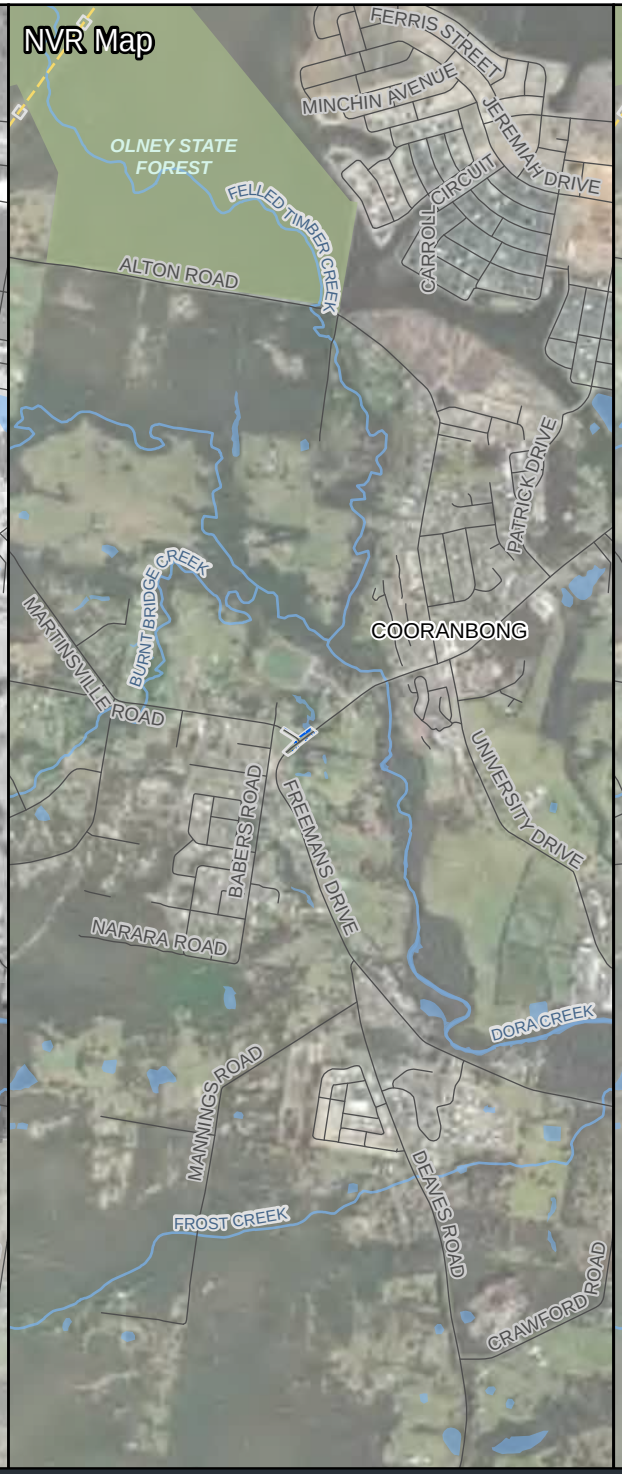

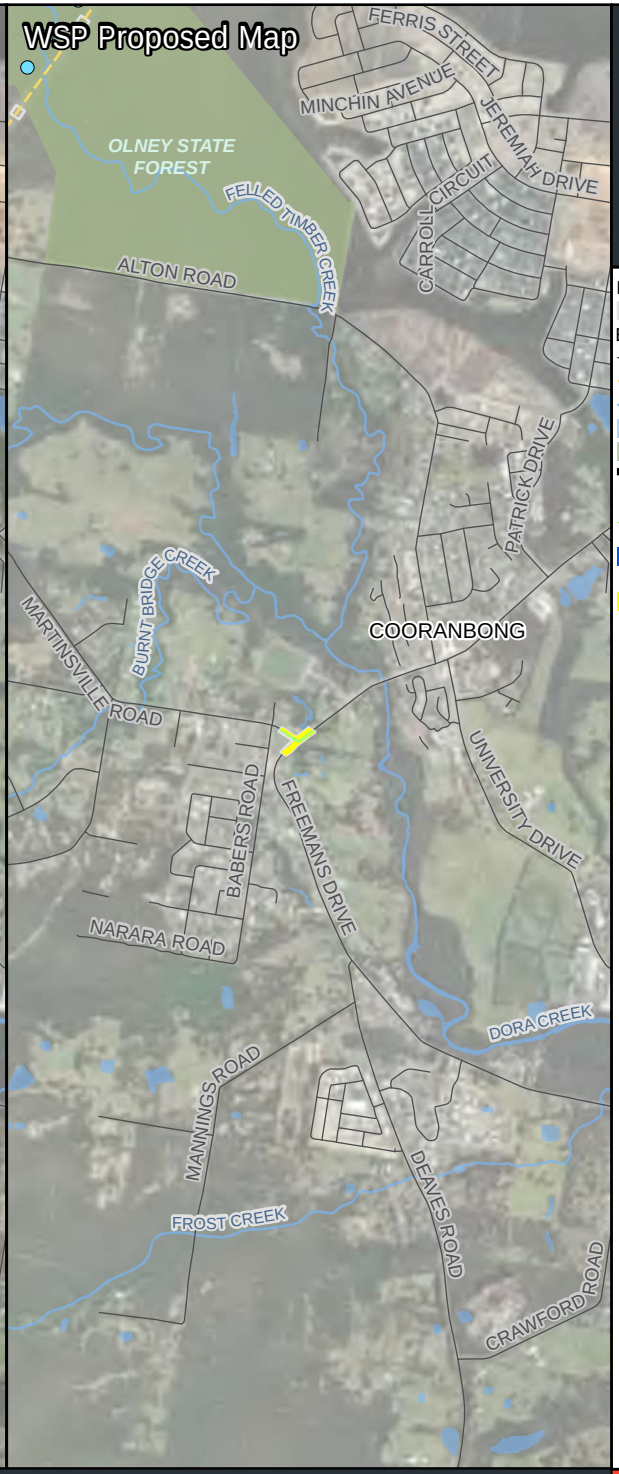

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping
Page 23 of 25

Legend

- Biodiversity study area

Existing environment

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- 500 kV transmission line
- Named watercourse
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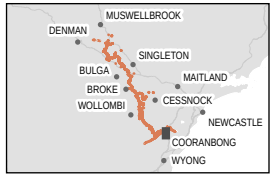

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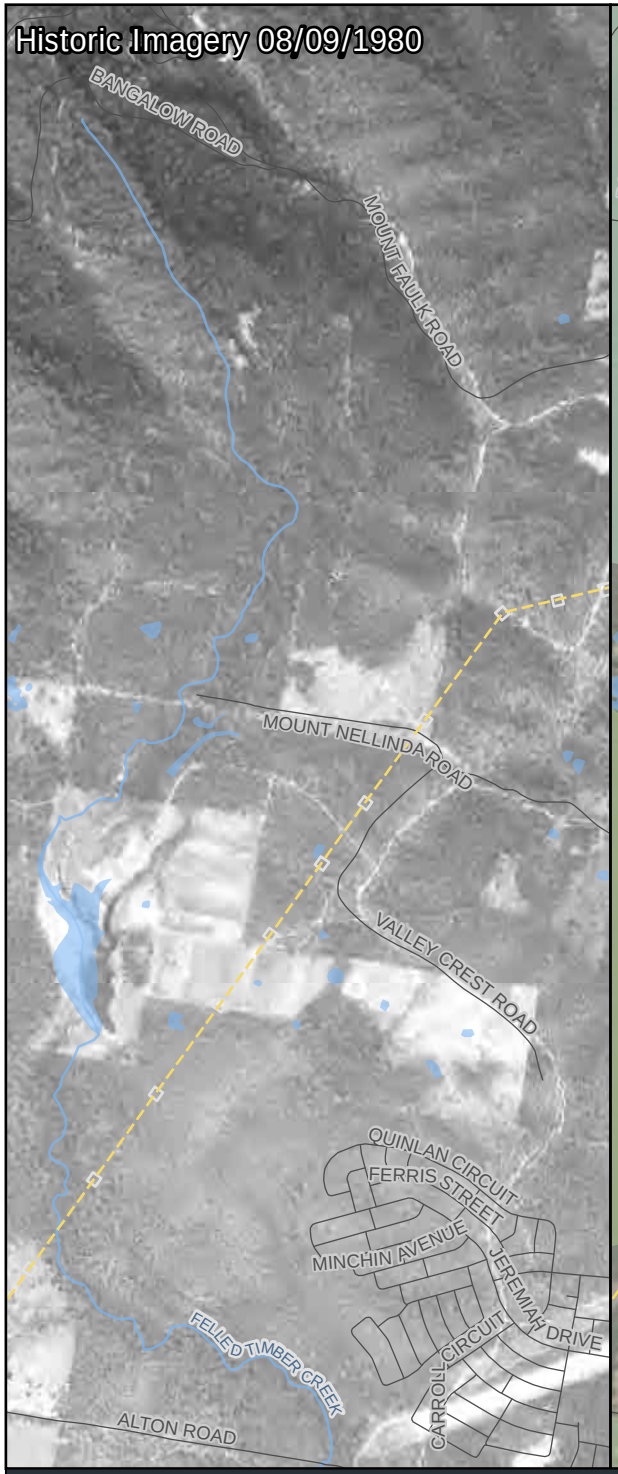

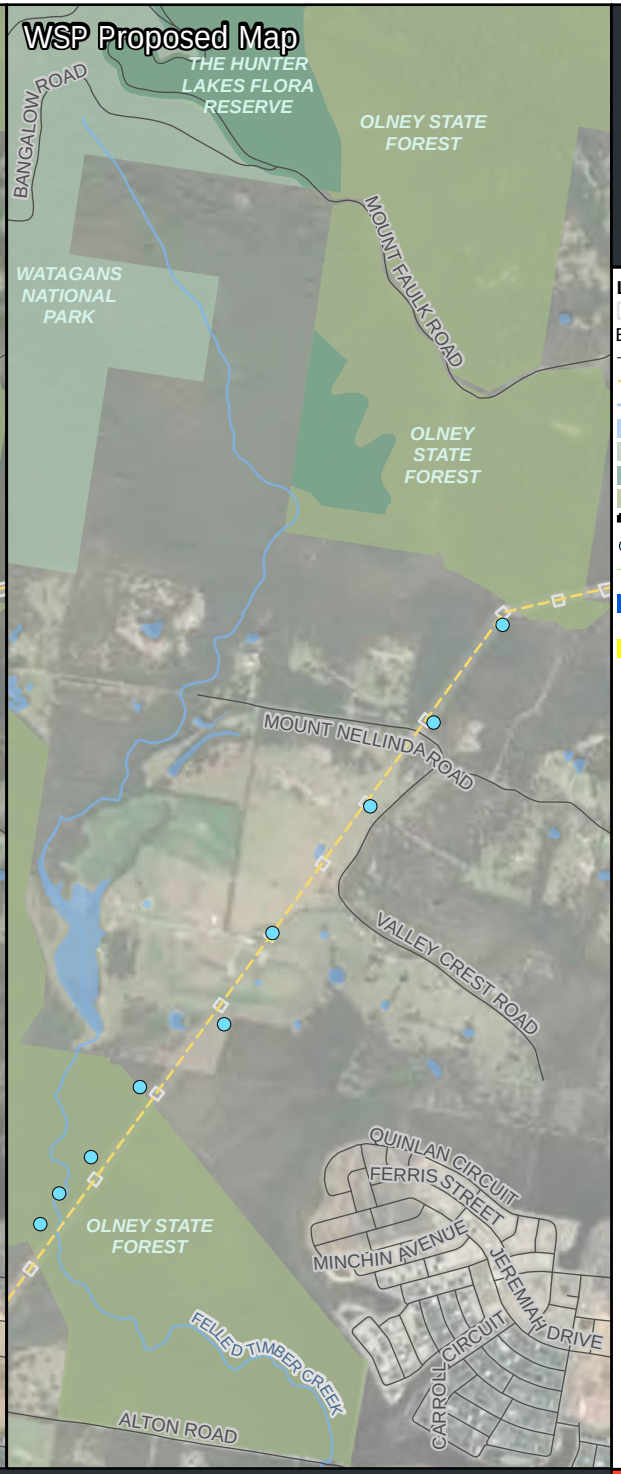

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping

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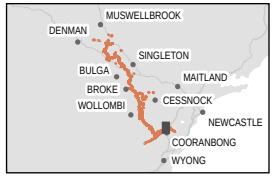

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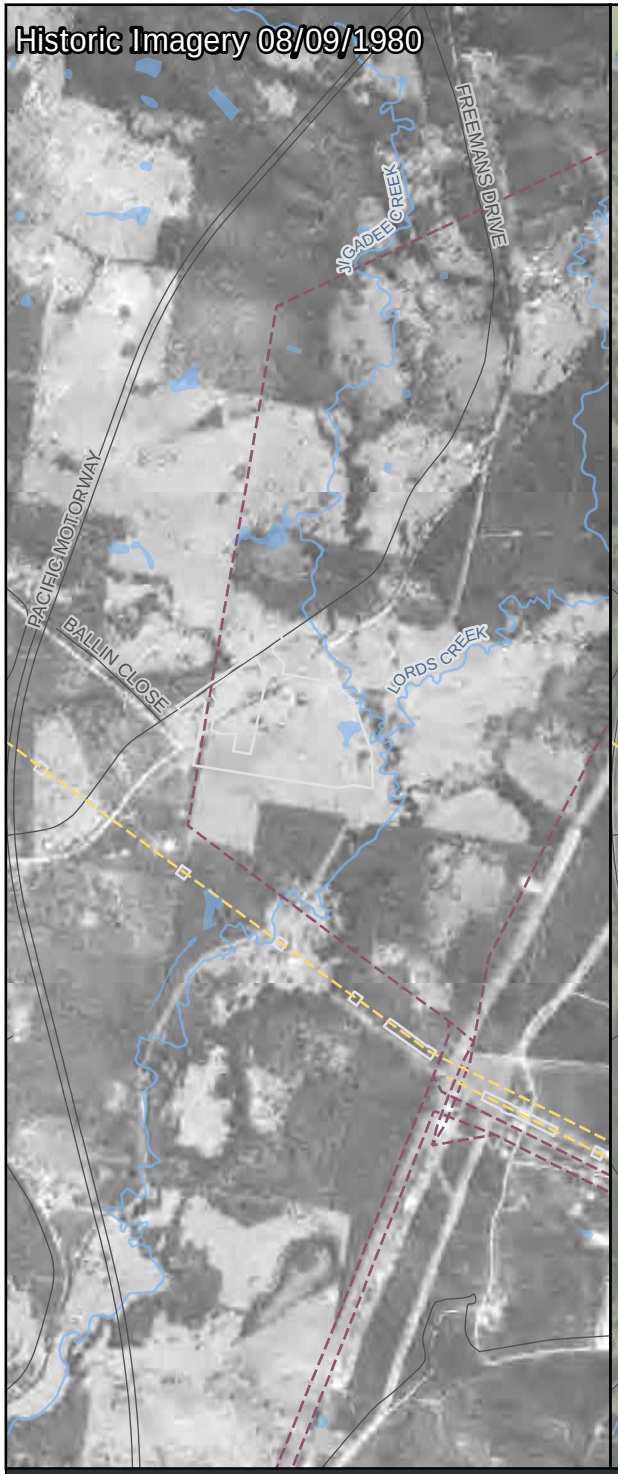

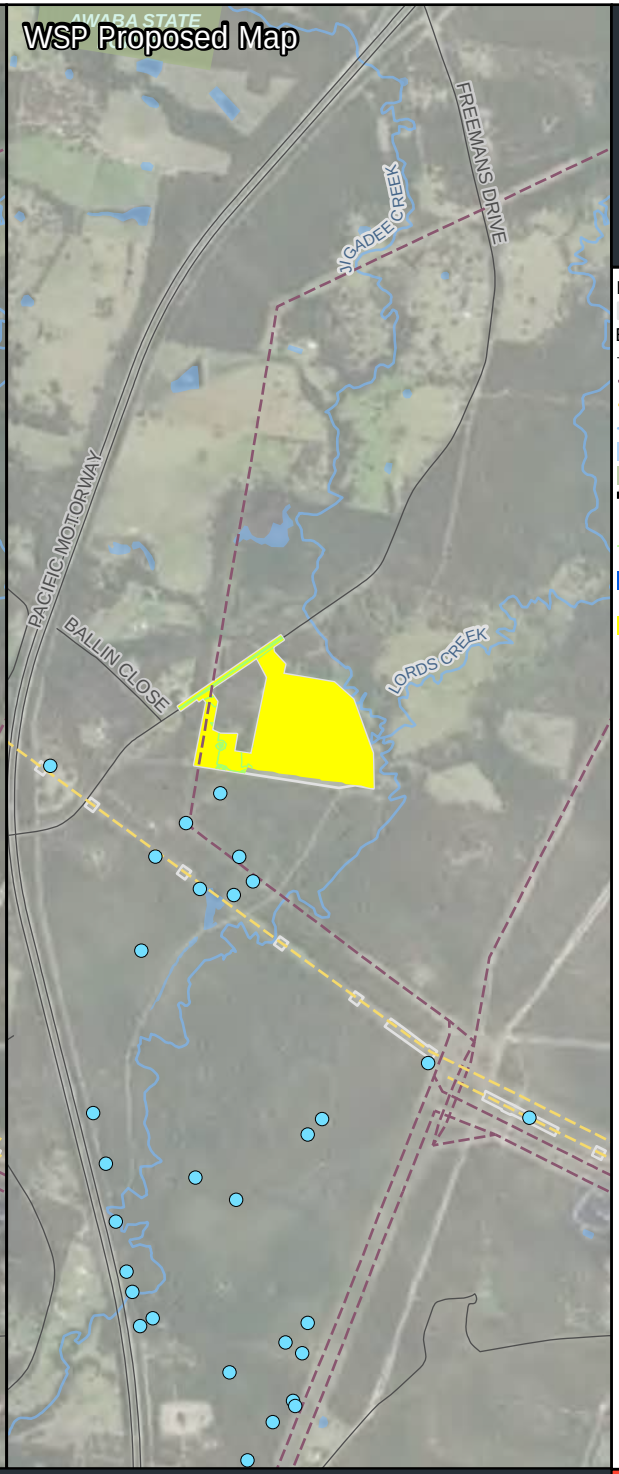

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix A
Proposed category 1 mapping
Page 25 of 25

Legend

- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- 500 kV transmission line
- Named watercourse
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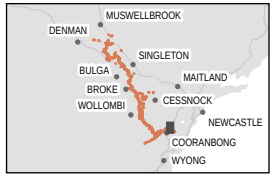

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Appendix C

Matters of national environmental significance

Design
for a better
future /

EnergyCo

Hunter Transmission Project

Matters of National Environmental Significance

August 2025

Question today
Imagine tomorrow
Create for the future

Hunter Transmission Project
Matters of National Environmental Significance

EnergyCo

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Newcastle NSW 2300
PO Box 1162
Newcastle NSW 2300

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Rev	Date	Details
Final	21/08/2025	Final report

	Name	Date	Signature
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Reviewed by:	Alex Cockerill	21/08/2025	
Approved by:	Alex Cockerill	21/08/2025	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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Table of Contents

1 Introduction 1

1.1 Policy, standards and guidelines 2

2 Project 3

2.1 Project description 3

2.2 Project design and alternatives 4

3 Methodology 7

3.1 Desktop assessment 7

3.2 Likelihood of occurrence assessment 8

3.3 Residual impact assessment 9

3.4 Field surveys 9

4 Threatened biodiversity 10

4.1 Threatened ecological communities 10

4.2 Threatened flora 14

4.3 Threatened fauna 16

5 Commonwealth land (plants and animals) 19

5.1 Plants 19

5.2 Animals 22

6 Impacts 25

6.1 Direct impacts 25

6.2 Indirect impacts 34

7 Mitigation measures 35

7.1 Mitigation measures 35

8 Threatened biodiversity assessment 36

9 References 40

List of tables

Table 3.1 Likelihood of occurrence assessment key terms 8

Table 4.1 EPBC Act listed TECs within the subject land 10

Table 4.2 Threatened flora likelihood of occurrence within the projects area.....14

Table 4.3 Threatened fauna likelihood of occurrence within the subject land 16

Table 5.1 Vegetation community types identified within the subject land on the Singleton Military Area 20

Table 5.2 Threatened plant species and associated PCTs recorded or assumed to be present in the subject land on Singleton Military Area.....21

Table 5.3 Threatened fauna species recorded or considered likely to occur within the subject land on the Singleton Military Area.....22

Table 6.1 Disturbance area definitions for biodiversity construction impact assessment purposes 25

Table 6.2 Summary of disturbance type and clearing methods.....27

Table 6.3 Summary of direct impacts to PCTs identified within the subject land 29

Table 6.4 Summary of project impacts on EPBC Act listed TECs 30

Table 6.5 Extent of project impacts on listed threatened species within the Wyong, Yengo, and Hunter IBRA subregions 32

Table 8.1 Summary of the total ecosystem credits required for EPBC threatened.....37

Table 8.2 Summary of the total species credits required.....38

List of appendices

Attachment A Likelihood of occurrence

Attachment B Significant impact assessment

Summary tables for the 'Assessment of predicted impacts on EPBC Act-listed Threatened Species and Communities' and the 'Completion Checklist for BDAR Appendix E, relating to assessment of predicted impacts on EPBC Act-listed Threatened Species and Communities' are provided below in accordance with the *Guidance for Accredited Assessors on the assessment of MNES* (attachment 1 and 2) (Department of Planning Housing and Infrastructure 2016).

Table ES.1 Summary table for assessment of predicted impacts on EPBC Act-listed Threatened Species and Communities

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Threatened ecological community						
Central Hunter Valley Eucalypt Forest and Woodland	3314_Thinned 3315_Thinned 3431_Thinned 3431_Poor 3431_Plantation 3438_Mod-good 3446 Mod-good	144.40	4,490	Ecosystem	EnergyCo intends to enter into a Strategic Offset Delivery Agreement (SODA) with the Secretary of the NSW Department of Climate Change, Energy, Environment and Water (NSW DCCEEW) for the project. Further detail on the offset requirements and approach are provided in Section 8.6 of the BDAR	Impact assessment BDAR: page 977, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
River-Flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria	3328_Mod-good 4039_Mod-good	1.36	42	Ecosystem		Impact assessment BDAR: page 977, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Warkworth Sands Woodland of the Hunter Valley	3636_Thinned 3636_Disturbed Grassland	12.37	166	Ecosystem		Impact assessment BDAR: pages 977, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Threatened species						
Botaurus poiciloptilus (Australasian Bittern)	4039, 4072, 4015 and 4089.	22.08	415	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Brachyscome brownii	3239 and 3241	25.42	3103	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Climacteris picumnus victoriae (Brown Treecreeper (eastern subspecies))	3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636 and 4015	751.21	8149	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Dasyurus maculatus (Spotted-tail Quoll)	PCT 3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3438, 3439, 3489, 3444, 3446, 3431,3581, 3599, 3605, 3636, 3617, 3621, 4015, 4072 and 4089	754.03	16,759	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Grantiella picta (Painted Honeyeater)	3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3151, 3636 and 4015	248.82	5,726	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Hirundapus Caudacutus (White-throated Needletail)	3029, 3087, 3151, 3152, 3230, 3237, 3238, 3241, 3242, 3244, 3250, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 3489, 3581, 3599, 3605, 3617, 3636, 4015, 4039, 4072 and 4089	761.98	12,341	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Melanodryas cucullata cucullata (South-eastern Hooded Robin)	3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3151, 3636 and 4015	248.82	5,736	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Nyctophilus corbeni (Corben's Long-eared Bat)	3315, 3438, 4039 and 3489	39.40	759	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Petaurus australis (Yellow-Bellied Glider)	3086, 3087, 3150, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3438, 3444, 3446, 3599, 3605, 3617 and 3621	480.38	11956	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Pseudomys novaehollandiae (New Holland Mouse)	3250, 3581, 3244, 3446, 3315 and 3446	31.98	542	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Pteropus poliocephalus (Grey-headed Flying fox)	PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3444, 3446, 3241, 4039, 3314, 3315, 3431, 4089, 3238 & 3086.	727.25	5406	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Pycnoptilus floccosus (Pilotbird)	3152, 3238, 3239, 3250, 3617, 3621, 3599 and 3605	217.72	5325	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Rostratula australis (Australian Painted Snipe)	4015, 4039, 4072 and 4089.	22.08	415	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Stagonopleura guttata (Diamond Firetail)	3239, 3244, 3250, 3314, 3315, 3431, 3439, 3446, 3489, 3605, 3617, 3621 and 4089.	453.97	9689	Ecosystem	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 960–976, 996–1002 Ecosystem credit requirements in BDAR page 1228–1266, 1233–1254
Angophora inopina (Charmhaven Apple)	3244, 3250, 3315 and 3581	1.74	51	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Anthochaera phrygia (Regent Honeyeater)	3230, 3239, 3241, 3244, 3314, 3315, 3431, 3438, 3439, 3444, 3599, 3605, 3621, 3636, 4039, 4072 and 4089	93.77	5,297	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Asperula asthenes (Trailing Woodruff)	3086, 3087, 3241, 3242, 3244, 3250 and 3446	2.29	79	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Callocephalon fimbriatum (Gang-gang Cockatoo)	3150, 3230, 3239, 3242, 3263, 3617, 3621, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, 4015, 4089 and 3086.	93.23	2,622	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo)	3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, 4015 and 4089.	69.50	1,689	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Chalinolobus dwyeri (Large-eared Pied Bat)	3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3605, 3617, 3621, 3636 and 4089.	506.63	307	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Cynanchum elegans (White-flowered Wax Plant)	3029, 3086, 3087, 3151, 3152, 3237, 3239, 3244, 3250, 3489, 3617 & 3621	9.75	403	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Eucalyptus glaucina (Slaty Red Gum)	3152, 3239, 3241, 3314, 3315, 3431, 3438, 3446, 3605 & 3636	1176 individuals	2212	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Eucalyptus pumila (Pokolbin Mallee)	3152, 3239, 3314, 3315, 3444, 3446 & 3605.	17.68	937	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Delma vescolineata (Hunter Valley Delma)	3314, 3315, 3431, 3438, and 3439.	233.04	3,122	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Heleioporus australiacus (Giant Burrowing Frog)	PCT 3150, 3151 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3263, 3438, 3439, 3489, 3581, 3599, 3605, 3617, 3621, 4039, & 4072	26.75	1,690	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Lathamus discolor (Swift Parrot)	3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3605, 3617, 3621, 3636, 4015, 4039 and 4072.	42.76	2,369	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Litoria littlejohni (Littlejohn's Tree Frog)	3150, 3230, 3237, 3238, 3239, 3250, 3263, 3581, 3605, 3617, 3621 & 4039	63.53	2,353	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Melaleuca biconvexa (Biconvex Paperbark)	3029, 3150. 3241,3242, 3244 and 3250	9.35	280	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Mixophyes balbus (Stuttering Frog)	3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3581, 3599, 3605, 3617, 3621, & 4072	180.99	9,243	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Mixophyes iteratus (Giant Barred Frog)	3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3581, 3605, 3617, 3621 & 4072	3.81	59	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Notamacropus parma (Parma Wallaby)	3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3242, 3244, 3250, 3263, 3581, 3605, 3617 & 3621	304.98	4,620	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Olearia cordata	3151, 3152, 3238, 3239, 3605 and 3617.	4.03	316	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Ozothamnus tesselatus	3315, 3431, 3431, 3431	7.69	155	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Petauroides volans (Southern Greater Glider)	3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3328, 3431, 3438, 3439, 3444, 3446, 3489, 3581, 3599, 3605, 3617, 3621, 3636, 4039 & 4072	477.12	11,258	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Petrogale penicillata (Brush-tailed Rock-wallaby)	3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 3489, 3581, 3599, 3605, 3617, 3621, 3636, 4015 & 4039	156.02	6892	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Phascolarctos cinereus (Koala)	3029, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3446, 3489, 3581, 3599, 3605, 3617, 3621 & 4089	284.74	10,260	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Potorous tridactylus (Long-nosed Potoroo)	3150, 3230, 3242, 3244, 3250, 3581 & 3617	135.10	4,279	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Prasophyllum petilum (Tarengo Leek Orchid)	3314, 3315 and 3431	30.99	688	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Prasophyllum sp. Wybong	3314, 3315, 3431, 3438 and 3444.	30.99	1032	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Prostanthera cineolifera (Singleton Mint Bush)	3237, 3239, 3605 3438 and 3444	57.72	1926	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Pterostylis gibbosa (Illawarra Greenhood)	3431	2.18	67	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Rhizanthella slateri (Eastern Australian Underground Orchid)	3029, 3086, 3087, 3150, 3230, 3237, 3242, 3244, 3250, 3263, 3581, 3599, 3617 and 3621	9.45	446	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Rhodamnia rubescens (Scrub Turpentine)	3029, 3087, 3150, 3152, 3230, 3237, 3239, 3242, 3244, 3263, and 3617	2,394 individuals	7182	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Rhodomyrtus psidioides (Native Guava)	3029, 3087, 3150, 3152, 3242, 3621, and 4072	19.99	936	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Syzygium paniculatum (Magenta Lilly Pilly)	3029, 3150, 3241, 3242, 3244 & 3250	513 individuals	1026	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Description of Threatened Species/ Community listed under EPBC Act	Description of PCTs associated with the ecosystem credit species/ ecological community (if applicable)	Area of predicted impact (ha)	Credits required	Credit type	Offsetting approach	Page references (EIS, BDAR)
Velleia perfoliata	3152, 3239, 3605 and 3617	4.02	128	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266
Zieria involucrata	3151, 3152, 3238, 3239, 3605 and 3617	4.03	129	Species	EnergyCo intends to enter into a SODA as described above	Impact assessment BDAR, Pages 978–994 Species credit requirements in BDAR, 1228–1266, 1255–1266

Table ES.2 Completion checklist for BDAR Appendix E, relating to assessment of predicted impacts on EPBC Act-listed Threatened Species and Communities

Initial when complete	Information required to be included in Appendix E	Comments
Part A		
Confirm that general information in Appendix E (MNES) of the BDAR is complete/sufficient		
X	Appendix E clearly shows how operational and construction footprints , including clearing boundaries, structures to be built and elements of the action, are situated with regard to MNES (and/or references to where this detail is provided within the body of the BDAR).	Listed in Appendix C, Section 6. Impacts which contains link to relevant figure in BDAR (BDAR Figure 14.12).
X	Appendix E includes a map(s) of the subject land boundary showing the proposal/disturbance footprint with respect to location of MNES, including links to or directory locations of GIS shape files (and/or references to where this detail is provided within the body of the BDAR).	Appendix C sections contain references to BDAR figures for MNES as required including: — Section 4 (Threatened biodiversity): Figure 14.1, Figure 14.13 — Section 6 (Impacts): Figure 14.12.
X	Appendix E identifies any other site constraints in selecting the location and design of the proposed development (such as bushfire protection requirements, flood planning levels, servicing constraints) (and/or references to where this detail is provided within the body of the EIS or BDAR).	Project siting constraints and design alternatives considered are discussed in Appendix C, Section 2 (Project).
X	Appendix E clearly depicts stages and timing of the action that may impact on MNES (and/or references to where this detail is provided within the body of the BDAR).	Listed in Appendix C, Section 6 (Impacts) References to relevant sections in BDAR (Chapters 6, 8 and 10) are provided in Appendix C, Section 6 and Appendix C, Section 8.
X	The BDAR Declarations (Section i) include an explicit statement that all EPBC Act listed threatened species and communities that occur on the subject land, or in the vicinity, have been identified in the BDAR/EIS including those that are ecosystem credit species.	Provided in BDAR Declarations (Section i). Also included in Appendix C, Section 1 (Introduction).
X	Appendix E contains a completed Summary Table	This summary table has been included as part of Appendix C.
X	Appendix E contains sufficient general information regarding the project's predicted impact on MNES	Impacts are discussed in detail in Appendix C, Section 6 (Impacts) with residual impacts after mitigations discussed in Appendix C, Section 8 (Threatened biodiversity assessment).

Initial when complete	Information required to be included in Appendix E	Comments
X	Appendix E contains (or references) a separate assessment for each threatened species and community that occurs on or near the site (containing minimum information requirements).	Provided in Appendix C, Attachment B (Significant impact assessment).
X	Appendix E contains appropriate analysis and justification for any species and communities identified in the referral documentation (provided by the Australian Government) that have been ruled out because they don't occur on or near the site.	Provided in Appendix C, Attachment A (Likelihood of Occurrence).
X	Appendix E identifies any relevant Commonwealth guidelines and policy statements applicable to the proposed development, including but not limited to: — international environmental obligations — Recovery Plans — Approved Conservation Advice, and — Threat Abatement Plans.	Provided in Appendix C, Attachment B (Significant impact assessment), with applicable Commonwealth guidelines and policy statements listed as part of the assessment for each TEC or threatened species.
X	Appendix E includes relevant information on the identification of [name of the species/community] on the site or in the vicinity via: — field based survey effort — published peer reviewed literature — local data, and — supporting databases (such as the NSW BioNet Vegetation Classification, NSW BioNet Threatened Biodiversity Data Collection, NSW BioNet Atlas, Commonwealth Species Profile and Threats Database search results).	Summarised in Appendix C, Section 4 (Threatened biodiversity) with identification methods provided in Appendix C, Attachment A (Likelihood of occurrence) and additional detail for each threatened entity provided in the assessments in Appendix C, Attachment B (Significant impact assessment).
X	Appendix E includes appropriate mapping of [species/community] in accordance with the relevant Commonwealth Listing Advice.	Appendix C sections contain references to BDAR figures for MNES as required including: — Section 4 (Threatened biodiversity): Figure 14.1, Figure 14.13 — Section 6 (Impacts): Figure 14.12.
X	Appendix E includes consideration of important populations and critical habitat as defined in Approved Listing Advice, Approved Conservation Advice, Threat Abatement Plans and Recovery Action Plans that relate to [species/community].	Important populations and critical habitat relevant to each threatened entity are discussed in detail in Appendix C, Attachment B (Significant impact assessment).

Initial when complete	Information required to be included in Appendix E	Comments
X	Appendix E identifies feasible alternatives and efforts to avoid and minimise predicted impacts on [species/community] (including direct, indirect and prescribed impacts) including an analysis of the following alternatives: — designs and engineering solutions — modes or technologies — routes and locations of facilities, and — sites within the subject site.	Chosen project design and alternatives are discussed in Appendix C, Section 2 (Project). Mitigation measures to minimise impacts are discussed in Appendix C, Section 7 (Mitigation measures). Specific impacts and efforts to avoid and minimise impacts for each threatened entity are discussed in Appendix C, Attachment B (Significant impact assessment).
X	Appendix E identifies feasible measures to mitigate and/or manage predicted impacts on [species/community] (including direct, indirect and prescribed impacts) including: — techniques, timing, frequency and responsibility — identify measures for which there is a risk of failure — evaluate the risk and consequence of any residual impacts, and — any adaptive management strategy proposed to monitor and respond to impacts.	Impacts on threatened entities and measures to mitigate and manage impacts are discussed in detail in Appendix C, Section 6 (Impacts) and Appendix C, Section 7 (Mitigation measures). Any specific measures for threatened entities discussed in Appendix C, Attachment B (Significant impact assessment).
X	Appendix E identifies the residual adverse impacts likely to occur to [species/community] after the proposed avoidance and mitigation measures are taken into account, including: — nature and consequences of impacts (i.e. direct and indirect) — duration of impact (e.g. construction, operation, life of project) — quantum of impact, and — consequences of impacts on the species, the population and/or extent of the community at local, state and national scales.	Provided in Appendix C, Section 8 (Threatened biodiversity assessment). Specific impact assessment and consequences for each threatened entity are provided in Appendix C, Attachment B (Significant impact assessment).

Initial when complete	Information required to be included in Appendix E	Comments
X	Appendix E identifies the level of predicted residual impact, and provides adequate justification and evidence for the predicted level of impact, with reference to the Commonwealth's Significant Impact Guideline. Note. This will mean that the level of predicted impact is described as either: — high likelihood of significant residual impact (requiring offsets) or — low likelihood of significant residual impact (not requiring offsets).	Summary of predicted residual impact provided in Appendix C, Section 8 (Threatened biodiversity assessment). Evidence and justifications for residual impact to each threatened entity are provided in Appendix C, Attachment B (Significant impact assessment).
X	Appendix E identifies plans for offsetting, including: — whether the MNES has been offset using the BAM — how impacts requiring offsets correlate to MNES impacts — whether ecological rehabilitation and/or biodiversity conservation actions are proposed for offsetting, and — whether any other offsetting approach is proposed, such as land-based offsets, retiring credits by payment into the Biodiversity Conservation Fund and/or through supplementary measures.	Summary of offsetting requirements in regard to MNES is provided in Appendix C, Section 8 (Threatened biodiversity assessment).
X	Appendix E identifies the number and type of (species/ecosystem) credits required for predicted residual adverse impacts to MNES.	Provided in Appendix C, Section 8 (Threatened biodiversity assessment).
X	Appendix E contains an explicit statement that confirms that the BAM (and BAM calculator) has been used correctly to identify the number and class of biodiversity credits that need to be offset to achieve a standard of 'no net loss' of biodiversity.	This is stated in Appendix C, Section 8 (Threatened biodiversity assessment).

1 Introduction

The EPBC Act establishes a requirement for Commonwealth environmental assessment and approval for actions that are likely to have a significant impact on any matters of national environmental significance (MNES) protected under the EPBC Act, including:

- world heritage properties
- national heritage places
- wetlands of international importance (listed under the Ramsar convention)
- listed threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef marine park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

Other matters protected under the EPBC Act include the environment where:

- actions proposed are on, or will affect Commonwealth land and the environment
- Commonwealth agencies are proposing to take an action.

When a proponent proposes to take an action that they believe may need approval under the EPBC Act, they must refer the project to the Australian Government Minister for the Environment (the Minister). The purpose of the referral is to determine whether a project requires further assessment and approval under the EPBC Act.

An EPBC Act referral for the Hunter Transmission Project (HTP, the project) was determined a controlled action on 5 February 2025, due to impacts on listed threatened species and ecological communities (sections 18 and 18A) and Commonwealth land (sections 26 and 27A). The project will be assessed under a bilateral agreement between the Australian Government and the State of New South Wales (in accordance with section 45 of the EPBC Act).

This appendix provides an assessment of potential impacts to EPBC listed threatened species and ecological communities from the project in accordance with the Significant Impact Guideline 1.1– Matters of National Environmental Significance (Significant Impact Guideline) (Department of the Environment, 2013).

Under the EPBC Act the assessment on Commonwealth Land must consider the environment on Commonwealth Land. The EPBC Act defines environment to include:

a ecosystems and their constituent parts, including people and communities
b natural and physical resources
c the qualities and characteristics of locations, places and areas
d heritage values of places; and
e the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b), or (c).

In accordance with the *Significant Impact Guidelines 1.2*: *Actions on, or impacting upon, Commonwealth Land and actions by Commonwealth agencies* (Department of the Environment 2013) the component of the environment considered in relation to this BDAR is vegetation/plants and animals. This includes common plants and animals, threatened species and ecological communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the EPBC Act.

This appendix accompanies the Biodiversity Development Assessment Report (BDAR) and the Environmental Impact Statement (EIS) for the HTP and addresses the Secretary's environmental assessment requirements (SEARs) issued on 13 August 2024. This assessment should be read in conjunction with the BDAR and the EIS. All EPBC Act listed threatened species and communities that occur on the subject land, or in the vicinity, have been identified in the BDAR including those that are ecosystem credit species.

1.1 Policy, standards and guidelines

Policy, standards and guidelines applied to the assessment of MNES include:

- Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (Significant Impact Guideline) (Department of the Environment, 2013).
- Significant Impact guidelines 1.2 – Actions on, or impacting upon, Commonwealth Land and actions by Commonwealth agencies (Department of the Environment 2013).
- Relevant listing advice(s), conservation advice(s), recovery plan(s) and threat abatement plan(s) from the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Species Profile and Threats Database (SPRAT) for the relevant listed threatened species and ecological communities assessed (Commonwealth of Australia).

2 Project

The title of the project is the Hunter Transmission Project, Bayswater Power Station, Muswellbrook to Eraring Power Station, Earring, NSW (EPBC 2024/09874).

2.1 Project description

The HTP involves the construction and operation of new high voltage electricity transmission infrastructure, including new substation infrastructure and ancillary works, required to connect energy generation and storage projects to the existing electricity network within the Hunter. The project includes a new overhead 500 kilovolt (kV) transmission line between two new 500 kV substations at Bayswater and in Olney State Forest. The new substations will be connected to the existing 500 kV transmission lines near Bayswater and Eraring to unlock electricity supply from the Central West Orana and New England Renewable Energy Zone (REZ).

The HTP includes:

- a new overhead 500 kV double circuit transmission line of around 100 kilometres (the HTP corridor)
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments to existing transmission lines
- ancillary works including road upgrades, access tracks, and temporary construction facilities such as laydown areas, stringing sites, and construction support sites (some with temporary workers accommodation).

The project requires approval from both the Commonwealth Minister for Environment under part 9 of the EPBC Act, and the NSW Minister for Planning under Division 5.2, Part 5 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). The project has been declared as NSW Critical State Significant Infrastructure under Section 5.13 of the EP&A Act.

An overview of the HTP is provided in BDAR (Table 1.2 and Figure 14.1) and Chapter 3 of the EIS.

2.1.1 Location

The HTP involves development across 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie). The HTP corridor extends generally west to east and consists of a transmission line corridor connecting a new Bayswater South switching station to the existing 500 kV transmission line near the Baywater Power Station and the Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek. The project also includes adjustments and upgrades to existing transmission lines connecting Bayswater and Eraring power stations. The location of the project is shown in Figure 14.1 Site Map and Figure 14.2 Location Map in the BDAR.

2.1.2 Timing and sequencing

Construction of the project would commence in 2026, subject to NSW Government and Commonwealth planning approvals, and is estimated to take about 3 years. The project is expected to become operational in early 2029.

2.1.3 Subject land

The subject land is the land subject to a development, activity, clearing, biodiversity certification or a biodiversity stewardship project. It excludes the assessment area which surrounds the subject land (i.e. the area of land in a buffer zone around the subject land).

The location of the subject land is shown in Figure 14.1 and Figure 14.2 of the BDAR. The subject land contains all areas impacted by construction and operation. Specifically, the subject land incorporates the development site and subset components including disturbance areas A, B and HZ. The subject land is otherwise referred to as the construction disturbance area.

2.2 Project design and alternatives

Section 7.1 of the BDAR and the EIS outline the design of the project. There are no alternatives to the project and the project has been designed in a sympathetic manner. There are no alternative modes or technologies, alternative routes, alternative locations, or alternative sites that would reduce prescribed biodiversity impacts.

The following strategic alternatives have been considered against their ability to deliver on the strategic project objectives:

- Strategic option 1: Base case ('do nothing')
- Strategic option 2: Battery storage
- Strategic option 3: Network solutions.

2.2.1 Strategic option 1: Base case ('do nothing')

This alternative is to do nothing to the existing transmission network that forms part of the 'Sydney Ring' and supplies the Sydney, Newcastle and Wollongong (SNW) load centres. The alternative would rely on the existing transfer capacity of the network and other augmentations by Transgrid to meet future load demands and accommodate the energisation of the REZs as part of the wider network.

Power flowing into the SNW load centre is measured by a cut-set limit, adding together all the transfer capacity of the transmission lines bringing power from regional NSW to the SNW load centres. The current Central NSW (CNSW) – SNW cut-set limit is 7525 megawatts. As coal fired power stations close, this limit will decrease to 6125 megawatts.

Further, Transgrid's 2022 Transmission Annual Planning Report has identified high line utilisations for the existing 330 kV transmission lines between Liddell and Tomago/Newcastle for both N and N-1 utilisation, where N utilisation refers to the condition with all network elements in service and N-1 utilisation refers to the most critical credible contingency.

Modelling results show that these loadings will increase to beyond 100% post Eraring Power Station retirement. As such, the do nothing alternative has been rejected as unacceptable because it will not address the overall energy system needs and will hamper delivery of the NSW Electricity Infrastructure Roadmap.

The do nothing alternative would adversely impact on:

- the ability to provide NSW consumers with affordable, clean and reliable power
- NSW's transition to renewable power generation, by impacting the implementation of REZs across NSW, particularly in the Central West Orana, New England and Hunter Central Coast regions as alternatives to the current coal fired power stations
- future opportunities for economic growth, particularly with regard to a further use of electrically powered transport, plant, equipment and devices.

2.2.2 Strategic option 2: Battery storage

In late 2021/early 2022, the Australian Energy Market Operator (AEMO) conducted consultation on non-network options for reinforcing supply to Sydney, Newcastle and Wollongong ('Sydney Ring') project. Submissions received generally comprised battery storage, battery storage with automated control schemes and power flow controllers. These proposals were assessed as to whether each solution met or was reasonably likely to deliver net market benefits for consumers by increasing capability to supply the SNW load centres, following coalfired power station closures in the Newcastle area.

AEMO's assessment findings indicate that the large scale of the SNW area means that non-network options such as battery storage and System Integration Protection Schemes (SIPS) on their own cannot fully provide the required capacity increase and instead could form part of a hybrid solution. As such, a long-term network solution that can provide the required improvement of transfer capacity is required.

Acknowledging that the proposed early closure of Eraring Power Station is unlikely to allow sufficient time to deliver a long-term network solution prior to closure, EnergyCo in its capacity as Infrastructure Planner under the EII Act is delivering the Waratah Super Battery (WSB) project to ensure that the SNW region continues to have a reliable energy supply following the closure of the Eraring Power Station until a longer term network solution is delivered.

2.2.3 Strategic option 3: Network solutions

EnergyCo engaged Transgrid to conduct a transfer limit study to assess the electricity transfer limit based on thermal and voltage constraints between the CNSW sub-region and the SNW sub-region post Eraring Power Station and Vales Point Power Station retirement. The study assessed a series of Hunter to Sydney transmission augmentation options including:

- uprate the existing 330 kV lines Bayswater – Sydney West via Regentville and Liddell – Tomago/Newcastle to high temperature conductor
- uprate the existing 330 kV line Bannaby – Sydney West to a higher operating temperature
- 500 kV double circuit from Bayswater to Eraring and substation upgrades as needed
- 500 kV double circuit from Bayswater to Kemps Creek
- install power flow controller on 330 kV line Liddell – Newcastle/Tomago
- battery option with SIPS that operate as a Virtual Transmission Line.

Transgrid's transfer limit study results show that minor augmentations such as transmission line uprating, the installation of power flow controllers and the battery SIPS option can increase the CNSW – SNW transfer level by about 200–1000 MW, while major augmentations such as a 500 kV double circuit from Bayswater to Eraring or Bayswater to Kemps Creek can increase the CNSW – SNW transfer level by 3000–4000 megawatts.

2.2.4 Preferred strategic alternative

Based on assessments conducted by AEMO and Transgrid, a 500 kV double circuit transmission line will be required to support the future load demands as a long-term solution. In addition, when considering the preferred connection for a new transmission line, a new connection between Bayswater and Eraring is preferred to the connection between Bayswater and Kemps Creek, due to the higher transfer level achieved and the overall shorter transmission line distance.

2.2.5 Avoidance

Informed by the results of field surveys and desktop assessments, the project has specifically avoided and minimised impacts on key areas with high conservation value by undertaking the following:

- avoiding Watagans National Park, Werakata National Park, Warrawolong Flora Reserve and Jilliby State Conservation Area. Design refinements further minimised the impacts to Jilliby State Conservation Area
- avoiding and minimising impacts to threatened ecological communities (TECs), in particular minimising clearing of woodland remnants and scarce valley floor vegetation such as the critically endangered Warkworth Sands Woodland
- avoiding and minimising the removal of critical habitat for key threatened species, such as the critically endangered Regent Honeyeater and Swift Parrot
- avoiding and minimising impacts to threatened species at risk of serious and irreversible impact (SAII) such as the Sooty Owl, Brush-tailed Rock Wallaby and Scrub Turpentine.

With the refinement of the project's design within the preferred corridor the following additional considerations were incorporated into the alignment and project assessment:

- **Co-location:** placing sections of the transmission line alongside existing infrastructure or in disturbed areas, such as mining sites, forestry operations or cleared lands, where native vegetation and habitat quality are low.
- **Relocation:** adjusting the corridor route to avoid impacts on listed ecological communities and species following fields surveys, particularly avoiding known populations of threatened species, such as significant SAII species of Brush-tailed Rock Wallaby, microbats and threatened flora habitats.

- **Spanning and retention of forested gullies:** within the project impact area the extent of clearing in the State forests has been reduced further by spanning steep ravines, avoiding clearing vegetation in the valleys and partially clearing the easement in other areas, similar to the clearing for the existing 500 kV Eraring-Kemps Creek transmission line in Olney State Forest.
- **Partial clearing:** implementing controlled vegetation clearing within and adjacent to the transmission line easement, focusing only on vegetation taller than 2 metres.
- **Project design and alterations:**
  - **Olney 500 kV switching station:** relocating the eastern switching station from Eraring to Olney State Forest to minimise vegetation clearing through Olney State Forest, Martinsville and Eraring
  - **Olney switching station to TG 5A1/5A2 tie-ins:** realignment within Olney State Forest to minimise extent of native vegetation clearing
  - **Watagan State Forest:** realignment within Watagan State Forest to avoid significant Brush-tailed Rock Wallaby and threatened frog breeding habitats, Warrawolong Flora Reserve, 'old growth' stands of vegetation and rainforest maximising the use of existing disturbed areas of the State forest hardwood plantation without impacting harvest operations
  - **Corrabare State Forest:** realignment within Corrabare State Forest to avoid the SAII Sooty Owl breeding location
  - **Pokolbin State Forest:** realignment within Pokolbin State Forest to avoid the significant Brush-tailed Rock Wallaby microbat and threatened flora populations
  - **Singleton Military Area:** avoiding further fragmentation of large, intact areas of important Regent Honeyeater and Swift Parrot habitat within the Singleton Military Area through co-location with existing transmission lines
  - **Hunter Valley:** minimising impacts on high-quality remnant Central Hunter Valley eucalypt forest and Warkworth Sands Woodland by prioritising location of the project on derived and disturbed grassland and low-quality vegetation areas. Project design within the Hunter Valley involved locating most of the transmission line along valley floors dominated by active coal mines and existing transmission easements, thereby avoiding national park estates
- **Access:** using existing access tracks where possible to minimise additional vegetation clearing and minimising construction of new access tracks.
- **Site selection:** strategically placing substations and ancillary infrastructure to largely avoid impacts on listed communities and species, including potential SAII entities.
- **Micro-siting:** mechanisms to adjust project features during the detailed design phase to avoid areas with high biodiversity value when on the ground works commence.

Cumulatively, the implemented measures to avoid and minimise impacts on biodiversity have resulted in a reduction in clearing of native vegetation by >200 hectares. Significantly, this includes >100 hectares of impact to TECs and habitat for a range of species.

Section 7.1 of the BDAR provides further detail on the design process that was undertaken to minimise impacts on biodiversity. Section 7.3 of the BDAR outlines how the project has been located to avoid and minimise impact on prescribed biodiversity impacts.

3 Methodology

The methodology was undertaken in accordance with the NSW Biodiversity Assessment Method (BAM) and the requirements of the BAM 2020 Operation Manual 1 (Department of Planning 2020). This section provides a summary of the methodology with further detail provided in section 2 of the BDAR.

3.1 Desktop assessment

The following sources were used in the preparation of this report:

- aerial photographic imagery (Maxar (Vivid) imagery captured at various dates between 2014 and 2024)
- Commonwealth Species Profiles and Threats Database (SPRAT) (DCCEEW 2024a)
- EPBC Protected Matters Search Tool (PMST)
- BioNet (NSW) Mitchell Landscapes – Version 3.1 (DPIE 2021)
- NSW Interim Biogeographic Regionalisation of Australia (IBRA region and subregion – Version 7.0) (DEE 2018)
- Atlas of Groundwater Dependent Ecosystems (GDE) (Bureau of Meteorology 2024)
- Directory of Important Wetlands of Australia (DAWE 2021)
- BioNet Threatened Biodiversity Data Collection (TBDC) (DCCEEW 2024b)
- BioNet Atlas (DCCEEW 2024c)
- BioNet Vegetation Classification Database (DCCEEW 2024d)
- BAM Important Area Maps for threatened species (DCCEEW 2024e)
- Register of Declared Areas of Outstanding Biodiversity Value – Critical habitat declarations in NSW (DCCEEW 2024f)
- Biodiversity Assessment Method 2020 (DPIE 2020)
- PlantNET NSW Database (Royal Botanic Gardens and Domain Trust, Sydney, 2024).

Existing information was also used to identify habitat constraints and microhabitats for threatened species within the subject land. A review of habitat constraints, geographic limitations and microhabitats for candidate threatened flora (species credit) species as listed within the NSW Threatened Biodiversity Data Collection was undertaken prior to survey.

A number of existing BDARs and other biodiversity reports were reviewed to obtain existing information on biodiversity in the locality with specific focus placed on areas assessed in previous BDARs that overlap with the Project. The reports reviewed included:

- *Hunter Valley Operations Continuation Project – Biodiversity Development Assessment Report* (Umwelt 2022)
- *Mt Pleasant Optimisation Project – Appendix E – Biodiversity Development Assessment Report* (Hunter Eco 2021)
- *Mangoola Coal Continued Operations Project – Biodiversity Assessment Report* (Umwelt 2019)
- *Ecology Report for the Continuation of Rix's Creek Mine, Singleton LGA* (Bell 2015)
- *Warkworth Coal Mine Continuation Project – Biodiversity Assessment Report* (Cumberland Ecology 2014a)
- *Bengalla Mine Continuation – Biodiversity Assessment Report* (Cumberland Ecology 2014b)
- *Bulga Coal Mine Optimisation – Ecological Impact Assessment* (Umwelt 2013).

3.2 Likelihood of occurrence assessment

Threatened species, populations and ecological communities and migratory species identified in the desktop assessment were assessed for likelihood of occurrence against the criteria outlined in Table 3.1.

Field surveys and habitat assessments were also utilised to inform the likelihood of occurrence assessments. Assessments were based on the habitat profile for the species and other habitat information in the Threatened Biodiversity Data Collection (TBDC), the Species Profile and Threats Database (SPRAT), and relevant approved conservation advice and recovery plans.

Table 3.1 Likelihood of occurrence assessment key terms

Likelihood of occurrence	Criteria
Low	— Have not been recorded previously in the subject land and surrounds and/or the subject land is beyond the current known geographic range of the species. — Are dependent on specific habitat types or resources that are not present. — Are considered extinct in the locality.
Moderate	— Have been recorded previously in the subject land and surrounds infrequently (i.e. vagrant individuals). — Use habitat types or resources that are present, although generally in a poor or modified condition. — Are unlikely to maintain sedentary populations, however, may seasonally utilise available resources opportunistically during variable seasons or migration.
High	— Have been recorded previously within the subject land. — Are dependent on habitat types or resources that are abundant and/or in good condition. — Are known or likely to maintain resident populations within/surrounding the subject land. — Are known or likely to visit during regular seasonal movements or migration.
Recorded	— Have been recorded within the subject land during surveys.

A risk assessment was also applied to listed threatened species to determine if further assessment was required. The risk assessment is based on the potential extent of habitat loss resulting from the project, and considers the following:

- the value of the impacted habitat to each respective species
- the amount of habitat to be lost against that to be retained
- potential fragmentation of a population into two or more populations
- increased fragmentation of wildlife corridors traversing the subject land
- risk of operational impacts
- each species ability (e.g. fauna) or inability (e.g. flora) to move away from areas of direct impact into retained habitats.

The likelihood of occurrence assessment is provided in Attachment A.

3.3 Residual impact assessment

Residual impacts are impacts of the project that may remain after the mitigation measures have been considered. The residual significant impact was determined by applying the relevant significant impact criteria set out in the *Significant Impact Guidelines (1.1)* to listed threatened species and ecological communities that were either recorded within the subject land or identified as having a moderate to high likelihood of occurrence.

The following factors have been considered in assessing the residual impacts on the environment and listed threatened species and ecological communities:

- nature of the impacts such as direct, indirect, cumulative and facilitated
- magnitude of the impact, taking into account the severity and scale of the impact when compared with baseline condition timing, duration and frequency of the impact (temporary or permanent) and the extent of habitat resources within the immediate vicinity of the subject land
- likelihood that any given impact would occur
- whether any impacts are unknown, unpredictable or irreversible.

3.4 Field surveys

Threatened flora and fauna surveys completed within the subject land were carried out in accordance with the methodology detailed in:

- *NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (Working Draft) (DEC 2004)
- *Survey Guidelines for Australia's Threatened Mammals* (DSEWPC 2011)
- *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide* (DDPE 2022)
- *NSW Survey Guide for Threatened Frogs* (DPIE 2020)
- *Species credit' threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method* (DPIE 2021) *Survey Guidelines for Australia's Threatened Birds* (DEWHA 2010)
- *Threatened Reptiles Biodiversity Assessment Method Survey Guide* (DPE 2022)
- BioNet Threatened Biodiversity Data Collection (TBDC) (NSW DCCEEW 2024a).

4 Threatened biodiversity

4.1 Threatened ecological communities

Based on the results of the EPBC Protected Matters Search Tool along with existing mapping, 10 threatened ecological communities (TECs) were known or predicted to occur within a 10 kilometre radius of the subject land:

- Central Hunter Valley eucalypt forest and woodland (Critically Endangered)
- Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (Endangered)
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (Endangered)
- Hunter Valley Weeping Myall (*Acacia pendula)* Woodland (Critically Endangered)
- Kurri sand swamp woodland of the Sydney Basin bioregion (Endangered)
- Lowland Rainforest of Subtropical Australia (Critically Endangered)
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (Critically Endangered)
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (Endangered)
- Warkworth Sands Woodland of the Hunter Valley (Critically Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).

Only 3 of the listed TECs were recorded in the subject land (see Table 4.1). The remaining 7 TECs were not recorded and therefore are not considered further in this assessment.

Table 4.1 EPBC Act listed TECs within the subject land

TEC name	EPBC Act Status[1]	IBRA subregion	Associated vegetation zones within the subject land (Plant Community Type/s)	Area within the subject land (ha)
Central Hunter Valley eucalypt forest and woodland	CE	Yengo Hunter	3314_Thinned (38.46 ha) 3315_Thinned (8.86 ha) 3431_Thinned (63.42 ha) 3431_Poor (5.20 ha) 3431_Plantation (14.90 ha) 3438_Mod-good (12.19 ha) 3446 Mod-good (1.37 ha)	144.40
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	CE	Yengo Hunter	3328_Mod-good (0.45 ha) 4039_Mod-good (0.91 ha)	1.36
Warkworth Sands Woodland of the Hunter Valley	CE	Hunter	3636_Thinned (12.37 ha) 3636_Disturbed Grassland (4.86 ha)	12.37
Total				**158.13**

(1) CE = Critically Endangered under the EPBC Act

In addition to these TECs, plant community type (PCT) 3314 has been assessed against the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC, since it can form part of this TEC. PCT 3314 did not meet the key diagnostic characteristics of this TEC and so was assigned to the Central Hunter Valley eucalypt forest and woodland TEC.

4.1.1 Central Hunter Valley eucalypt forest and woodland (Critically Endangered)

The Central Hunter Valley eucalypt forest and woodland TEC is dominated by one or more of the following four eucalypt species: *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia maculata* (Spotted Gum), *E. dawsonii* (Slaty Gum) and *E. moluccana* (Grey Box) (Department of the Environment, 2015). Under certain circumstances a fifth species, *Allocasuarina luehmannii* (Buloke), may be part of the mix of dominants, in sites previously dominated by one or more of the above four eucalypt species (Department of the Environment, 2015). Derived native grasslands and shrublands are not included in the nationally protected ecological community (Department of the Environment, 2015).

The Central Hunter Valley eucalypt forest and woodland TEC occurs in the Hunter Valley region (primarily in the Central Hunter) which is mostly in the northeast of the Sydney Basin interim biogeographic regionalisation for Australia (IBRA) Bioregion (Department of the Environment, 2015). The ecological community generally occurs on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges (Department of the Environment, 2015). The occurrence of the Central Hunter Valley eucalypt forest and woodland TEC within the subject land is within the central distribution for the TEC (see Figure 4.1 for the mapped distribution of the TEC).

The approved conservation advice (including listing advice) for the Central Hunter Valley eucalypt forest and woodland ecological community (Department of the Environment, 2015) provides key diagnostic characteristics and condition threshold required to meet the TEC listing criteria. The key diagnostic characteristics for the TEC are:

- it occurs in the Hunter River catchment (typically called the Hunter Valley region); AND
- it typically occurs on lower hillslopes and low ridges, or valley floors in undulating country; on soils derived from Permian sedimentary rocks; AND
- it does not occur on alluvial flats, river terraces, aeolian sands, Triassic sediments, or escarpments; AND
- it is woodland or forest, with a projected canopy cover of trees of 10% or more; or with a native tree density of at least 10 native tree stems per 0.5 hectares (at least 20 native tree stems per hectare) that are at least 1 metre in height; AND
- the canopy of the ecological community is dominated by one or more of the following four eucalypt species: *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia maculata* (Spotted Gum), *E. dawsonii* (Slaty Gum) and *E. moluccana* (Grey Box); OR
  - a fifth species, *Allocasuarina luehmannii* (Buloke) dominates in combination with one or more of the above four eucalypt species, in sites previously dominated by one or more of the above four eucalypt species; AND
- *Allocasuarina torulosa* (Forest Oak/She-oak, Rose She-oak/Oak), *Eucalyptus acmenoides* (White Mahogany) and *E. fibrosa* (Red/Broad-leaved Ironbark) are largely absent from the canopy of a patch; AND
- a ground layer is present (although it may vary in development and composition), as a sparse to thick layer of native grasses and other native herbs and/or native shrubs.

Based on the field surveys it was determined that PCTs 3314, 3315, 3431, 3438 and 3446 within the subject land met the key diagnostic characteristics for the TEC. However, areas mapped under the derived native grassland condition class did not meet the key diagnostic characteristics for the TEC. Further details on the assessment of the key diagnostic characteristics for the TEC are provided in Section 4.3.2.1 of the BDAR.

An assessment against the TEC conditions threshold identified that patches of PCT 3314 (poor) had less than 50% of perennial native understorey vegetation cover and therefore do meet the condition threshold for the TEC. A summary of each of the PCTs and condition thresholds is shown in Table 4.76 of the BDAR.

4.1.2 River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria

The River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria TEC is found in the South East Corner (SEC) and Sydney Basin (SYB) IBRA bioregions. This encompasses the area from around Sale on the south-east coast of Victoria to around Raymond Terrace, just north of Newcastle on the New South Wales east coast.

The ecological community occurs on alluvial landforms related to coastal river floodplains and associated sites where transient water accumulates, including floodplains, riverbanks, riparian zones, lake foreshores, creek lines (including the floors of tributary gullies), floodplain pockets, depressions, alluvial flats, fans, terraces, and localised colluvial fans. Floodplains may be occasionally or more often saturated, water-logged or inundated. The ecological community is typically found below 50 metres above sea-level (mASL), although it can occur up to 250 mASL (e.g. on floodplain pockets and plateaus above nick points).

Based on the field surveys and characteristics of the PCTs within the subject land, two PCTs (3328 and 4039) were assessed against the River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria TEC key diagnostic characteristics and condition thresholds (Section 4.3.2.2 of the BDAR). Given the previous agricultural practices PCT 3328 lacked the diagnostic canopy species. Therefore, the PCT does not meet the key diagnostic for the TEC and is not considered to be River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria.

Plant Community Type 4039 met both the key diagnostic characteristics and condition thresholds. The PCT occurs in a patch size of greater than 2 hectares in area with 50–80% of its total perennial understory vegetation cover comprised of native species, with over 20 identified within the patch. With 5 large trees identified within the vegetation integrity plot, there is likely to be over 20 large trees per hectare. Recent fauna surveys conducted within or near this patch have identified several arboreal mammal species, including Squirrel Glider and Yellow-bellied Glider. It is likely that at least four or more species of arboreal mammals would utilise this patch. Plant Community Type 4039 likely meets the threshold to be considered under the condition class A2 (large or contiguous patch in good condition with arboreal mammals).

4.1.3 Warkworth Sands Woodland of the Hunter Valley

The Warkworth Sands Woodland TEC occurs in the Hunter River catchment, in the Central Hunter region of the Hunter Valley. It occurs in the Hunter Valley IBRA subregion (SYB02), in the north of the Sydney Basin Bioregion (SYB). The ecological community is only known to occur on aeolian sands – on old dune formations and swales between the dunes and on sand sheets (‘veneers’), all part of the Warkworth Land System. Isolated native grasslands are not included in the ecological community, except where they fill a gap in, or at the edge of a patch, or between two patches across a short distance.

The patches of PCT 3636 within the subject land occur on aeolian sands within the Hunter Valley IBRA subregion (SYB02). These disturbed woodland patches contained a canopy dominated by either *Angophora floribunda* or *Eucalyptus crebra*, with the *Allocasuarina luehmannii* usually dominant as a small tree. Tree cover was at least 10% in each of these patches, with a sparse to thick native ground layer present.

The patches of PCT 3636 within the subject land (excluding derived grasslands) met the key diagnostic characteristics for the EPBC Act listed Warkworth Sands Woodland of the Hunter Valley TEC (Section 4.3.2.3 of the BDAR).

4.1.4 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Plant Community Type 3314 is part of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC listed under the EPBC Act. A summary of the relevant Commonwealth guidelines available for this TEC is as follows:

- Approved conservation advice: Approved Conservation Advice for the *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*. Canberra. (Commonwealth DCCEEW 2023). Available from: https://www.environment.gov.au/biodiversity/threatened/communities/pubs/43-conservation-advice.pdf. In effect under the EPBC Act from 31 August 2023.
- Relevant listing advice: Commonwealth Listing Advice on *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Threatened Species Scientific Committee 2006). Available from: https://www.dcceew.gov.au/sites/default/files/env/pages/dcad3aa6-2230-44cb-9a2f-5e1dca33db6b/files/box-gum.pdf. In effect under the EPBC Act from 18 May 2006.
- Policy statement: EPBC Act policy statement 3.5 – White box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands (DEH 2006).

The approved conservation advice and relevant listing advice has been applied to PCT 3314 to determine whether this vegetation within the subject land is part of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC listed under the EPBC Act.

Description

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC is broadly characterised by a species-rich understory of native tussock grasses, herbs and shattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees (Threatened Species Scientific Committee 2006) Associated, and occasionally co-dominant, trees include, but are not restricted to *Eucalyptus microcarpa, Eucalyptus conica, Eucalyptus bridgesiana, Eucalyptus polyanthemos, Eucalyptus macrorhyncha, Callitris glaucophylla, Callitris endlicheri, Eucalyptus goniocalyx, Eucalyptus caliginosa, Eucalyptus mannifera, Eucalyptus rubida, Eucalyptus cinerea, Brachychiton populneus* and *Allocasuarina verticillata* (DCCEEW, 2023). This ecological community occurs in areas where rainfall is between 400 and 1200 millimetres per annum, on moderate to highly fertile soils at altitudes of 170 metres to 1200 metres (NSW Scientific Committee, 2002).

Key diagnostic characteristics

The approved conservation advice for the *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (DCCEEW, 2023) provides key diagnostic characteristics for the TEC which are:

- The ecological community occurs in the following bioregions: Brigalow Belt South, Murray Darling Depression, Nandewar, New England Tableland, NSW North Coast, NSW South Western Slopes, Riverina, South Eastern Queensland, South East Corner, South East Coastal Plain, South Eastern Highlands, Southern Volcanic Plain, Sydney Basin and Victorian Midlands.
- It has, or previously had, an overstory dominated or co-dominated by:
  - *Eucalyptus albens* (White Box) and/or *Eucalyptus melliodora* (Yellow Box) and/or *Eucalyptus blakelyi* (Blakely's Red Gum) (applicable across the entire range of the ecological community); or
  - in the Nandewar bioregion, any of the above three species and/or *Eucalyptus microcarpa* (Western Grey Box) and/or *E. moluccana* (Coastal Grey Box).
- It has a predominantly native ground layer.
- Tussock grasses are conspicuous in the ground layer (except in some situations, such as under dense groves of shrubs or regenerating trees), usually with several native species from some of the following genera: *Austrostipa, Bothriochloa, Chloris, Cymbopogon, Dichanthium, Microlaena, Poa, Themeda, Rytidosperma* or *Sorghum*.

- Amongst the grass tussocks and sometimes in swathes, a range of broad-leaved forbs and petaloid monocots (e.g. lilies *sensu lato.*) may be a major component of the plant diversity.
- While shrubs may be dominant locally within areas of the ecological community, areas of native vegetation with a more continuous shrub layer, in which the average shrub cover of the whole patch is greater than 30% is considered to be a shrubby woodland and so is not part of the listed ecological community. In assessing this, the effects of disturbance need to be considered, e.g. where heavy grazing may result in high densities of shrubs during a recovery phase.

While PCT 3314 in the subject land meets most of these key diagnostic characteristics for the TEC, it particularly fails to include and/or have evidence that it contained the characteristic canopy species listed above within its patches. The only canopy species recorded within these patches was *Eucalyptus moluccana*, which was often accompanied with *Allocasuarina luehmannii* and *Brachychiton populneus*. One plot (HTP-MS-03) recorded *Eucalyptus tereticornis*, however this plot was dominated by *Eucalyptus moluccana* and *Allocasuarina luehmannii*. The vegetation within the subject land mapped as PCT 3314 does not meet the key diagnostic characteristics of the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC.

Furthermore, PCT 3314 in the subject land has also been tested against the Central Hunter Valley eucalypt forest and woodland ecological community TEC, which it also forms part of. PCT 3314 (Thinned) and 3314 (Poor) were found to meet the key diagnostic characteristics for the TEC. Plant Community Type 3314 (disturbed grassland) does not meet the key diagnostic characteristics for the TEC.

4.2 Threatened flora

Database searches identified 63 threatened flora species listed under the EPBC Act known or likely to occur within the subject land or surrounding locality (10 kilometre buffer area). Of these, 5 species were recorded within the subject land. Based on the likelihood of occurrence assessment (Attachment A) a further 14 species were determined to have a moderate to high likelihood of occurrence within the subject land (Table 4.2).

Table 4.2 Threatened flora likelihood of occurrence within the projects area.

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence
Angophora inopina	Charmhaven Apple	V	Moderate. Habitat associated with PCT 3244, 3250, 3315 and 3581within the subject land.
Asperula asthenes	Trailing Woodruff	V	Moderate. Habitat associated with PCT 3086, 3087, 3241, 3242, 3244, 3250 and 3446
Brachyscome brownii	–	CE	Recorded. Habitat occurs in the subject land in the form of PCT 3239 and 3241.
Cynanchum elegans	White-flowered Wax Plant	E	Moderate. Within the subject land the species is associated with PCTs 3029, 3086, 3087, 3151, 3152, 3237, 3239, 3244, 3250, 3489, 3617 & 3621
Eucalyptus glaucina	Slaty Red Gum	V	High. Recorded during the survey but outside the subject land (see Figure 14.13 of the BDAR).
Eucalyptus pumila	Pokolbin Mallee	V	High. The subject land occurs west of the current known distribution of this species. Potential habitat occurs in the subject land in the form of PCTs 3152, 3239, 3314, 3315, 3444, 3446 & 3605.

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence
Melaleuca biconvexa	Biconvex Paperbark	V	Moderate. The eastern portion of the subject land near Cooranbong and Martinsville is located within the northern extent of the Central Coast meta population. The species is associated with the following PCTs within the subject land PCTs 3029, 3150. 3241,3242, 3244 and 3250.
Olearia cordata	–	V	Moderate. Species associated with PCT 3151, 3152, 3238, 3239, 3605 and 3617.
Ozothamnus tesselatus	–	V	Moderate. The species is known to occur near Bayswater Power Station which is within the western extent of the subject land. The existing records are outside the subject land footprint and no specimens of this species have been recorded from preliminary field surveys to date.
Prasophyllum petilum	Tarengo Leek Orchid	E	Moderate. Whilst the subject land is outside the current known distribution for this species, it is known from the Muswellbrook area to the west. Potential habitat occurs in the subject land in the form of PCTs 3314, 3315 and 3431.
Prasophyllum sp. Wybong	Leek Orchid	CE	Moderate. Whilst the subject land is outside the current known distribution for this species, it is known from the Muswellbrook area to the west. Species is associated with 3314, 3315, 3431, 3438 and 3444.
Prostanthera cineolifera	Singleton Mint Bush	V	Recorded. The species was recorded within PCTs 3237, 3239 and 3605 of Yengo IBRA subregion and PCTs 3438 and 3444 of Hunter IBRA subregion.
Pterostylis gibbosa	Illawarra Greenhood	E	Recorded. The species was recorded within the Singelton Military Area within PCT 3431.
Rhizanthella slateri	Eastern Australian Underground Orchid	E	Moderate. Within the subject land the species is associated with PCTs 3029, 3086, 3087, 3150, 3230, 3237, 3242, 3244, 3250, 3263, 3581, 3599, 3617 and 3621.
Rhodamnia rubescens	Scrub Turpentine	CE	Recorded. This species has been recorded from Watagan, Corrabare and Pokolbin State Forests. In the subject the species is associated with PCTs 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3242, 3244, 3263, and 3617.
Rhodomyrtus psidioides	Native Guava	CE	Recorded. This species was recorded from Watagan State Forest. Species is associated with subject land with PCTs: 3029, 3087, 3150, 3152, 3242, 3621, and 4072 in the subject land.
Syzygium paniculatum	Magenta Lilly Pilly	V	Moderate. Not recorded during targeted surveys.
Velleia perfoliata	–	V	Moderate. Species is associated with PCTs 3152, 3239, 3605 and 3617 in the subject land.
Zieria involucrata	–	V	Moderate: Species is associated with PCTs 3151, 3152, 3238, 3239, 3605 and 3617 in the subject land.

(1) CE= critically endangered, E = Endangered, V = Vulnerable.

4.3 Threatened fauna

The database search identified 61 threatened fauna species listed under the EPBC Act with known or likelihood of occurrence within the subject land or surrounding locality (10 kilometre buffer area). Of these, 17 species were recorded within the subject land. Based on the likelihood of occurrence assessment (Attachment A) a further 12 species were determined to have a moderate likelihood of occurrence within the subject land (Table 4.3).

Table 4.3 Threatened fauna likelihood of occurrence within the subject land

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence
Threatened frogs			
Heleioporus australiacus	Giant Burrowing Frog	V	Recorded. Species recorded in PCT 3263 and 4089.
Litoria littlejohni	Littlejohn's Tree Frog	E	Recorded. Species recorded in PCT 3150 and 3263 surrounding the Olney substation.
Mixophyes balbus	Stuttering Frog	V	Recorded. Species recorded within habitats associated with PCT 3029, 3041, 3150, 3230, 3239, 3242, 3244, 3263, 3581, 3517 and 3612.
Mixophyes iteratus	Giant Barred Frog	V	Recorded. Species recorded in PCT 3029.
Threatened birds			
Anthochaera phrygia	Regent Honeyeater	CE	High. Suitable habitat is present in the subject land, and the subject land includes mapping of Regent Honeyeater important areas habitat (BAM 2020). Species associated with PCT 3230, 3239, 3241, 3244, 3314, 3315, 3431, 3438, 3439, 3444, 3599, 3605, 3621, 3636, 4039, 4072 and 4089.
Botaurus poiciloptilus	Australasian Bittern	E	Moderate. Species associated with PCT 4039, 4072, 4015 and 4089.
Callocephalon fimbriatum	Gang-gang Cockatoo	E	Recorded. Species associated with PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, 4015, 4089 and 3086.
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	Recorded. Species associated with PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, 4015 and 4089.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies	V	Moderate. Species associated with PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636 and 4015.
Grantiella picta	Painted Honeyeater	V	Moderate. Species associated with PCT 3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3151, 3636 and 4015.

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence
Hirundapus caudacutus	White-throated Needletail	V, M [2]	Recorded. Species associated with PCT 3029, 3087, 3151, 3152, 3230, 3237, 3238, 3241, 3242, 3244, 3250, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 3489, 3581, 3599, 3605, 3617, 3636, 4015, 4039, 4072 and 4089.
Lathamus discolor	Swift Parrot	CE	Recorded. Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3605, 3617, 3621, 3636, 4015, 4039 and 4072.
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	Moderate. Suitable habitat is found within the subject land. Species associated with PCT 3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3151, 3636 and 4015.
Pycnoptilus floccosus	Pilotbird	V	Moderate. Suitable habitat is found within the subject land, with records of this species from the broader locality. Species associated with PCT 3152, 3238, 3239, 3250, 3617, 3621, 3599 and 3605.
Rostratula australis	Australian Painted Snipe	E	Moderate. Species associated with PCT 4015, 4039, 4072 and 4089.
Stagonopleura guttata	Diamond Firetail	V	Moderate. Species associated with PCT 3239, 3244, 3250, 3314, 3315, 3431, 3439, 3446, 3489, 3605, 3617, 3621 and 4089.
Threatened mammals			
Chalinolobus dwyeri	Large-eared Pied Bat	E	Recorded. Species associated with PCT 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3605, 3617, 3621, 3636 and 4089.
Dasyurus maculatus	Spotted-tail Quoll	E	Moderate. Species associated with PCT 3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3438, 3439, 3489, 3444, 3446, 3431,3581, 3599, 3605, 3636, 3617, 3621, 4015, 4072 and 4089.
Notamacropus parma	Parma Wallaby	V	Recorded. Species recorded in PCT 3230 3242 and 3263 within Corrabare State Forest.
Nyctophilus corbeni	Corben's Long-eared Bat	V	Moderate. Suitable habitat may be present within the subject land, with limited records from the broader locality. This species is associated with PCTs 3315, 3438, 4039 and 3489.
Petauroides volans	Southern Greater Glider	E	Recorded. Species recorded in PCT 3237, 3239, 3242, 3263, 3599, 3605 and 4089.
Petaurus australis australis	Yellow-bellied Glider	V	Recorded. This species has been recorded within the subject land. Species associated with PCTs 3086, 3087, 3150, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3438, 3444, 3446, 3599, 3605, 3617 and 3621.

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence
Petrogale penicillata	Brush-tailed Rock Wallaby	V	Recorded. Species recorded in PCT 3239, 3244, 3263, 3605 and 4089.
Phascolarctos cinereus	Koala	E	Recorded. Species recorded in PCT 3239, 3263, 3605 and 4089.
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	Recorded. Species recorded in PCT 3617 in Olney State Forest.
Pseudomys novaehollandiae	New Holland Mouse	V	Moderate. Suitable habitat may be present within the subject land, with a number of records from the broader locality. The species is associated with PCT 3250, 3581, 3244, 3446, 3315 and 3446.
Pteropus poliocephalus	Grey-headed Flying-fox	V	Recorded. Species recorded in PCT 3263, 3315 and 3438.
Threatened reptiles			
Delma vescolineata	Hunter Valley Delma	E	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, and 3439.

(1) CE= critically endangered, E = Endangered, V = Vulnerable, M = Migratory.

(2) The project was not determined to be a controlled action for listed migratory species; therefore, the species has only been considered under its threatened species status.

5 Commonwealth land (plants and animals)

The project will transect the Singleton Military Area, which is considered Commonwealth land under the EPBC. The assessment of Commonwealth land must consider the 'environment' on Commonwealth land. The EPBC Act defines environment to include: (a) ecosystems and their constituent parts, including people and communities; and (b) natural and physical resources; and (c) the qualities and characteristics of locations, places and areas; and (d) heritage values of places; and (e) the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b), or (c).

In accordance with the *Significant Impact Guidelines 1.2: Actions on, or impacting upon, Commonwealth Land, and actions by Commonwealth agencies (Significant Impact Guidelines 1.2*) the component of the environment considered in relation to biodiversity includes the plants and animals on Commonwealth land (Singleton Military Area). This includes an assessment of the common species, threatened species and ecological communities listed under the BC Act and the EPBC Act, and migratory species listed under the EPBC Act known or likely to occur within the subject land on the Singleton Military Area. Indirect and cumulative impacts associated with the project in relation to Commonwealth land have been considered in the assessing the entire project under the BDAR and in section 4 of this report (including the significant impact assessment in Attachment B).

5.1 Plants

The *Significant Impact Guidelines 1.2* provides guidance to identify the environmental context for an action. In relation to plants the guidelines considers this to be vegetation types and vegetation species. Based on the database searches and ecological surveys, native vegetation within the subject land on the Singleton Military Area has been assigned to 4 vegetation formations and 5 vegetation classes being:

- Dry Sclerophyll Forests (shrub/grass sub-formation)
  - Hunter-Macleay Dry Sclerophyll Forests
- Forested Wetlands
  - Coastal Floodplain Wetlands
  - Eastern Riverine Forests
- Grassy Woodlands
  - Coastal Valley Grassy Woodlands
- Wet Sclerophyll Forests (shrubby sub-formation)
  - North Coast Wet Sclerophyll Forests.

An overview of the PCTs within the subject land on the Singleton Military Area, including the associated listed threatened ecological communities under the EPBC Act and BC Act, is presented in Table 5.1.

Table 5.1 Vegetation community types identified within the subject land on the Singleton Military Area

PCT	Area (ha) within SMA	Condition States	Associated TECs within subject land on the Singleton Military Area (SMA)	
			BC Act	EPBC Act
PCT 3087 – North Ranges Riparian Turpentine Forest	0.94	Mod-good	–	–
PCT 3314 – Central Hunter Slopes Grey Box Forest	0.13	Thinned	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Valley eucalypt forest and woodland
PCT 3315 – Central Hunter Ironbark-Spotted Gum Forest	20.56	Derived	–	–
	14.08	Thinned	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Valley eucalypt forest and woodland
PCT 3431 – Central Hunter Ironbark Grassy Woodland	7.70	Disturbed Grassland	–	–
	7.91	Plantation	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Valley eucalypt forest and woodland
	0.02	Poor		
	44.33	Thinned		
PCT 3438 – Hunter Escarpment Footslopes Ironbark Forest	21.43	Mod-good	–	Central Hunter Valley eucalypt forest and woodland
PCT 3439 – Hunter Escarpment Grey Gum Sheltered Forest	3.84	Mod-good	–	–
PCT 3444 – Lower Hunter Spotted Gum-Ironbark Forest	47.22	Mod-good	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	–
PCT 3446 – Lower North Foothills Ironbark-Box-Gum Grassy Forest	2.51	Mod-good	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	Central Hunter Valley eucalypt forest and woodland
PCT 4015 – Central Hunter Swamp Oak Riparian Forest	0.03	Derived	–	–
	1.14	Thinned	–	–
PCT 4039 – Hunter Range Creekflat Apple-Red Gum Forest	1.18	Mod-good	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria
PCT 4072 – Hunter River Oak Mesic Forest	0.21	Mod-good	–	–
Total	**173.23**			

Two threatened plant species were recorded within the subject land on the Singleton Military Area and 1 endangered population listed under the BC Act. Based on the database searches and ecological surveys, a further 10 species and 1 endangered population were assumed present due to their association with PCTs within the Singleton Military Area (Table 5.2).

Table 5.2 Threatened plant species and associated PCTs recorded or assumed to be present in the subject land on Singleton Military Area

Scientific name	Common name	BC Act status[1]	EPBC Act status[1]	Associated PCTs within subject land on the SMA
Prostanthera cineolifera	Singleton Mint Bush	V	V	Recorded. Species associated with PCTs 3315, 3438, and 3444.
Pterostylis gibbosa	Illawarra Greenhood	E	E-	Recorded within area of PCT 3431. Species also associated with PCT 3438.
Cymbidium canaliculatum – endangered population	*Cymbidium canaliculatum* population in the Hunter Catchment	Endangered Population	–	Recorded. Species associated with PCTs 3314, 3315, 3431, 3438 and 3439.
Acacia bynoeana	Bynoe's Wattle	E	V	Assumed habitat. Species associated with PCT 3315.
Acacia pendula – endangered population	*Acacia pendula* population in the Hunter catchment	EP	–	Assumed habitat. Species associated with PCT 3314, 3315, 3431 and 3438.
Angophora inopina	Charmhaven Apple	V	V	Assumed habitat. Species associated with PCT 3315.
Diuris tricolor	Pine Donkey Orchid	V	-	Assumed habitat. Species associated with PCTs 3314, 3315 and 3431.
Eucalyptus pumila	Pokolbin Mallee	V	V	Assumed habitat. Species associated with PCTs 3314, 3315 and 3444.
Grevillea Parviflora	Small-flower Grevillea	V	V	Assumed habitat. Species associated with PCTs 3444 and 3446.
Ozothamnus Tesselatus	-	V	V	Assumed habitat Species associated with PCTs 3315 and 3431.
Prasophyllum Petilum	Tarengo Leek Orchid	E	E	Assumed habitat. Species associated with PCTs 3315 and 3431.
Prasophyllum sp. *Wybong*	–	–	CE	Assumed habitat. Species associated with PCTs 3314, 3315, 3431, 3438 and 3444.
Pterostylis Chaetophora	–	V	–	Assumed habitat. Species associated with PCTs 3314, 3315, 3431, 3438 and 3444, 3446
Rutidosis heterogama	Heath Wrinklewort	V	V	Assumed habitat. Species associated with PCTs 3315 and 3444.

(1) CE= critically endangered, E = Endangered, V = Vulnerable.

5.2 Animals

Eighteen threatened fauna species were recorded within the subject land on the Singleton Military Area during the ecological surveys, including 9 mammal species, 8 bird species and 1 reptile species. An additional 24 species were predicted as likely to occur within the subject land based on BioNet records within a 5 kilometres radius, and observations from fieldwork (i.e. presences of habitat features, habitat condition and connectivity). Threatened species known to occur or assumed/predicted to be present based on associated PCTs within the Singleton Military Area are shown in Table 5.3.

The Singleton Military Area has been mapped as important habitat area for the critically endangered Regent Honeyeater and Swift Parrot. Neither species were recorded during the ecological surveys.

Table 5.3 Threatened fauna species recorded or considered likely to occur within the subject land on the Singleton Military Area

Scientific name	Common name	EPBC Act	BC Act / FM Act	Associated PCTs within the subject land on the Singleton Military Area
Amphibians				
Heleioporus australiacus	Giant Burrowing Frog	V	V	Suitable habitat present. Species associated PCTs 4039 and 4072
Litoria aurea	Green and Golden Bell Frog	V	E	Suitable habitat present. Species associated with PCT 3315, 3431, 3438, 3444, 4015, 4039
Birds				
Anthochaera phrygia	Regent Honeyeater	CE	CE	Suitable habitat present. Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444, 4039, 4072
Apus pacificus	Fork-tailed Swift	M	–	Associated PCTs not listed for this species however records from ALA and BioNet are present within the locality and the species exhibits a diverse range of habitat preferences
Botaurus poiciloptilus	Australasian Bittern	E	E	Assumed habitat. Species associated with PCT 4039, 4072, 4015
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	Assumed habitat. Species associated with PCT 3087, 3438, 3439, 3444, 3446, 4039, 4072, 3314, 3315, 3431, 4015
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	Assumed habitat. Species associated with PCT 3087, 3444, 3446, 4039, 4072, 3314, 3315, 3431, 4015
Chthonicola sagittata	Speckled Warbler	–	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4015, 4039, 4072
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	V	Recorded. Species associated with PCT 3087, 3438, 3439, 3444, 3446, 4039, 4072, 3314, 3315, 3431, and 4015
Daphoenositta chrysoptera	Varied Sittella	–	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4015, 4039, 4072
Erythrotriorchis radiatus	Red Goshawk	E	E	Assumed habitat. Species associated with PCT 3315, 4039, 3446

Scientific name	Common name	EPBC Act	BC Act / FM Act	Associated PCTs within the subject land on the Singleton Military Area
Grantiella picta	Painted Honeyeater	V	V	Assumed habitat. Species associated with PCT 4015
Glossopsitta pusilla	Little Lorikeet	–	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3438, 3439, 3444, 3446, 4015, 4039, 4072
Hirundapus caudacutus	White-throated Needletail	V, M	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4039, 4072
Lathamus discolor	Swift Parrot	CE	E	Assumed habitat. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 4015
Ninox strenua	Powerful Owl	–	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 4015, 4039, 4072
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	E	Assumed habitat. Species associated with PCT 4015
Petroica boodang	Scarlet Robin	–	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3444, 3446, 4072
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern)	–	V	Recorded. Species associated with PCT 3315, 3431, 3438, 3444, 3446, 4015, 4039, 4072
Rostratula australis	Australian Painted Snipe	E	E	Species associated with PCT 4015, 4039, 4072
Stagonopleura guttata	Diamond Firetail	V	V	Species associated with PCT 3446, 3314, 3315, 3431
Tyto novaehollandiae	Masked Owl	–	V	Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444
Fish				
Mogurnda adspersa	Southern Purple Spotted Gudgeon	–	E	Monkey Place Creek is mapped as habitat for the Southern Purple Spotted Gudgeon
Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	E	E	Recorded Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444
Dasyurus maculatus	Spotted-tail Quoll	E	V	Species associated with PCT 3087, 3438, 3439, 3444, 3446, 4072, 3314, 3315, 3431, 4015
Micronomus norfolcensis	Eastern Coastal Free-tailed Bat	–	V	Recorded Species associated with PCT 3314, 3315, 3431, 3444, 3446, 4015, 4039
Miniopterus australis	Little Bent-winged Bat	–	V	Recorded Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 4039

Scientific name	Common name	EPBC Act	BC Act / FM Act	Associated PCTs within the subject land on the Singleton Military Area
Miniopterus orianae oceanensis	Large Bent-winged Bat	–	V	Recorded Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4015, 4039
Myotis macropus	Southern Myotis	–	V	Species associated with PCT 3087, 3150, 3314, 3315, 3431, 3438, 3439, 3444, 4015, 4039, 4072
Notamacropus parma	Parma Wallaby	V	V	Species associated with PCT 3087
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Species associated with PCT 3315, 3438, 4039
Petauroides volans	Southern Greater Glider	E	E	Species associated with PCT 3314, 3315, 4039, 4072
Petaurus australis australis	Yellow-bellied Glider	V	V	Recorded. Species associated with PCT 3438, 3444, 3446, 3087
Petaurus norfolcensis	Squirrel Glider	–	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3444, 3446, 4015, 4039
Petrogale penicillata	Brush-tailed Rock Wallaby	V	E	Species associated with PCT 3087, 3314, 3315, 3444, 3446, 4015, 4039
Phascolarctos cinereus	Koala	E	E	Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3446
Planigale maculata	Common Planigale	–	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, 3439
Pseudomys novaehollandiae	New Holland Mouse	V	V	Species associated with PCT PCT 3446 and 3315
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Recorded. Species recorded in PCT 3315 and 3438
Scoteanax rueppellii	Greater Broad-nosed Bat	–	V	Recorded. Species associated with PCT 3315, 3431, 3446
Vespadelus troughtoni	Eastern Cave Bat	–	V	Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444, 4015, 4039
Reptiles				
Delma vescolineata	Hunter Valley Delma	E	E	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, and 3439

*E = Endangered, V = Vulnerable, CE = Critically Endangered, M= migratory

6 Impacts

The project will impact on biodiversity within the subject land during the construction and ongoing maintenance once the HTP is operational. Direct impacts on listed threatened species and ecological communities associated with the project, include:

- vegetation clearing and loss of habitat
- habitat fragmentation and barrier effects
- injury and mortality.

The above impacts are discussed in Section 6.1.

Indirect impacts occur when project-related activities affect vegetation or habitats in a manner other than a direct loss or clearing. By potentially modifying or disrupting ecological processes these impacts can adversely affect the ecological values within the subject land. The potential indirect impacts that may result from project are discussed in Section 6.1.

6.1 Direct impacts

To assess direct impacts associated with the construction of each stage, a disturbance area, as defined in Table 6.1, has been used. It should be noted that the final project design has not been completed and as a result the disturbance area is based on a reference design. This has enabled the assessment to consider the worst-case scenario of the likely quantum and type of impacts of the project. These will be confirmed following the completion of the final design.

Table 6.1 Disturbance area definitions for biodiversity construction impact assessment purposes

Term	Definition
Disturbance area	Refers to the area that would be directly impacted by construction and operation of the project including all project infrastructure elements (including the proposed project disturbance area, substation site works and other ancillary works i.e. the permanent works footprint) as well as locations for currently proposed construction elements such as construction compounds, access tracks and site access points, laydown and staging areas, concrete batching plants, brake/winch sites, site offices and accommodation camps. The area is identified based on realistic project component locations and areas however it is indicative at this stage. The area would be confirmed during finalisation of design and construction methodology and would be developed as part of the consideration of avoidance and impact minimisation. Also termed the construction impact area.
Disturbance area A	Refers to an area at and around the transmission line towers, areas for brake and winch sites and for new/upgraded access tracks in which vegetation would be removed during construction. The area also includes the proposed construction compounds and accommodation camps. It would include vegetation (including tree) removal and sub-surface impacts through construction activities such as grading, excavation, and full tree removal. Except in areas where only temporary disturbance is required (i.e. temporary access tracks and brake and winch sites), this area would also be subject to ongoing maintenance during operation (i.e. vegetation removal to ground level) for operational and safety requirements (including bushfire).

Term	Definition
Disturbance area B	Refers to an area between the proposed transmission line towers in which it is assumed vegetation removal would only be required to meet the vegetation clearance heights. Where trees within this area would or have the potential to exceed vegetation clearance heights with growth heights greater than 2 metres, these trees would be removed. Retention of root bases, and or tree stumps of trees identified for removal, would occur where practicable. Vegetation clearance heights take into account operational and safety requirements, including bushfire risk management. This zone is a subset of the disturbance area.
Disturbance area HZ	Refers to an area adjacent to disturbance area B which is known as a hazard tree zone (Hazard High Risk Trees). The hazard tree zone is inspected for trees within the risk category height range 20–30 metres. Then those that meet the height category are considered for structural stability. A structurally sound tree with no obvious risk of falling is left standing. Trees with obvious defects that pose a risk of falling are removed. The number of trees that are likely to be at risk of falling are likely to be minimal. A disturbance area HZ has been mapped and a nominal 10% of this area is taken to likely be impacted. Selective tree removal is posed for disturbance area HZ. This zone is a subset to the disturbance area.

6.1.1 Vegetation clearing

To minimise the impacts associated with the project, a number of specific clearing controls have been identified for each disturbance area. A summary table of the disturbance types, potential impacts, proposed clearing method and specifications is provided below in Table 6.2. Further details on the clearing controls are provided in Section 1.1.4.3 of the BDAR.

Table 6.2 Summary of disturbance type and clearing methods

Disturbance type	Component	Transmission line easement section	Impact type	Clearing method	Control measures/specifications	Post construction restoration
Disturbance area A (including centreline)	Tower sites, substation sites, access tracks, stringing sites, construction support sites, laydown area and central 20 m strip of the transmission line easement.	10 m either side of centreline (total 20 m).	Full clearing to ground, including root ball removal.	No restrictions, tracked heavy machinery permitted.	— Standard mitigation controls. — In sensitive biodiversity areas associated with mapped breeding habitats for threatened amphibians – implementing water quality controls and structures to maintain existing water quality levels and prevent impact to downstream amphibian breeding habitats. — In sensitive biodiversity areas associated with mapped Locations of threatened plants (*Rhodamnia rubescens*) – implement myrtle rust controls.	— Disturbance area A (centreline) to be rehabilitated to maintain erosion and sedimentation controls. — No changes to existing water quality levels in areas of sensitive biodiversity areas associated with mapped breeding habitats for threatened amphibians. — Areas not associated with permanent access tracks or permanent infrastructure to be remediated as part of restoration phase of the project with existing native understorey species with growth heights below 2 m. Species mix to be dictated by pre-disturbance vegetation types identified in the EIS. — Mulched material will be evenly spread on bare disturbed areas to assist with the protection of the soil. Spread of mulched material to a depth of >50 mm will be avoided where practicable. — Herbicides will be applied as required. — Temporary off transmission line easement construction zones: laydown, stringing sites, workshops, site offices and accommodation will be remediated as part of restoration phase of the project.
Disturbance area B	Operational easement 25 m strips outside the central 20 m corridor.	Outer 10–35 m either side of 20 m centreline.	All vegetation that impinges clearances to the overhead conductors will be removed. Partial clearing only that minimise impacts to the understorey vegetation, defined by growth height not exceeding 2m at maturity.	Non-tracked machinery/plant within disturbance area B. Tracked and wheeled machinery will be permitted through disturbance area A central 20 m of the transmission line easement (fully cleared). This is to remove fell timber within the disturbance area B.	— Standard mitigation controls. — Maintaining an average of 40% of existing understorey vegetation in situ across the total area for disturbance area B in the transmission line easement. — Retention of threatened species of plant associated with mapped locations of threatened plants with growth height forms of < 2 m in height. — In sensitive biodiversity areas associated with mapped breeding habitats for threatened amphibians– implementing water quality controls and structures to prevent impact to downstream amphibian breeding habitats. — In sensitive biodiversity areas associated with mapped locations of threatened plants (*Rhodamnia rubescens*) – implement myrtle rust controls. — Where possible, retain felled habitat trees in situ. — Mulched material will be evenly spread on bare disturbed areas to assist with the protection of the soil. Spread of mulched material to a depth of >50 mm will be avoided where practicable.	— Maintaining an average of 40% of existing understorey vegetation < 2 m in height in situ across the area. Some vegetation may require removal to access tall growing trees that could exceed the VCR in the future.

Disturbance type	Component	Transmission line easement section	Impact type	Clearing method	Control measures/specifications	Post construction restoration
Disturbance area B – mapped sensitive biodiversity areas	Locations of threatened plants for avoidance Streams 5 m buffer zone from top of bank.	Outer 10–35 m either side of 20 m centreline	As above and minimise impacts on the surrounds and avoid degrading the water quality.	Hand Clearing – Vegetation to be cut down by chain saws and removed from the transmission line easement. Tracked and wheeled vehicles will be permitted through disturbance area A central 20 m of the transmission line easement. This is to remove fell timber within the disturbance area B.	— In sensitive biodiversity areas associated with mapped breeding habitats for threatened amphibians – implementing water quality controls and structures to prevent impact to downstream amphibian breeding habitats. — In sensitive biodiversity areas associated with mapped locations of threatened plants (*Rhodamnia rubescens*) –implement myrtle rust controls. — Where possible, retain felled habitat trees in situ.	Maintaining an average of 40% of existing understorey vegetation < 2 m in height in situ across the area.
Disturbance area HZ	Hazard trees 10 m either side of operational transmission line easement in areas of canopy heights > 20 m in height.	Limited areas identified through LiDAR analysis within 10 m either side of 70 m wide easement.	Partial clearing of structurally unsound canopy trees only, minimise impacts to the understorey vegetation, defined by growth height forms of < 2 m in height.	Non-tracked machinery/plant/ hand clearing.	— Implement clearing mitigation controls. — Maintaining an average of 40% of existing understorey vegetation in situ across the area. — Retention of threatened species of plant with growth forms of < 2 m in height. — Where possible, retain felled habitat trees in situ.	Maintaining an average of 40% of existing understorey vegetation < 2 m in height in situ across the area.
No Clearing Zone	Gullies and other areas where project design and construction does not require vegetation to be removed.	Entire width of easement in areas that meet the Vegetation Clearing Requirements (> 10 m from conductor).	No impact	No clearing required as construction methods able to avoid this area.	N/A	Not required as vegetation retained.

The project requires clearing of approximately 761.98 hectares of native vegetation which may result in temporary and permanent residual impacts (Table 6.3). Table 6.4 provides a summary of the TECs to be cleared.

For disturbed grassland and derived vegetation conditions the impacts are limited to disturbance area A where there would be complete vegetation removal and potential sub-surface impacts through construction activities such as grading, excavation, and full tree removal. The impacts from disturbance area B and disturbance area HZ are not applicable to vegetation conditions as these areas would not contain vegetation over 2 metres in height.

Table 6.3 Summary of direct impacts to PCTs identified within the subject land

PCT ID number and name	Disturbance area A impact (ha)	Disturbance area B impact (ha)	Disturbance area HZ impact (ha)	Total impact (ha)
3029 - Lower North Wet Gully Palm Rainforest	1.61	3.20	0.00	4.81
3086 - Lower North Hinterland Riparian Dry Rainforest	4.84	1.12	0.00	5.96
3087 - Lower North Ranges Riparian Turpentine Forest	1.64	1.49	0.00	3.13
3150 - Hunter Coast Ranges Turpentine Wet Forest	17.48	17.99	0.56	36.03
3151 - Northwest Sydney Sandstone Grey Myrtle Dry Rainforest	0.87	0.98	0.00	1.85
3152 - Hunter Range Turpentine-Grey Myrtle Gully Forest	0.25	0.67	0.00	0.92
3230 - Central Coast Escarpment Moist Forest	52.60	17.77	0.09	70.46
3237 - Hunter Range Blue Gum Gully Forest	2.43	3.03	0.00	5.46
3238 - Hunter Range Colluvial Apple-Gum Forest	0.01	0.04	0.00	0.05
3239 - Hunter Range Sheltered Grey Gum Forest	85.86	23.98	0.13	109.97
3241 - Lower North White Mahogany-Spotted Gum Moist Forest	12.30	0.00	0.00	12.30
3242 - Lower North Ranges Turpentine Moist Forest	17.67	18.63	0.20	36.50
3244 - Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	1.31	0.31	0.00	1.62
3250 - Northern Foothills Blackbutt Grassy Forest	2.02	0.00	0.00	2.02
3263 - Watagan Range Turpentine-Mahogany Grassy Forest	29.72	9.14	0.24	39.10
3314 - Central Hunter Slopes Grey Box Forest	64.01	13.87	0.00	77.88
3315 - Central Hunter Ironbark-Spotted Gum Forest	22.20	4.10	0.00	26.30
3328 - Lower Hunter Red Gum-Paperbark Riverflat Forest	0.34	0.11	0.00	0.45
3431 - Central Hunter Ironbark Grassy Woodland	77.98	40.88	0.00	118.86
3438 - Hunter Escarpment Footslopes Ironbark Forest	6.28	5.9	0.01	12.19
3439 - Hunter Escarpment Grey Gum Sheltered Forest	0.40	1.01	0.21	1.62
3444 - Lower Hunter Spotted Gum-Ironbark Forest	21.15	16.72	0.00	37.87
3446 - Lower North Foothills Ironbark-Box-Gum Grassy Forest	0.48	0.89	0.00	1.37
3489 - Hunter Escarpment Grey Box Forest	4.45	1.21	0.01	5.67
3581 - Hunter Coast Foothills Apple Forest	0.67	0.00	0.00	0.67

PCT ID number and name	Disturbance area A impact (ha)	Disturbance area B impact (ha)	Disturbance area HZ impact (ha)	Total impact (ha)
3599 - Blue Mountains Peppermint Shrub Forest	7.23	0.01	0.00	7.24
3605 - Hunter Range Ironbark Forest	43.47	13.45	0.18	57.10
3617 - Sydney Hinterland Peppermint-Apple Forest	29.83	5.52	0.21	35.56
3621 - Sydney Hinterland Turpentine-Apple Gully Forest	2.02	2.84	0.00	4.86
3636 - Warkworth Sands Woodland	18.97	3.11	0.00	22.08
4015 - Central Hunter Swamp Oak Riparian Forest	7.09	2.73	0.00	9.82
4039 - Hunter Range Creekflat Apple-Red Gum Forest	0.60	0.31	0.00	0.91
4072 - Hunter River Oak Mesic Forest	0.21	0.00	0.00	0.21
4089 - Namoi-Upper Hunter River Red Gum Forest	8.10	3.04	0.00	11.14
Totals	**546.09**	**214.05**	**1.84**	**761.98**

Table 6.4 Summary of project impacts on EPBC Act listed TECs

TEC name	EPBC Act status[1]	Associated PCT and vegetation zones within the subject land	Disturbance area A	Disturbance area B	Disturbance area HZ	Impact within subject land (ha)
Central Hunter Valley eucalypt forest and woodland	CE	3314_Thinned (38.46 ha) 3315_Thinned (8.86 ha) 3431_Thinned (63.42 ha) 3431_Poor (5.20 ha) 3431_Plantation (14.92 ha) 3438_Mod-good (12.19 ha) 3446 Mod-good (1.37 ha)	80.58	63.81	0.01	144.40
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	CE	3328_Mod-good (0.45 ha) 4039_Mod-good (0.91 ha)	0.94	0.42	0.00	1.36
Warkworth Sands Woodland in the Sydney Basin Bioregion	CE	3636_Thinned (12.37 ha) 3636_Disturbed Grassland (4.86 ha)	9.26	3.11	0.00	12.37
Total			**90.78**	**67.34**	**0.01**	**158.13**

(1) CE = Critically Endangered under the EPBC Act

6.1.2 Habitat loss

The extent of impacts has been refined based on design principles of avoid and minimise impacts. Nonetheless, the project would directly impact habitat for EPBC Act listed threatened species that have either been recorded or assessed as likely to occur in the subject land, as well as a diverse assemblage of common flora and fauna species. This would impact and reduce the overall in-situ biodiversity (flora and fauna species abundance) within the subject land.

The removal of habitat will displace native fauna into adjacent retained habitats and create a level of intraspecific and interspecific competition for habitat resources for a period, until home ranges are re-established, and a biodiversity equilibrium is once again attained.

Important microhabitat features that will be removed during land clearing, include:

- ground cover containing hollow logs, coarse woody debris, dense vegetation, and leaf litter suitable for sheltering by reptiles, amphibians and small mammals
- hollow bearing trees and stags providing sheltering and breeding habitat for a range of arboreal fauna such as gliders, possums, forest owls, hollow nesting parrots, owlet nightjars, microbats, and native bees
- flowering eucalypts and other native trees providing suitable foraging habitat for fauna such as flying foxes and native birds.

The extent of impacts associated with the project on listed threatened fauna species within the subject land is presented in Table 6.5. The project has considered the impacts on both confirmed habitat (habitat confirmed by surveys) and assumed habitat (non-surveyed potential habitat) for the species across all disturbance areas.

6.1.3 Habitat fragmentation

The project has the potential to further fragment habitat within the subject land through the creation or use of powerline easements and related infrastructure, thus affecting the connectivity between habitats in the wider landscape. Habitat connectivity is essential for the mitigation of habitat loss and fragmentation resulting from changes to a landscape, with connected habitats providing a means for species dispersal, improved genetic diversity, and movement between populations that might otherwise become isolated by these changes (Doerr *et al*. 2010). Maintenance of access routes and infrastructure associated with powerline easements is required regularly, creating a significant abrupt difference of habitat condition types. This ultimately leads to dispersal and movement inhibition for many species (Strevens *et al*. 2008).

6.1.4 Injury and mortality

As with any land clearing activities involving removal of native vegetation, there is always an inherent risk of native fauna mortality, especially those fauna species actively sheltering or breeding in microhabitats (i.e. hollows) during vegetation clearing.

It is possible native fauna could be injured or killed during vegetation clearing, earthworks and vehicle and machinery interactions during construction activities. Increased traffic along access roads for the project during the construction phase may increase the current level of vehicle and fauna interactions and roadkill. Vehicle collision is a direct impact that reduces local population numbers and is a common occurrence in Australia (Coffin 2007; Rowden *et al.* 2008). Overall, vehicle strike would not appear to be a significant concern for the project. Areas in the Hunter Valley are near existing infrastructure and highly disturbed areas. During operation in the State forests, vehicle speeds would be very low due to the topography and nature of the roads, combined with speed limits.

There is an increased risk of collision with the transmission line. The general fauna group most likely to have potential for powerline strike are those groups of birds which are likely to fly at heights where powerlines are located and are not familiar with local habitat attribute. Such birds can include, birds of prey, quail, and other birds, many of which move in response to changing distributions of resources usually associated with water. A fauna risk assessment is provided in Appendix I of the BDAR identifies 2 EPBC listed threatened species, Gang-gang Cockatoo and South-eastern Glossy Black-Cockatoo, as a high risk of collision with powerline infrastructure. These species are wide-ranging in the vicinity of the project's greenfield locations.

Electrical and magnetic fields (EMF) impacts from new infrastructure include impacts to birds moving through the alignment. It is considered unlikely, however, that birds would be at high risk of electrocution, as electrocution would require contact with different phases or conductor potentials, and the horizontal separation between individual conductors, or bundled conductors, exceeds the wingspans (WS) of all birds, including the largest migratory birds, such as Brolgas (WS~2.4 m), Pelicans (WS~2.4–2.6 m), Black Swans (WS~2.0 m) and Australian Shelduck (WS~1.2 m) (Pizzey and Knight 2012).

Table 6.5 Extent of project impacts on listed threatened species within the Wyong, Yengo, and Hunter IBRA subregions

Scientific name	Common name	EPBC Act[1]	Total impacts habitat (ha) or individuals (count), including confirmed and assumed habitat
Threatened flora			
Angophora inopina	Charmhaven Apple	V	1.74
Asperula asthenes	Trailing Woodruff	V	2.29
Brachyscome brownii	-	CE	25.42
Cynanchum elegans	White-flowered Wax Plant	E	9.75
Eucalyptus glaucina	Slaty Red Gum	V	1176 (individuals)
Eucalyptus pumila	Pokolbin Mallee	V	17.68
Melaleuca biconvexa	Biconvex Paperbark	V	9.35
Olearia cordata	-	V	4.03
Ozothamnus tesselatus	-	V	7.69
Prasophyllum petilum	Tarengo Leek Orchid	E	30.99
Prasophyllum sp. Wybong	Leek Orchid	CE	30.99
Prostanthera cineolifera	Singleton Mint Bush	V	57.72
Pterostylis gibbosa	Illawarra Greenhood	E	2.18
Rhizanthella slateri	Eastern Australian Underground Orchid	E	9.45
Rhodamnia rubescens	Scrub Turpentine	CE	2,394 (individuals)
Rhodomyrtus psidioides	Native Guava	CE	19.99
Syzygium paniculatum	Magenta Lilly Pilly	V	513 (individuals)
Velleia perfoliata	-	V	4.02
Zieria involucrata	-	V	4.03

Scientific name	Common name	EPBC Act[1]	Total impacts habitat (ha) or individuals (count), including confirmed and assumed habitat
Threatened frogs			
Heleioporus australiacus	Giant Burrowing Frog	V	26.75
Litoria littlejohni	Littlejohn's Tree Frog	E	63.53
Mixophyes balbus	Stuttering Frog	V	180.99
Mixophyes iteratus	Giant Barred Frog	V	3.81
Threatened birds			
Anthochaera phrygia	Regent Honeyeater	CE	93.77
Botaurus poiciloptilus	Australasian Bittern	E	22.08
Callocephalon fimbriatum	Gang-gang Cockatoo	E	93.23
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	69.50
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies	V	751.21
Grantiella picta	Painted Honeyeater	V	248.82
Hirundapus caudacutus	White-throated Needletail	V, M	761.98
Lathamus discolor	Swift Parrot	CE	42.76
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	248.82
Pycnoptilus floccosus	Pilotbird	V	217.72
Rostratula australis	Australian Painted Snipe	E	22.08
Stagonopleura guttata	Diamond Firetail	V	453.97
Threatened mammals			
Chalinolobus dwyeri	Large-eared Pied Bat	E	506.63
Dasyurus maculatus	Spotted-tail Quoll	E	754.03
Notamacropus parma	Parma Wallaby	V	304.98
Nyctophilus corbeni	Corben's Long-eared Bat	V	39.40
Petauroides volans	Southern Greater Glider	E	477.12
Petaurus australis australis	Yellow-bellied Glider	V	480.38
Petrogale penicillata	Brush-tailed Rock Wallaby	V	156.02
Phascolarctos cinereus	Koala	E	284.74
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	135.10

Scientific name	Common name	EPBC Act[1]	Total impacts habitat (ha) or individuals (count), including confirmed and assumed habitat
Pseudomys novaehollandiae	New Holland Mouse	V	31.98
Pteropus poliocephalus	Grey-headed Flying-fox	V	727.57
Threatened reptiles			
Delma vescolineata	Hunter Valley Delma	E	233.04

(1) V = Vulnerable, E = Endangered, CE = Critically Endangered under the EPBC Act

6.2 Indirect impacts

Indirect impacts occur when project related activities affect vegetation or habitats in a manner other than a direct loss or clearing. Indirect impacts have been considered in terms of the nature, extent and duration of impacts on native vegetation, threatened species and habitats likely to be affected and are presented.

Indirect impacts associated with the project include:

- inadvertent impacts on adjacent habitat or vegetation including:
  - impact to habitat surrounding known locations of Brush-tailed Rock Wallaby populations
  - impact to habitat surrounding known aquatic or gully locations of threatened frog species
  - impact to habitat near known locations of Hunter Valley Delma
  - impact to caves that are known or potential breeding habitat for threatened microbat species
- reduced viability of adjacent habitat due to edge effects
- reduced viability of adjacent habitat due to noise, dust or light spill
- transport of weeds, pests and pathogens from the site to adjacent vegetation
- increased risk of starvation, exposure and loss of shade or shelter
- loss of breeding habitats
- trampling of threatened flora species
- increased risk of fire
- increased risk of collision with lines and EMF impacts with new infrastructure.

Table 8.19 of the BDAR documents the indirect impacts likely to occur on native vegetation, threatened entities and their habitat. Figure 14.12 in the BDAR illustrates the final impacts likely to occur on the subject land including consideration of indirect impacts.

7 Mitigation measures

Specific clearing methods for removal of trees in threatened species habitats

There would be a requirement to remove trees from areas of known threatened species habitat in disturbance areas B and HZ. Where trees are to be removed in known threatened species habitats, work must be done so that the shrub and ground layer is not disturbed. Work methods including manual dismantling of trees with chainsaws ensuring that tree sections are lowered to the ground without damaging the ground or shrub layer would be required. Likewise, to avoid any impacts, no vehicular access to the areas of known threatened species habitats would be permitted.

Careful tree removal is required in areas of known threatened species presence where the species is expected to be retained and not impacted. A detailed clearing and grubbing environmental work method statement (EWMS) will be prepared and implemented for all clearing activities, including those impacting upon or in proximity of threatened species or habitat, so all required mitigation and management measures are identified and effectively communicated to personnel involved.

It will include:

- sensitive biodiversity area maps (showing clearing boundaries and exclusion zones)
- types of flagging used for construction footprint, clearing limits, exclusion zones, habitat trees and services
- measures for the management of fauna encountered
- measures for the management of weeds.

Noting that different clearing methods will be required across the project, the EMWS will provide the relevant clearing methodology to accommodate:

- site specific conditions such as topography and ground stability
- access to the clearing locations
- disturbance area categories.

Operation of the project would be managed through the accredited environmental management system maintained by the Network Operator.

7.1 Mitigation measures

The proposed mitigation and management measures for the project are outlined in Table 8.28 of the BDAR. These measures are focused on the residual impacts from the project to native vegetation and threatened species habitat (including areas of planted native vegetation).

These safeguards seek to minimise potential adverse impacts of the project. All mitigation measures described in this BDAR, and the EIS, would be incorporated into the Network Operator's construction contractor's environmental management strategies and issue-specific construction environmental plans, or the Network Operator's operational environmental management system.

The timing and responsibility for the implementation of the safeguards would also be outlined in the environmental management sub-plans. However, the Network Operator or its construction contractor would be responsible for the environmental management of the project and the implementation of the majority of the mitigation measures. The estimated costs of environmental mitigation measures have been captured in project capital costs.

8 Threatened biodiversity assessment

Residual impacts are impacts of the project that may remain after the mitigation measures have been considered. The residual significant impact was determined by applying the relevant significant impact criteria set out in the *Significant Impact Guidelines (1.1 and 1.2)* relevant to listed threatened species and ecological communities and Commonwealth Land.

The following factors have been considered in assessing the residual impacts on the environment and listed threatened species and ecological communities:

- nature of the impacts such as direct, indirect, cumulative and facilitated
- magnitude of the impact, taking into account the severity and scale of the impact when compared with baseline condition timing, duration and frequency of the impact (temporary or permanent)
- likelihood that any given impact would occur
- whether any impacts are unknown, unpredictable or irreversible
- benchmarks and requirements set by statutory requirements, policies, and guidelines
- mitigation measures to minimise the impacts.

Details on the residual impacts to MNES are outlined in Chapters 8 and 10 of the BDAR.

Under the EPBC Act where a project is likely to have a significant residual impact on a listed threatened species and/or community, the impacts must be compensated. Based on the assessment of significance the project would result in residual impact to 3 threatened ecological communities, and 36 threatened species were also determined to have a significant residual impact.

The project would reduce the habitat for threatened species within the subject land on the Singleton Military Area. Therefore, the project would result in a significant residual impact on a component (plants and animals) of the environment on Commonwealth Land. Compensation for the loss of vegetation and habitat for plants and animals on Commonwealth land will be offset through species and ecosystem credits under the NSW Biodiversity Offsets Scheme (BOS).

The Australian Government has endorsed the NSW Biodiversity Offsets Scheme (BOS). This means that offsets for MNES can be compensated for under the NSW BOS. Chapter 11 of the BDAR sets out the biodiversity credit report; a summary of the required credits is provided in Table 8.1 and Table 8.2. The BDAR (and all calculations) had been prepared by an accreditor assessor in accordance with the BAM 2020. Appendix A of the BDAR provides an assessment of the compliance with the minimum information requirements outlined in BAM Appendix K. The methodology used is consistent with the requirements to identify the number and class of biodiversity credits need to be offset in accordance with the endorsed BOS.

Not all species requiring species credits were determined to have a significant residual impact under the EPBC Act. In addition, some species under the NSW BOS will require ecosystem credits. Ecosystem credits will also account for those species that are only listed under the EPBC Act, as the ecosystem credits aim to offset the PCTs/habitat for the species.

A summary of ecosystem credits required to offset the residual impacts associated with the project on threatened species and ecological communities is presented in Table 8.1 and species credit requirements for EPBC listed threatened species are summarised in Table 8.2.

Table 8.1 Summary of the total ecosystem credits required for EPBC threatened

Threatened species and ecological communities	Impact area (ha/count)	Significant residual impact	Ecosystem credits required
Threatened ecological community			
Central Hunter Valley Eucalypt Forest and Woodland	144.40	Yes	4,490
River-Flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria	1.36	Yes	42
Warkworth Sands Woodland of the Hunter Valley	12.37	Yes	166
Threatened species			
Botaurus poiciloptilus (Australasian Bittern)	22.08	No	415
Brachyscome brownii	25.42	Yes	3103
Climacteris picumnus victoriae (Brown Treecreeper (eastern subspecies))	751.21	Yes	8149
Dasyurus maculatus (Spotted-tail Quoll)	754.03	Yes	16,759
Grantiella picta (Painted Honeyeater)	248.82	Yes	5,726
Hirundapus Caudacutus (White-throated Needletail)	761.98	No	12,341
Melanodryas cucullata cucullata (South-eastern Hooded Robin)	248.82	Yes	5,736
Nyctophilus corbeni (Corben's Long-eared Bat)	39.40	Yes	759
Petaurus australis (Yellow-Bellied Glider)	480.38	Yes	11956
Pseudomys novaehollandiae (New Holland Mouse)	31.98	Yes	542
Pteropus poliocephalus (Grey-headed Flying fox)	727.25	Yes	5406
Pycnoptilus floccosus (Pilotbird)	217.72	Yes	5325
Rostratula australis (Australian Painted Snipe)	22.08	No	415
Stagonopleura guttata (Diamond Firetail)	453.97	Yes	9689

Table 8.2 Summary of the total species credits required

Scientific name	Common name	Impact area (ha/count)	Significant residual impact	Species credits required
Angophora inopina	Charmhaven Apple	1.74	No	51
Anthochaera phrygia	Regent Honeyeater	93.77	Yes	5,297
Asperula asthenes	Trailing Woodruff	2.29	No	79
Callocephalon fimbriatum	Gang-gang Cockatoo	93.23	Yes	2,622
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	69.50	Yes	1,689
Chalinolobus dwyeri	Large-eared Pied Bat	506.63	Yes	307
Cynanchum elegans	White-flowered Wax Plant	9.75	No	403
Eucalyptus glaucina	Slaty Red Gum	1176 individuals	Yes	2212
Eucalyptus pumila	Pokolbin Mallee	17.68	Yes	937
Delma vescolineata	Hunter Valley Delma	233.04	Yes	3,122
Heleioporus australiacus	Giant Burrowing Frog	26.75	Yes	1,690
Lathamus discolor	Swift Parrot	42.76	Yes	2,369
Litoria littlejohni	Littlejohn's Tree Frog	63.53	Yes	2,353
Melaleuca biconvexa	Biconvex Paperbark	9.35	Yes	280
Mixophyes balbus	Stuttering Frog	180.99	Yes	9,243
Mixophyes iteratus	Giant Barred Frog	3.81	No	59
Notamacropus parma	Parma Wallaby	304.98	Yes	4,620
Olearia cordata	–	4.03	No	316
Ozothamnus tesselatus	–	7.69	Yes	155
Petauroides volans	Southern Greater Glider	477.12	Yes	11,258
Petrogale penicillata	Brush-tailed Rock-wallaby	156.02	Yes	6892
Phascolarctos cinereus	Koala	284.74	Yes	10,260
Potorous tridactylus	Long-nosed Potoroo	135.10	Yes	4,279
Prasophyllum petilum	Tarengo Leek Orchid	30.99	Yes	688
Prasophyllum sp. Wybong	–	30.99	Yes	1032
Prostanthera cineolifera	Singleton Mint Bush	57.72	Yes	1926
Pterostylis gibbosa	Illawarra Greenhood	2.18	No	67
Rhizanthella slateri	Eastern Australian Underground Orchid	9.45	Yes	446
Rhodamnia rubescens	Scrub Turpentine	2,394 individuals	Yes	7182

Scientific name	Common name	Impact area (ha/count)	Significant residual impact	Species credits required
Rhodomyrtus psidioides	Native Guava	19.99	Yes	936
Syzygium paniculatum	Magenta Lilly Pilly	513 individuals	Yes	1026
Velleia perfoliata	–	4.02	No	128
Zieria involucrata	–	4.03	No	129
Total species credits				**84053**

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Attachment A

Likelihood of occurrence

The following table considers the likelihood of occurrence for threatened species in relation to the controlling provision for listed threatened species and ecological communities and whether further assessment is required. Threatened species considered under the Commonwealth Land controlling provision are provided in Attachment B Table B.4.

Table A.1 Threatened flora likelihood of occurrence

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Acacia bynoeana	Bynoe's Wattle	V	Occurs in heath or dry sclerophyll forest on sandy soils with a preference for open, sometimes slightly disturbed sites e.g., trail margins, edges of roadside spoil mounds and in recently burnt patches. This species is associated with Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	BioNet, PMST, ALA	Low. Habitat associated with PCT 3315, 3617, 4039. Despite detailed targeted surveys, the species has not been recorded within the subject land.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Acacia gordonii	-	E	This species has a disjunct distribution in the Sydney Basin bioregion and is primarily found in the lower Blue Mountains	BioNet, ALA	Low. project alignment outside of known range and distribution. Suitable microhabitats deemed not to be present.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required
Acacia pubescens	Downy Wattle	V	This species is restricted to the Sydney region of NSW. Although the distribution includes a large area, the extant sites are mostly small and fragmented. This species is associated with open woodland and forest.	BioNet, ALA	Low. Species was not recorded despite targeted ecological surveys.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Androcalva rosea Syn. Commersonia rosea	-	E	This species is known to the Hunter Valley, from Lee's Pinch in Goulburn River National Park to Payne's Crossing near Wollombi. Large population within Wollemi National Park. The species occurs on sandy soils with scrub or heath with some tree species including *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris endlicheri* (Black Cypress Pine) and/or *E. caleyi* subsp. *caleyi*.	BioNet, PMST	Low. Despite detailed targeted surveys, including during a post-fire survey window, the species has not been recorded within the subject land.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required
Angophora inopina	Charmhaven Apple	V	This species occurs most frequently in four main vegetation communities: (i) *Eucalyptus haemastoma–Corymbia gummifera–Angophora inopina* woodland/forest; (ii) *Hakea teretifolia*-Banksia oblongifolia wet heath; (iii) *Eucalyptus resinifera-Melaleuca sieberi-Angophora inopina sedge woodland; (iv) Eucalyptus capitellata-Corymbia gummifera-Angophora inopina* woodland/forest.	BioNet, PMST, ALA	Moderate Habitat associated with PCT 3244, 3250, 3315 and 3581 within the subject land. Not recorded during targeted surveys,	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**
Asperula asthenes	Trailing Woodruff	V	Found in scattered locations within NSW from Bulahdelah to Kempsey. This species occurs in damp sites, often along riverbanks, and distribution overlaps with the 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland' EPBC Act-listed threatened ecological community.	PMST, BioNet, ALA	Moderate. A population of *Asperula asthenes* occurs outside the subject land in the Mandalong, Durren Durren and Wyee areas. Habitat associated with PCT 3086, 3087, 3241, 3242, 3244, 3250 and 3446. Not recorded during targeted surveys	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Asterolasia elegans	-	E	Found in sheltered forests on mid- to lower slopes and valleys on Hawksbury sandstone. E.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (*Syncarpia glomulifera subsp. glomulifera*), Smooth-barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*), Forest Oak (*Allocasuarina torulosa*) and Christmas Bush (*Ceratopetalum gummiferum).*	PMST	Low. Species was not recorded despite targeted ecological surveys.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required
Astrotricha crassifolia	Thick-leaf Star-hair	V	This species occurs within the Hawkesbury-Nepean, Hunter-Central Rivers, Sydney Metro and Lachlan and Murrumbidgee Regions. Found on dry ridgetops to 300 m altitude and is associated with very rich heath, or dry sclerophyll woodland.	BioNet	Low. project alignment outside of known range and distribution. Suitable microhabitats deemed not to be present.	Species is unlikely to occur within the subject land, therefore unlikely to be impacted by the project. EPBC Act significant impact assessment is not required
Brachyscome brownii	-	CE	This species is endemic to NSW, with four possibly extant populations located between Windsor and Cessnock. Associations with riparian zones, and sandy zones in dry sclerophyll forest, within approximately 100 m of watercourses.	BioNet, PMST	Recorded. Habitat occurs in the subject land in the form of PCTs 3239 and 3241.	EPBC Act significant impact assessment is required (refer Attachment B).
Caladenia tessellata	Thick-lipped Spider-orchid	V	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	PMST	Low. The subject land is outside the known distribution of this species. *Caladenia tessellata* is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW.	The project occurs outside of known range and distribution of the species. EPBC Act significant impact assessment is not required

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Commersonia rosae	Sandy Hollow	E	Occurs on skeletal sandy soils in scrub or heath vegetation with occasional emergents of Narrow-leaved Ironbark (Eucalyptus crebra), Black Cypress Pine (*Callitris endlicheri*) or *E. caleyi subsp. caleyi.*	PMST, ALA	Low *Commersonia rosea* is known from the central Hunter valley, extending from near Lee's Pinch in Goulburn River NP in the west to Payne's Crossing near Wollombi in the east. Species associated with PCT 3439 and 3431. Despite targeted seasonal surveys, the species was not recorded in the subject land.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Cryptostylis hunteriana	Leafless Tongue Orchid	V	This species does not appear to have well-defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. However, larger populations occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (Corymbia gummifera) and Black Sheoak (*Allocasuarina littoralis*). Open areas in the understorey of this community are preferred. On the Central Coast of NSW, populations have been recorded in woodland dominated by Scribbly Gum (*Eucalyptus haemastoma*), Brown Stringybark (*Eucalyptus capitellata)*, Red Bloodwood (*Corymbia gummifera*). The Leafless Tongue Orchid is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*).	BioNet, PMST, ALA	Low. Despite targeted surveys, species was not recorded within associated PCTs of subject land.	Species is unlikely to be in the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Cynanchum elegans	White-flowered Wax Plant	E	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation as well as littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum*–Coastal Banksia coastal scrub; Forest Red Gum aligned open forest and woodland; Spotted Gum aligned open forest and woodland; and Bracelet Honeymyrtle scrub to open scrub.	BioNet, PMST, ALA	Moderate, Species associated with PCTs 3029, 3086, 3087, 3151, 3152, 3237, 3239, 3244, 3250, 3489, 3617 & 3621.	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**
Darwinia biflora		V	The species is found across the Hornsby plateau area of north-western Sydney along the edges of weathered shale-capped ridges and Hawkesbury Sandstone.	BioNet	Low. project alignment outside of known range and distribution. Suitable microhabitats deemed not to be present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Dichanthium setosum	Bluegrass	V	Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	PMST, ALA	Low. Species was not recorded during targeted surveys.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Diuris praecox	Rough Doubletail	V	Found on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey.	BioNet, PMST, ALA	Low. project alignment outside of known range and distribution. Suitable microhabitats deemed not to be present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Eucalyptus camfieldii	Camfield's Stringybark	V	This species occurs on poor coastal country, in shallow sandy soils overlying Hawkesbury sandstone including within coastal heath on exposed sandy ridges. Found in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas. Associated species frequently include stunted species of *E. oblonga, E. capitellata and E. haemastoma.*	BioNet, PMST	Low. Despite targeted surveys, species was not recorded.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Eucalyptus sp. cattai	–	CE	Only known from north-western Sydney between Castle Hill and Cattai. The species grows in scrub, heath and low woodland, on sandstone-derived soils.	BioNet	Low. project alignment outside of known range and distribution. Suitable microhabitats deemed not to be present.	The known distribution range for the species occurs outside of the subject land, therefore it is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Eucalyptus glaucina	Slaty Red Gum	V	Occurs in grassy woodland and dry eucalypt forest on deep, moderately fertile and well-watered soils.	BioNet, PMST, ALA	High. Habitat occurs in the subject land in association with PCTs 3152, 3239, 3314, 3315, 3431, 3438, 3466, 3605 and 3636.	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Eucalyptus parramattensis subsp. decadens	Earp's Gum	V	Generally, occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.	PMST, BioNet	Low. Despite targeted surveys, the species has not been recorded within the subject land.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Eucalyptus pumila	Pokolbin Mallee	V	The single known population occupies north-west-facing slopes derived from sandstone within dry sclerophyll woodland, with a canopy comprising *Eucalyptus fibrosa, Callitris endlicheri and, to a lesser extent, Corymbia maculata.*	BioNet, PMST, ALA	Moderate. The subject land occurs west of the current known distribution of this species. Habitat associated in the PCTs 3152, 3239, 3314, 3315, 3444, 3446 & 3605.	Species may occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Gaudium deanei Syn. Leptospermum deanei	*Gaudium deanei* Syn. *Leptospermum deanei*	V	This species occurs with Hornsby, Warringah, Ku-ring-gai and Ryde LGAs. The species prefers woodland on sandy alluvial soil or sand and sandstone and tend to occur on lower slopes. Usually occurs near to creeks or in riparian scrub.	BioNet	Low. project alignment outside of known range and distribution. Suitable microhabitats deemed not to be present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Genoplesium baueri	Yellow Gnat-orchid	E	Grows in dry sclerophyll forest and moss gardens over sandstone.	PMST	Low. The subject land is outside any known records of this species. The species generally occurs within coastal areas from Ulladulla on the south coast to Port Stephens on the mid-north coast.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Genoplesium branwhiteorum Syn. Corunastylis sp. Charmhaven	-	CE	This species occurs within Morisset to Warnervale and east to Chain Valley Bay. The species occurs in low woodland or heathland with shrubby understorey and ground layer. Species within habitat include *Allocasuarina littoralis* (Black She-oak), *Leptospermum juniperinum* (Prickly Tea-tree), *Melaleuca nodosa* (Prickly-leaved Paperbark), *Callistemon linearis* (Narrow-leaved Bottlebrush) and *Schoenus brevifolius* (Zig-zag Bog-rush).	BioNet	Low. Despite targeted surveys, the species was not recorded within the subject land.	Species was not recorded in the subject land and is considered unlikely to be present. Therefore, it is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Genoplesium insigne	Variable Midge Orchid	CE	This species appears to be associated with Scribbly Gum – Red Bloodwood –*Angophora inopina* (not always present) heathy woodland on lowlands of the Central Coast and variations containing *Angophora costata*. Several known sites exhibit a removed/managed shrub layer and canopy. Grows in patches of *Themeda triandra* (Kangaroo Grass), which can be ephemeral. Other associated species include, but are not limited to, *Mirbelia speciosa, Ptilothrix deusta, Leptospermum trinervium* and *L. juniperinum* in wet (seasonal) heath settings, *Banksia spinulosa* and *Xanthorrhoea latifolia*, and *X. media*. Other seasonal and cryptic species commonly associated with known populations include: *Cryptostylis subulate, C. erecta, Thelymitra ixiodes, T. pauciflora, Microtis spp., Burchadia umbellate, Tricoryne elatior,* and *Thysanotus juncifolius.*	BioNet, ALA	Low. Recorded during targeted surveys.	The species is known to occur within the existing electrical transmission easement, therefore will not be impacted by this project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Grevillea parviflora subsp. Parviflora	Small-flower Grevillea	V	Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Hunter occurrences are usually 30–70 mASL, often occurring in open, slightly disturbed sites such as along tracks. This species grows in sandy or light clay soils in a range of vegetation types, from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in the Hunter in Kurri Sand Swamp Woodland. Associated species in the Kurri Sand Swamp Woodland include *Eucalyptus parramattensis subsp. Decadens, Angophora bakeri and E. fibrosa with Acacia elongate, Dillwynia parvifolia, Melaleuca thymifolia, Grevillea montana, Eragrostis brownie and Aristida vagans.* Despite the range of associated communities several understorey species which are common to several of the known sites include *Allocasuarina littoralis, Daviesia ulicifolia, Kunzea ambigua, Banksia spinulosa, Leptospermum trinervium, Melaleuca nodosa, linifolia, Themeda australis, Entolasia stricta and Eragrostis brownie*.	BioNet, PMST, ALA	Low. Despite targeted surveys, the species was not recorded within the subject land.	Species is not present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is <u>not</u> required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Homoranthus darwinioides	Fairy Bells	V	Grows in in various woodland habitats with shrubby understoreys, usually in gravely sandy soils. Landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand. Associated species include *Callitris endlicheri, Eucalyptus crebra, E. fibrosa, C. trachyphloia, E. beyeri subsp. illaquens, E. dwyeri, E. rossii, Leptospermum divaricatum, Melaleuca uncinata, Calytrix tetragona, Allocasuarina spp. and Micromyrtus spp.*	PMST	Low. The subject land is outside the known distribution of this species. *Homoranthus darwinioides* is known to occur in central tablelands and western slopes of NSW, occurring from Putty to the Dubbo district. It is found west of Muswellbrook between Merriwa and Bylong, and north of Muswellbrook to Goonoo SCA.	Species is unlikely to occur within the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Kunzea rupestris	-	V	Grows in shallow depressions on large flat sandstone rock outcrops. Characteristically found in short to tall shrubland or heathland.	PMST	Low. *Kunzea rupestris* has a highly restricted distribution, with most locations in the Maroota – Sackville – Glenorie area and one outlier in Ku-ring-gai Chase National Park	The subject land is outside the known distribution of this species and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Lasiopetalum joyceae	-	V	Grows in heath on sandstone, on lateritic shaley ridgetops.	PMST	Low. *Lasiopetalum joyceae* has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest.	The subject land is outside the known distribution of this species and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Leionema lamprophyllum subsp. fractum	-	CE	Found in sparse heathland or very open low woodland in skeletal sandy soils on exposed northerly to north-westerly facing rocky terrain. This species is associated with *Corymbia maculate, Eucalyptus sparsifolia, Pultenaea spinosa, Leptospermum trinervium, Acacia parvipinnula, Dillwynia sieberi, Persoonia linearis, Leucopogon muticus, Astrotricha sp. Quorrobolong, Correa reflexa var. reflexa, Patersonia sericea, Entolasia stricta, Cleistochloa rigida, Pomax umbellate, Lepidosperma gunnii and Lomandra confertifolia subsp. Rubiginosa.*	BioNet, PMST	Low. Despite targeted surveys, the species was not recorded within the subject land.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Melaleuca biconvexa	Biconvex Paperbark	V	Occurs in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. The species may also occur in coastal districts and adjacent tablelands. Found within the Hawkesbury-Nepean, Northern Rivers, Hunter-Central Rivers and Southern Rivers Regions.		Moderate. The eastern portion of the subject land near Cooranbong and Martinsville is located within the northern extent of the Central Coast meta population. Within the subject land the species is associated with PCTs 3029, 3150, 3241, 3242, 3244 and 3250.	Given the proximity of the subject land to the northern population. A precautionary approach has been undertaken. **EPBC Act significant impact assessment is required (refer Attachment B).**
Melaleuca deanei	Deane's Melaleuca	V	Endemic to Sydney Basin Bioregion in New South Wales. The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Co-occurring woodland species include *Banksia ericifolia* (Heath-leaved Banksia), *B. serrata* (Old-man Banksia), *Petrophile pulchella* (Conesticks), *Leptospermum trinervium* (Flaky-barked Tea-tree), and *Hakea teretifolia* (Needlebush).	PMST	Low. *Melaleuca deanei* occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Despite targeted surveys the species was not recorded in the subject land.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is <u>not</u> required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Micromyrtus blakelyi	-	V	The species is restricted to areas near the Hawkesbury River. Typically occurs within heathlands in shallow sandy soil in cracks and depressions of sandstone rock platforms. A Habitat constraint exists of skeletal soil in rocky areas, and Hawkesbury sandstone rock platforms and outcrops or within 50 m.	PMST	Low. This species is restricted to areas near the Hawkesbury River, north of Sydney. Distribution extends from north of Maroota in the north, to Cowan in the south. All known populations occur within the Baulkham Hills and Hornsby local government areas.	Subject land occurs outside of the species distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Neoastelia spectabilis	-	V	Grows in rock crevices near waterfalls and in seepage lines on rocky slopes in Antarctic Beech rainforest, between 900–1150 m altitude. The species grows on stony and shallow soils but will tolerate deeper soils.	PMST	Low. This species is not known to occur in NSW.	Subject land occurs outside of the species distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Olearia cordata	-	V	Populations are typically small and scattered. Grows in dry open sclerophyll forest and open shrubland, on Hawkesbury sandstone ridges. The species grows in shallow or skeletal soils that are neutral to slightly acidic.	PMST	Moderate. Not recorded during targeted surveys. Species associated with PCT 3151, 3152, 3238, 3239, 3605 and 3617.	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Ozothamnus tesselatus		V	The species occurs within the Hunter-Central Rivers Region. Grows in eucalypt woodland.	BioNet, PMST	Moderate. The species is known to occur near Bayswater Power Station which is within the western extent of the subject land. The existing records are outside the subject land footprint and no specimens of this species have been recorded from preliminary field surveys to date. Habitat associated PCTs 3315 and 3431 within the subject land. Not recorded during targeted surveys. Assumed present in areas lacking survey where there was associated PCTs and/or potentially suitable habitat.	While the existing known records for the species occur outside for the subject land, given the proximity to the subject land a precautionary approach has been undertaken. **EPBC Act significant impact assessment is required (refer Attachment B).**
Persicaria elatior	Tall Knotweed	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	PMST	Low. There are no current records of this species within the subject land.	The species was not recorded within the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Persoonia hirsuta	Hairy Geebung	E	The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. It is usually present as isolated individuals or very small populations.	PMST	Moderate Associated with PCTs 3238, 3605 and 3617. Not recorded during targeted surveys.	The species was not recorded within the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Persoonia pauciflora	North Rothbury Persoonia	CE	Occurs in dry open forest or woodland on silty sandstone soils with a moderate to sparse shrub layer and grassy groundcover. Associated dominate canopy species include *Corymbia maculata, Eucalyptus fibrosa* and *E. crebra.*	BioNet, PMST	Low. This species has a highly restricted distribution at North Rothbury in the Cessnock local government area which occurs well outside the current subject land.	Subject land occurs outside of the species known distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Pimelea curviflora var. curviflora		V	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain.	PMST	Low. *Pimelea curviflora var. curviflora* is generally confined to the coastal area of the Sydney and Illawarra regions.	Subject land occurs outside of the species distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Pomaderris brunnea	Brown Pomaderris	V	The species is endemic to south-eastern Australia, where majority of the sub-populations occur in south-west Sydney. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	PMST	Low. *Pomaderris brunnea* is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria.	Subject land occurs outside of the species distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Pomaderris reperta	Denman Pomaderris	CE	Denman Pomaderris occupies woodland on sandy loam of sandstone or conglomerate, in association with *Eucalyptus crebra , E. blakelyi, Notelaea macrocarpa* and *Allocasuarina littoralis*.	BioNet	Low. ***Pomaderris reperta*** is only known from a small number of sites along a single ridgeline near Denman in the upper Hunter Valley. Habitat associated with PCTs 3439 and 3489. Furthermore, the species was not recorded during targeted surveys.	Subject land occurs outside of the species distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Prasophyllum petilum	Tarengo Leek Orchid	E	Found within open natural temperate grassland at known sites, as well as in grassy woodland in association with *Poa labillardieri, Eucalyptus aggregate and Leptospermum spp*. near Queanbeyan and within the grassy ground layer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford. This species is only retained at little-grazed travelling stock reserves and in cemeteries at some locales. The population near Muswellbrook is considered small.	BioNet	Moderate. The subject land is outside the known distribution of this species. Habitat associated PCTs 3314, 3315,3431, 3438 and 3444. Not recorded during targeted surveys. Assumed present in areas lacking survey where there was associated PCTs and/or potentially suitable habitat.	While the subject land is outside the current known distribution for this species, it is known from the Muswellbrook area to the west, and habitat occurs within the subject land. Therefore, a precautionary approach has been undertaken. **EPBC Act significant impact assessment is required (refer Attachment B).**
Prasophyllum sp. Wybong	Leek Orchid	CE	This species is known to occur in open eucalypt woodland and grassland.	BioNet	Moderate. Prasophyllum sp. Wybong is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. The subject land is outside the known distribution of this species. Habitat associated with PCT 3314, 3315, 3431, 3438 and 3444. Not recorded during targeted surveys.	While the subject land is outside the current known distribution for this species, it is known from the Muswellbrook area to the west and habitat occurs within the subject land. Therefore, a precautionary approach has been undertaken. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Prostanthera askania	Tranquility Mintbush	E	Occurs adjacent to, but not immediately in, drainage lines on flat to moderately steep slopes formed on Narrabeen sandstone and alluvial soils derived from it. Found in moist sclerophyll forest and warm temperate rainforest communities, and the ecotone between them. These communities are generally tall forests with a mesic understorey; *Eucalyptus saligna* and *Syncarpia glomulifera* are usually present, though canopy species present can be highly variable.	BioNet	Low. *Prostanthera askania* has a very restricted geographic range (of less than 12 km) in the upper reaches of creeks that flow into Tuggerah Lake or Brisbane Water within the Central Coast local government areas.	Subject land occurs outside of the species distribution range and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Prostanthera cineolifera	Singleton Mint Bush	V	Grows in open woodlands on exposed sandstone ridges in association with shallow or skeletal sands.	BioNet, PMST	Recorded. This species has been recorded from Pokolbin State Forest during preliminary field surveys. Habitat associated with PCTs 3239, 3315, 3438, 3444, 3446 and 3605.	Species is known to occur within the subject and may be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Prostanthera junonis	Somersby Mintbush	E	The species is restricted to the Somersby Plateau, on both the Somersby and Sydney Town soil landscapes on gently undulating country over weathered Hawkesbury sandstone within open forest/low woodland/open scrub. It occurs in both disturbed and undisturbed sites.	BioNet, PMST	Low. Not recorded in the locality and rare in the region (generally restricted to the Somersby Plateau).	The species was not recorded in the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Pterostylis gibbosa	Illawarra Greenhood	E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Hunter region, the species grows in open woodland dominated by *Eucalyptus crebra* and *Callitris endlicheri*.	BioNet, PMST	Recorded. The species was recorded within the Singelton Military Area within PCT 3431. In the Hunter the species is only known from the Kurri Kurri and Maitland area.	Species is known to occur within the subject and may be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Rhizanthella slateri	Eastern Australian Underground Orchid	E	Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	BioNet, PMST, ALA	Moderate. Not recorded during targeted surveys. Habitat associated with PCTs 3029, 3086, 3087, 3150, 3230, 3237, 3242, 3244, 3250, 3263, 3581, 3599, 3617 and 3621.	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**
Rhodamnia rubescens	Scrub Turpentine	CE	Scrub Turpentine occupies littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	BioNet, PMST	Recorded. This species has been recorded from Watagan, Corrabare and Pokolbin State Forests during preliminary field surveys. Habitat associated with PCTs 3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3446, 3617.	Species is known to occur within the subject and may be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Rhodomyrtus psidioides	Native Guava	CE	This species occurs in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	BioNet, PMST	Recorded. This species was recorded from Watagan State Forest during preliminary field surveys. Habitat associated with PCTs: 3029, 3086, 3087, 3150, 3151, 3152, 3242, 3250, 3621 and 4072.	Species is known to occur within the subject and may be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Rutidosis heterogama	Heath Wrinklewort	V	Grows in heath on sandy soils and moist areas in open forest, with records along disturbed roadsides.	BioNet, PMST, ALA	Low. Species was not recorded despite targeted ecological surveys.	The species is unlikely to be present within the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Syzygium paniculatum	Magenta Lilly Pilly	V	On the central coast *Syzygium paniculatum* occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	BioNet, PMST, ALA	Moderate. Not recorded during targeted surveys.	The species is assumed present in areas lacking survey where there was associated PCTs and/or potentially suitable habitat. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Tetratheca juncea	Black-eyed Susan	V	Found in low open forest/woodland with a mixed shrub understorey and grassy groundcover, as well as in heathland and moist forest. Often found on well-drained sites.	BioNet, PMST, ALA	Low. Despite targeted surveys, the species was not recorded within subject land.	The species is unlikely to be present within the subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Thelymitra adorata	Wyong Sun Orchid	CE	Occurs from 10–40 mASL in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. Common vegetation type is a Spotted Gum - Ironbark Forest with a diverse grassy understorey and occasional scattered shrubs. Often found at disturbed sites, including on the edges of roads that contain a mixture of native and introduced species in the understorey. Alluvial Redgum Footslopes Forest adjoins Dooralong Spotted Gum - Ironbark Forest at one known population and may constitute habitat for the species. Alluvial Floodplain Shrub Swamp Forest also adjoins Dooralong Spotted Gum – Ironbark Forest at another extant population.	BioNet, PMST, ALA	Low. The closest being from southern portion of Lake Macquarie City Council area.	The species known distribution is located north of the subject, therefore unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Thesium australe	Austral Toadflax	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*).	PMST	Low The species is rare but widespread in distribution. Species was not recorded during targeted.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further assessment required
Velleia perfoliata		V	Found in shallow depressions on Hawkesbury sandstone shelves, on rocky hill sides, under cliffs or on rocky/sandy soils along tracks and trails. Occurs on fairly shallow soils of sandy loam texture. Often found growing on moss and lichen mats formed on rock.	BioNet	Moderate *Velleia perfoliata* is only known from the Hawkesbury district and upper Hunter Valley (near Munghorn Gap Nature Reserve). Habitat associated with PCTs 3152, 3239, 3605 and 3617.	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**
Wollemia nobilis	Wollemi Pine	CE	Occurs in warm temperate rainforest and rain forest margins in remote sandstone canyons.	PMST	Low. Restricted to remote canyons in the Wollemi National Park, north-west of Sydney.	The species known distribution is located north of the subject, therefore unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Zieria involucrata		V	Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium. Found primarily in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest, although some populations extend upslope into drier vegetation. Also known from at least two atypical ridgetop locations. The canopy typically includes *Syncarpia glomulifera subsp. glomulifera* (Turpentine), *Angophora costata* (Smooth-barked Apple), *Eucalyptus agglomerata* (Blue-leaved Stringybark) and *Allocasuarina torulosa* (Forest Oak).	PMST	Moderate. Not recorded in the locality and rare in the region. Habitat associated with PCTs 3151, 3152, 3238, 3239, 3605 and 3617.	Not recorded during targeted surveys, however assumed present in areas lacking survey in areas of potential habitat throughout associated PCTs. **EPBC Act significant impact assessment is required (refer Attachment B).**

(1) CE= Critically endangered, E = Endangered and V = Vulnerable, under the Commonwealth EPBC Act.

(2) Source: PMST = The Department of the Environment and Energy's EPBC Protected Matters Search Tool, BioNet = BioNet Atlas of NSW Wildlife.

The following table consider the likelihood of occurrence for threatened species in relations to the controlling provision for listed threatened species and ecological community. Threatened species considered under the Commonwealth Land controlling provision are provided in Attachment B Table B.4.

Table A.2 Threatened fauna within the locality of the project, likelihood of occurrence

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Amphibians						
Heleioporus australiacus	Giant Burrowing Frog	V	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spending more than 95% of its time in non-breeding habitat below the soil surface in areas up to 300 m from breeding sites. Breeding habitat of this species generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water.	BioNet, PMST, ALA	Recorded. Species recorded in PCT 3263 near the Olney Substation.	Species is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Litoria aurea	Green and Golden Bell Frog	V	This species inhabits marshes, dams and stream-sides, particularly those containing bullrushes or spikerushes that are unshaded, free of predatory fish such as Plague Minnow, have a grassy area nearby and diurnal sheltering sites available. Can occur in highly disturbed areas.	PMST, BioNet	Low. Despite targeted surveys, the species was not recorded within the subject land.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Litoria booroolongensis	Booroolong Frog	E	Found along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. This species occurs on or near cobble banks and other rock structures within stream margins where they shelter under rocks or amongst vegetation near the ground on the stream edge.	PMST	Low. Species not recorded despite targeted surveys.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Litoria littlejohni	Littlejohn's Tree Frog	E	Littlejohn's Tree Frog breeds in the upper reaches of permanent streams and in perched swamps, calling from low overhanging vegetation. Non-breeding habitat includes heath-based forests and woodlands.	BioNet, PMST, ALA	Recorded. Species recorded in PCT 3150 and 3263 surrounding the Olney substation.	Species is known to occur within the subject land. The project has been designed to avoid breeding habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**
Mixophyes balbus	Stuttering Frog	V	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Adults live in deep leaf litter and thick understorey vegetation on the forest floor out of breeding season. Breeding occurs in small flowing streams with rock shelves or shallow riffles connected to deep permanent pools.	BioNet, PMST, ALA	Recorded. Species recorded in PCT 3029, 3041, 3150, 3230, 3239, 3242, 3244, 3263, 3581, 3517 and 3612.	Species is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Mixophyes iteratus	Giant Barred Frog	V	Occurring along freshwater streams with permanent or semi-permanent water, generally at lower elevation within moist riparian habitats such as rainforest or wet sclerophyll forest. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams.	BioNet, PMST, ALA	Recorded. Species recorded in PCT 3029.	Species is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Uperoleia mahonyi	Mahony's Toadlet	E	Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on coastal fringes. Habitat is exclusively associated with leached white sand including heath or wallum habitat including acid paperbark swamps.	PMST	Low. No suitable habitat is found within the subject land.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Birds						
Anthochaera phrygia	Regent Honeyeater	CE	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	ALA, BioNet, PMST	High. Species associated with PCT 3230, 3239, 3241, 3244, 3314, 3315, 3431, 3438, 3439, 3444, 3599, 3605, 3621, 3636, 4039, 4072.	Important habitat for species is mapped within the subject land (BAM 2020). **EPBC Act significant impact assessment is required (refer Attachment B).**
Aphelocephala leucopsis	Southern Whiteface	V	Occupying a wide range of dry open woodland and shrubland on ranges, foothills, lowlands and plains. Dominated by an acacia or eucalypt canopy of low tree density, the understorey is usually grassy or shrubby, with hollows and crevices of live or dead trees required for roosting and nesting.	ALA, PMST	Low. This species is not recorded within the subject land, and no suitable dry habitat present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Ardenna grisea	Sooty Shearwater	V	The species mostly lives over deep ocean waters but is sometimes found in onshore areas particularly in rough weather. It nests on islands and headlands in large colonies.	PMST	Low. This species is not recorded within the subject land, and no suitable dry habitat present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Arenaria interpres	Ruddy Turnstone	V	During the austral summer non-breeding season, the ruddy turnstone is widespread within Australia. The species is found in most coastal regions, preferring rocky shores or beaches where there are large deposits of rotting seaweed. The species breeds on the coasts of Europe, Asia, and North America	PMST	Low. This species is not recorded within the subject land, and no suitable dry habitat present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Botaurus poiciloptilus	Australasian Bittern	E	This species favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes.	ALA,PMST	Moderate. Species associated with PCT 4015, 4039, 4072 and 4089.	Habitat for the species is known to occur in the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Calidris acuminata	Sharp-tailed Sandpiper	V, M	This migratory species may stop at coastal salt marshes, lagoons and mudflats during migration.	ALA, PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Calidris canutus	Red Knot	V, M	Recorded in small numbers within the Hunter River estuary during non-breeding season, this species is a rare visitor to terrestrial saline wetlands, freshwater swamps and inland wetlands. Found more commonly on intertidal mudflats, estuaries, lagoons, sandflats and sandy beaches along sheltered coasts.	PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Calidris ferruginea	Curlew Sandpiper	CE, M	Spends non-breeding season in Australia where it occurs around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. 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	ALA, BioNet, PMST	Low. Species rarely occurs away from the coast and preferred habitat not present. Species not associated with any impacted PCTs.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Calidris tenuirostris	Great Knot	CE, M	With scattered occurrence along the NSW coastline, this species is found within sheltered coastal habitats including bays, estuaries and lagoons, all with large intertidal mudflats or sandflats. Recorded on sandy beaches and spits with nearby mudflats, and sometimes on coastal rocky platforms.	ALA, PMST	Low. Species rarely occurs away from the coast and preferred habitat not present. Species not recorded despite targeted surveys.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Callocephalon fimbriatum	Gang-gang Cockatoo	E	Occurs from southern Victoria through south- and central-eastern New South Wales and ACT. In New South Wales, it occurs from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes – it is rare at the extremities of its range. Occurs in wetter tall mountain forests and woodlands in autumn/winter, and in spring/summer moves to lower altitudes in drier more open eucalypt forests and woodlands particularly box-gum and box-ironbark assemblages. Often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3230, 3239, 3242, 3263 and 3605. Species associated with PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, 4015, 4089 and 3086.	The Gang-gang Cockatoo has been recorded within the subject land. The project has the potential to impact both foraging and breeding habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	Occurs from central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3086, 3150, 3230, 3239, 3241, 3263, 3431, 3599, 3605 and 3617. Species associated with PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3029, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, 4015, and 4089.	The species has been recorded within the subject land. The project has the potential to impact both foraging and breeding habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**
Charadrius leschenaultia	Greater Sand Plover	V, M	Rarely appears on the east coast of Australia, this species has been recorded between the northern rivers and Illawarra. Sheltered coastal sandy, shelly or muddy beaches with large sandbanks or mudflats are utilised.	ALA, PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Charadrius mongolus	Lesser Sand Plover	E,M	A coastal migratory species, found on sheltered beaches with large mudflats or sandflats, less frequently on reefs and rocky platforms.	ALA, Bionet, PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	This species is endemic to the south-eastern Australia, occupying dry open eucalypt forests and relatively undisturbed grassy woodlands.	PMST	Moderate. Species associated with PCT 3150, 3230, 3239, 3242, 3263, 3617, 3621, 3250, 3581, 3087, 3152, 3237, 3244, 3438, 3439, 3489, 3599, 3605, 3238, 3328, 3444, 3446, 3151, 3241, 4039, 4072, 3314, 3315, 3431, 3636, and 4015	The project is likely to impact breeding and foraging habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**
Diomedea antipodensis	Antipodean Albatross	V, M	Endemic to New Zealand with six breeding sites on the sub-Antarctic Antipodes Islands, Auckland Islands and Campbell Island. Australia is within the foraging range of the species. his species regularly occurs in small numbers off the NSW south coast from Green Cape to Newcastle during winter where they feed on cuttlefish	PMST	Low. Habitat is not present within the subject land	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Diomedea antipodensis gibsoni	Gibson's Albatross	V, M	Endemic to the Auckland Islands of New Zealand. The non-breeding range is poorly known however the species probably disperses across the southern Pacific. The species is regularly encountered on trans-Tasman shipping routes and at seas off Sydney and regularly occurs off the NSW coast usually between Green Cape and Newcastle.	PMST	Low. Habitat is not present within the subject land	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Diomedea epomophora	Southern Royal Albatross	V, M	Endemic to New Zealand with four breeding sites in the sub-Antarctic Auckland Islands, and Campbell Island. Australia is within the foraging range of the Southern Royal Albatross. Tracking studies indicate that during the breeding season the birds mostly forage in New Zealand waters, but dispersal is circumpolar during non-breeding periods, including southern	PMST	Low. Habitat is not present within the subject land	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Diomedea exulans	Wandering Albatross	V, M	The Wandering Albatross is known to visit Australian waters extending from Fremantle, Western Australia, across the southern water to the Whitsunday Islands in Queensland between June and September. It has been recorded along the length of the NSW coast. The species feed in pelagic, offshore and inshore waters, often at night, taking fish and cephalopods such as squid, crustaceans and carrion, and will often follow ships feeding on the refuse they trail. The Wandering Albatross breed on a number of islands just north of the Antarctic Circle: South Georgia Island (belonging to the UK), Prince Edward and Marion Islands (South Africa), Crozet and Kerguelen Islands (French Southern Territories) and Macquarie Island (Australia)	PMST	Low. Habitat is not present within the subject land	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Falco hypoleucos	Grey Falcon	V	Distributed primarily throughout the Murray-Darling Basin, with the occasional vagrant found east of the Great Dividing Range within open woodland. This species is generally restricted to arid and semi-arid regional grassland, shrubland and wooded watercourses.	ALA, PMST	Low. No records within the subject land.	Subject land occurs outside of the species known distribution. The species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Gallinago hardwickii	Latham's Snipe	V, M	A non-breeding migrant to south-east Australia, they are found in freshwater wetland on or near the coast, often with dense vegetation cover including grasses, sedges or rushes. Occasionally occurring in saltmarshes and along creek edges.	ALA, PMST	Low. Preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Grantiella picta	Painted Honeyeater	V	Found in low densities this nomadic species breeds west of the Great Dividing Range. Preferred habitat includes Boree/ Weeping Myall, Brigalow, and Box-Gum Woodlands and Box-Ironbark Forests.	ALA, BioNet, PMST	Moderate. Species associated with PCT 3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3151, 3636 and 4015.	The project is likely to impact foraging habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Hirundapus caudacutus	White-throated Needletail	V, M	A migratory species, it is recorded along most of coastal eastern Australia west to the Great Dividing Range. Occurring as an aerial species over a broad range of habitats, roosting within dense canopy foliage or tree hollows.	ALA, BioNet, PMST	Recorded. Species associated with PCT 3029, 3087, 3151, 3152, 3230, 3237, 3238, 3241, 3242, 3244, 3250, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 3489, 3581, 3599, 3605, 3617, 3636, 4015, 4039, 4072 and 4089.	The project is likely to impact foraging habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**
Lathamus discolor	Swift Parrot	CE	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen, and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. This species is migratory, breeding in Tasmania and nomadic, moving about in response to changing food availability. The subject land did not occur within important mapped areas.	ALA, BioNet, PMST	Recorded Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3605, 3617, 3621, 3636, 4015, 4039 and 4072.	Important habitat for species is mapped within the subject land (BAM 2020). **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Limosa lapponica baueri	Bar-tailed Godwit	E	The Bar-tailed Godwit is a migratory wader. Birds arrive in New South Wales between August and October and then leave between February and April, with a small number of individuals overwintering. The species is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platform	PMST	Low. Preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Macronectes halli	Northern Giant-Petrel	V, M	The Northern Giant-Petrel has a circumpolar pelagic distribution, usually between 40-64ºS in open oceans. Their range extends into subtropical waters (to 28ºS) in winter and early spring, and they are a common visitor in NSW waters, predominantly along the south-east coast during winter and autumn. Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer	PMST	Low. Preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	This species occurs in dry eucalypt and acacia woodlands and shrublands, found in south-eastern Australia.	ALA, PMST	Moderate Suitable habitat is found within the subject land. Species associated with PCT 3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3151, 3636 and 4015.	Species habitat is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Numenius madagascariensis	Eastern Curlew	CE, M	Spends non-breeding season in Australia where it occurs primarily along the coast and rarely inland. In NSW the species occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. 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.	ALA, Bionet, PMST	Low. Preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Pachyptila turtur subantarctica	Fairy Prion	V	The Fairy Prion is found throughout oceans and coastal areas in the Southern Hemisphere. Their colonies can be found, amongst other places, on the Chatham Islands, Snares Islands and Antipodes Islands of New Zealand, the Bass Strait Islands of Australia. The species is mainly offshore but may move inshore during stormy weather. Its diet is comprised mostly of crustaceans (especially krill) but occasionally includes some fish and squid.	PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Pycnoptilus floccosus	Pilotbird	V	Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne. Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth. Its natural habitat is temperate wet sclerophyll forests and occasionally temperate rainforest, where there is dense undergrowth with abundant debris.	ALA, BioNet, PMST	Moderate. Suitable habitat is found within the subject land, with records of this species from the broader locality. Species associated with PCT 3152, 3238, 3239, 3250, 3617, 3621, 3599 and 3605.	Species habitat is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Rostratula australis	Australian Painted Snipe	E	Important locations within NSW, with recent records, include the Clarence and lower Hunter Valleys. This species occupies swamp and dam fringes as well as nearby marshy areas with accompanying grass, low scrub or open timber cover.	ALA, BioNet, PMST	Moderate. Species associated with PCT 4015, 4039, 4072, and 4089.	Species habitat is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Stagonopleura guttata	Diamond Firetail	V	Occurs on the south-east mainland of Australia, with the distribution stretching across NSW expanding 300km inland from the sea. This species occupies eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees.	ALA, BioNet, PMST	Moderate. Species associated with PCT 3239, 3244, 3250, 3314, 3315, 3431, 3439, 3446, 3489, 3605, 3617, 3621 and 4089.	Species habitat is known to occur within the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Thalassarche cauta	Shy Albatross	E, M	Occurs widely in the southern oceans. Islands off Australia and New Zealand provide breeding habitat. In Australian waters, the Shy Albatross occurs along the east coast from Stradbroke Island in Queensland along the entire south coast of the continent to Carnarvon in Western Australia. Although uncommon north of Sydney, the species is commonly recorded off southeast NSW, particularly between July and November, and has been recorded in Ben Boyd National Park	PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Thalassarche melanophris	Black-browed Albatross	V, M	The species has a circumpolar range over the southern oceans and are seen off the southern Australian coast mainly during winter. This species migrates to waters off the continental shelf from approximately May to November and is regularly recorded off the NSW coast during this period. The species has also been recorded in Botany Bay National Park	PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Thalassarche salvini	Salvin's Albatross	V,M	The species is a large seabird, that breeds mostly on small, bare rocky islands mainly on the Bounty Islands of New Zealand. At sea they range from South Africa across to Australia and as far east as the coast of South America.	PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Thalassarche steadi	White-capped Albatross	V, M	The species breeds on islands off Tasmania and New Zealand but disperses widely across the southern Oceans between 15 and 60°S, where it is a frequently encountered pelagic seabird. Australia is within the foraging range of the White-capped Albatross, feeding across the surface of the water on fish, cephalopods, tunicates and crustaceans.	PMST	Low. Species rarely occurs away from the coast and preferred habitat not present.	Species is unlikely to be present in subject land and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Tringa nebularia	Common Greenshank	E,M	The common greenshank is widespread in coastal regions across Australia. In NSW, the species is widespread west of the Great Dividing Range. This species occurs at the edge of wetlands, mudflats in channels or within shallows around the edge of waterbodies.	PMST	Low. Limited suitable habitat is found and the species not recorded despite targeted surveys.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Fish						
Epinephelus daemelii	Black Cod Fish	V	The species is known to occur from southern Queensland through NSW to northern Victoria. The NSW coastline forms the species' main range, both in Australia and internationally. Black cod are known to occur to some degree in all six NSW Marine Parks – Lord Howe, Cape Byron, Solitary Island, Port Stephens, Jervis Bay and Batemans Bay. Black cods generally inhabit near-shore rocky and offshore coral reefs at depths down to 50 m. In coastal waters adult Black cod are found in rock caves, rock gutters and on rock reefs	PMST	Low. Preferred habitat not present in the subject land.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Invertebrates						
Meridolum maryae	Maroubra Woodland Snail	E	This species is endemic to NSW, confined to coastal habitat within the Royal National Park to Palm Beach in Sydney. The species occurs within coastal vegetation, found amongst leaf litter, commonly in heathland on foredunes. The species can occur in sandstone and clay heathstone on headlands.	PMST	Low. Project alignment is outside of species known range and distribution.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Pommerhelix duralensis	Dural Land Snail	E	This species is endemic to NSW, occurring within shale-sandstone habitats. The species is known to St Albans in the north, southwest to East Kurrajong and south along the Blue Mountains. The species is found in a range of forests and woodlands within leaf litter or exposed areas, but sheltering beneath rocks, leaves and woody debris.	PMST	Low. Project alignment is outside of species known range and distribution.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Mammals						
Chalinolobus dwyeri	Large-eared Pied Bat	E	Found in well-timbered areas containing gullies. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Occurs mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3150, 3230, 3239, 3242, 3244, 3263, 3328, 3231, 3444 and 3599. Species associated with PCT 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3605, 3617, and 3621, 3636.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Dasyurus maculatus	Spotted-tail Quoll	E	Occupies a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest to the coast.	ALA, BioNet, PMST	Moderate Species associated with PCT 3029, 3086, 3087, 3150, 3151, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3438, 3439, 3489, 3444, 3446, 3431,3581, 3599, 3605, 3636, 3617, 3621, 4015, 4072 and 4089.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Notamacropus parma	Parma Wallaby	V	This species prefers moist eucalypt forest, with a dense shrubby understorey adjacent to grassy areas, rainforest margins and sometimes drier eucalypt forest.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3230, 3242 and 3263 within Corrabare State Forest.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Nyctophilus corbeni	Corben's Long-eared Bat	V	Found in a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities. A preference is shown for box/ironbark/cypress-pine vegetation along the western slopes and plains of NSW.	BioNet, PMST	Moderate Suitable habitat may be present within the subject land, with limited records from the broader locality. This species is associated with PCTs 3315,3438and 4039.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Petauroides volans	Southern Greater Glider	E	The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The distribution may be patchy even in suitable habitat. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3237, 3239, 3242, 3263, 3599 and 3605.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Petaurus australis australis	Yellow-bellied Glider	V	Found in tall mature eucalypt forest in areas with high rainfall, with mixed coastal forests to dry escarpment forests utilised in the north, and moist coastal gullies and creek flats to tall montane forests in the south.	ALA, BioNet, PMST	Recorded. Species associated with PCT 3086, 3087, 3150, 3152, 3230, 3237, 3238, 3239, 3241, 3242, 3244, 3250, 3263, 3438, 3444, 3446, 3599, 3605, 3617 and 3621.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Petrogale penicillata	Brush-tailed Rock Wallaby	V	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Found in rocky areas in a wide variety of habitats including rainforest gullies, wet and dry sclerophyll forest, open woodland, and rocky outcrops in semi-arid country. Commonly sites have a northerly aspect with numerous ledges, caves, and crevices.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3239, 3244, 3263 and 3605.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Phascolarctos cinereus	Koala	E	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3239, 3263 and 3605.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	Occurs in coastal heaths and dry and wet sclerophyll forests featuring a dense understorey with occasional open areas. Habitat may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas on a sandy loam soil. is also a common feature.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3617 in Olney State Forest.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Pseudomys novaehollandiae	New Holland Mouse	V	Occupies open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	ALA, BioNet, PMST	Moderate. Suitable habitat may be present within the subject land, with a number of records from the broader locality. The species is associated with PCT 3250, 3581, 3244, 3315 and 3446.	Records have been identified within the locality and habitat occurs in the subject land. **EPBC Act significant impact assessment is required (refer Attachment B).**
Pteropus poliocephalus	Grey-headed Flying-fox	V	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.	ALA, BioNet, PMST	Recorded. Species recorded in PCT 3239, 3263, 3315 and 3605.	Camp occurs within 50km of the subject land. The project may impact foraging habitat for the species. **EPBC Act significant impact assessment is required (refer Attachment B).**

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Reptiles						
Aprasia parapulchella	Pink-tailed Legless Lizard	V	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. Inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo grass. Sites are typically well-drained, with rocky outcrops or scattered, partially buried rocks.	ALA, BioNet, PMST	Low. Species not recorded despite targeted surveys.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.
Delma vescolineata	Hunter Valley Delma	E	The species is known almost entirely from a 25 km wide corridor in the Hunter Valley, between Maitland and Muswellbrook. Habitat suitable for the species occurs in secondary native grasslands remaining after the removal or dieback of previous woody canopy vegetation.	PMST	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, and 3439.	Species occurs within the subject land and is likely to be impacted by the project. **EPBC Act significant impact assessment is required (refer Attachment B).**
Delma impar	Striped Legless Lizard	V	Occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Found in natural temperate grassland, secondary grassland and open box-gum woodland. Habitat is typically dominated by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda australis*, spear-grasses *Austrostipa spp*. and *poa tussocks Poa spp*., and occasionally wallaby grasses *Austrodanthonia spp*., though can occur in modified grasslands with a significant content of exotic grasses.	ALA, BioNet, PMST	Low. Species was not recorded in subject land.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

Scientific name	Common name	EPBC Act[1]	Habitat	Source[2]	Likelihood of occurrence	Further Assessment required
Hoplocephalus bungaroides	Broad-headed Snake	V	This species shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring and moves to shelters in crevices or hollows in large trees within 500 m of escarpments in summer.	PMST	Low. Species was not recorded in subject land.	Species is unlikely to be present in project development footprint and is unlikely to be impacted by the project. EPBC Act significant impact assessment is not required.

(1) CE= critically endangered, E = Endangered, V = Vulnerable, M = Migratory under the EPBC Act.

(2) Source: PMST = The Department of the Environment and Energy's EPBC Protected Matters Search Tool, BioNet = BioNet Atlas of NSW Wildlife.

Attachment B

Significant impact assessment

B1. Significant impact assessment

The Significant Impact Guidelines 1.1 provide definitions for specific terms used throughout the significant impact assessment criteria contained in the Significant Impact Guidelines 1.1 as follows:

- population of a species
- important population
- habitat critical to the survival of a species or ecological community
- important habitat for migratory species
- ecologically significant proportion (migratory species)
- population of a migratory species
- invasive species.

These definitions are key considerations when conducting a significant impact assessment for threatened and migratory species listed under the EPBC Act. The definition for each is presented below.

Population of a species

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion.

Important population

An 'important population' is defined by the Significant Impact Guidelines as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

Habitat critical to the survival of a species or ecological community

'*Habitat critical to the survival of a species or ecological community*' is defined by the Significant Impact Guidelines as 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.

Critical habitat can be further explained as an identified area of viable habitat that contains habitat attributes that are essential for the conservation of a threatened species. These areas are typically under a regime of special protection and management to ensure the critical habitat remains a stronghold for the species to ensure its long-term survival and viability in the wild. Critical habitat may also include an area of land not currently occupied by the species but can act as a sanctuary by possessing the necessary whole of life cycle habitat attributes to facilitate the recovery of a declining population of the species.

Invasive species

An *'invasive species'* is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources, or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.

Bushfires

In the summer of 2019–2020, Australia experienced extreme bushfires across many areas of the country. The number of fires, their severity and extent, and the damage caused to the environment were unprecedented. The fires covered almost 10 million hectares. A Wildlife and Threatened Species Bushfire Recovery Expert Panel was convened in January 2020 to assist in prioritising recovery actions for native species and ecological communities affected by the 2019–2020 extreme fire event. The expert panel identified priority native plants, animals and ecological communities considered to be at risk due to additional degradation and loss of habitat associated with the bushfires. The following documents and datasets have been considered in conjunction with the relevant statutory documents in assessing the significant residual impacts for the threatened species or ecological community:

- *National prioritisation of Australian plants affected by the 2019-2020 bushfire season* – Report to the Commonwealth Department of Agriculture, Water and Environment (Gallagher RV. 2020).
- Priority TECs recovery action in each fire affected NRM Region
- Fire affected TECs – summary of threats and action
- Threatened and migratory species known or predicted to occur in areas affected by bushfires in southern and eastern Australia from 1 August 2019 and 13 January 2020 (XLSX - 74.21 KB)
- Preliminary analysis area map (PDF - 2.18 MB)

B2. Listed threatened species and ecological communities

B2.1 Threatened ecological communities

Three Threatened Ecological communities (TECs) listed under the EPBC Act were recorded the subject land, including:

- Central Hunter Valley eucalypt forest and woodland – Critically Endangered
- River-flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria – Critically Endangered
- Warkworth Sands Woodland of the Hunter Valley– Critically Endangered.

An assessment of significant residual impacts has been undertaken for all three TECs in accordance with the significant impact guidelines 1.1.

B2.1.1 Central Hunter Valley eucalypt forest and woodland

The Central Hunter Valley eucalypt forest and woodland is listed as a critically endangered ecological community under the EPBC Act. The ecological community occurs in the Hunter Valley region (primarily in the Central Hunter) which is mostly in the northeast of the Sydney Basin IBRA Bioregion (Department of the Environment, 2015). Within the Sydney Basin Bioregion the ecological community occurs mainly in the Hunter Valley IBRA subregion and occurs in subregions adjacent to the Hunter Valley IBRA subregion; for example, in the Goulburn Valley in the Kerrabee IBRA subregion and in the Hunter Thrust Zone in the Upper Hunter IBRA subregion (Department of the Environment, 2015).

The Central Hunter Valley eucalypt forest and woodland ecological community generally occurs on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges (Department of the Environment, 2015).

The canopy of the ecological community is dominated by one or more of the following four eucalypt species: Narrow-Leaved Ironbark (*Eucalyptus crebra*), Spotted Gum (*Corymbia maculata* (syn. *E. maculata*)), Slaty Gum (*E. dawsonii*) and Grey Box (*E. moluccana*) (Department of the Environment, 2015). Under certain circumstances a fifth species, Buloke (*Allocasuarina luehmannii*), may be part of the mix of dominants, in sites previously dominated by one or more of the above four eucalypt species (Department of the Environment, 2015). Derived native grasslands and shrublands are not included in the nationally protected ecological community.

Relevant commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant commonwealth statutory document considered for this ecological community is the approved Conservation Advice on Central Hunter Valley eucalypt forest and woodland (Department of the Environment, 2015). In effect under the EPBC Act from 07 May 2015.

Specific impacts

The following plant community types (PCTs) recorded within the subject land were considered to potentially align with (were equivalent to) the EPBC Act Central Hunter Valley eucalypt forest and woodland listing:

- PCT 3315 – Central Hunter Ironbark-Spotted Gum Forest
- PCT 3314 – Central Hunter Slopes Grey Box Forest
- PCT 3431 – Central Hunter Ironbark Grassy Woodland
- PCT 3438 – Hunter Escarpment Footslopes Ironbark Forest.

Based on these assessments, the project is estimated to impact upon approximately 153.62 hectares of remnant vegetation potentially corresponding with the EPBC listed community. Additional areas of derived native and exotic mixed grasslands potentially corresponding with the TEC also have the potential to be impacted by the project.

Significant impact criteria

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*

The approved conservation advice for the Central Hunter Valley eucalypt forest and woodland notes that the extent of occurrence within the Sydney Basin IBRA Bioregion is estimated to be 740,000 hectares with area of occupancy estimated at 370,000 hectares. However since this estimation there has been significant regeneration, revegetation and rehabilitation of the ecological community associated with mining and land management *(Threatened Species Scientific Committee 2010).*

The project would result in loss of approximately 144.40 hectares of remnant vegetation and additional mixed native and exotic grassland areas potentially corresponding with the EPBC listed community. Based on the 'Central Hunter Valley eucalypt forest and woodland: a nationally protected ecological community' (Department of the Environment, 2016) the project is likely to reduce the northwestern extent of the Central Hunter Valley eucalypt forest and woodland.

- *fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines*

The project would require the removal and/or disturbance of approximately 144.40 hectares of the Central Hunter Valley eucalypt forest and woodland ecological community. Given the large extent of clearing of this community the project is likely to significantly increase fragmentation of TEC within the area.

- *adversely affect habitat critical to the survival of an ecological community*

The approved conservation advice for the Central Hunter Valley eucalypt forest and woodland ecological community (Department of Environment 2015) outlines that: 'Areas that meet the minimum (Moderate quality condition class) condition thresholds, or are within the buffer zone, are considered critical to the survival of the Central Hunter Valley eucalypt forest and woodland ecological community. Additional areas such as adjoining native vegetation and areas that meet the description of the ecological community but not the condition thresholds are also important to the survival of the ecological community and should be taken into consideration as part of the surrounding environment and landscape context.'

The vegetation within the subject land was assessed as meeting condition thresholds of Class A High quality condition. Therefore, the loss of 144.40 hectares associated with the project will adversely affect habitat critical to the survival of the community.

- *modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns*

The project would require the removal of up to 144.40 hectares of Central Hunter Valley eucalypt forest and woodland ecological community. Construction of the access roads and towers may require some excavation works; however, these are not expected to alter groundwater levels or substantially change surface water drainage patterns to an extent that would impact the community's survival. Furthermore, mitigation measures will be implemented during the construction phase and ongoing maintenance to minimise disturbance and reduce surface water impacts (e.g. controls for sedimentation and hydrological impacts).

- *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, for example through regular burning or flora or fauna harvesting.*

The project does not include regular burning or flora and fauna harvesting or other activities that would substantially change the species composition of the community.

Indirect impacts caused by shifting of edge effects and weed dispersal may result in a reduction in the quality or integrity on the edge of the remaining areas of the ecological community. Mitigation measures such as weed and pathogen control, controls for sedimentation and hydrological impacts will be put in place to limit indirect impacts of the project on the surrounding vegetation. Therefore, it is considered unlikely the project will result in the decline or loss of a functionally important species, substantially change the species composition of the retained vegetation, or substantially impact fauna occurring within this habitat.

- *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 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.*

Most of the project occurs within previously disturbed agricultural land, therefore the Central Hunter Valley eucalypt forest and woodland within the subject land is currently subject to weed and pest invasion.

There is potential for the mobilisation of fertilisers, herbicides or other chemicals or pollutants to impact on the remaining area of the ecological community. The project includes mitigation measures to minimise sedimentation and hydrological impacts (water-sensitive urban design) and to minimise potential indirect impacts resulting from altered soil or drainage patterns. It is considered that with the implementation of the mitigation measures, the project is unlikely to substantially reduce the quality or integrity of the community's occurrence or significantly increase the spread of invasive species.

- *interfere with the recovery of an ecological community*

To date, no recovery plan has been developed by the DCCEEW for Central Hunter Valley eucalypt forest and woodland. The approved conservation advice ((Department of Environment 2015) notes that one of the highest priorities in the recovery of the TEC is to avoid further clearance and fragmentation of the ecological community and of surrounding native vegetation. The project will involve clearing of this TEC and therefore the project is likely to interfere with the recovery of this TEC.

Conclusion

The project will remove approximately 144.40 hectares of Central Hunter Valley eucalypt forest and woodland, which is likely to result in a reduction of the extent of the TEC, impact habitat critical to the survival and interfere with the recovery of the community. For these reasons, the project is likely to have a significant residual impact on this community.

B2.1.2 River-Flat Eucalypt Forest on Coastal Floodplains of Southern New South Wales And Eastern Victoria

The River-flat Eucalypt Forest on Coastal Floodplains of southern New South Wales and eastern Victoria Ecological Community is listed as a critically endangered ecological community under the EPBC Act. The ecological community occurs on deep alluvial soils, sometimes shallower on the edges of floodplains, within coastal river floodplains and associated sites below 50 metres above sea level (mASL) with accumulated transient water, although it can occur on floodplain pockets up to 250 mASL.

River-flat Eucalypt Forest on Coastal Floodplains communities are tall open forest to woodland, with taller (up to 40 metres) denser forest found in confined floodplains, with lower, less dense structure as floodplains widen. The canopy is dominated by *Angophora* and *Eucalyptus* species, primarily Rough-barked Apple (*Angophora floribunda*), Broad-leaved Apple (*A. subvelutina*), Forest Red Gum (*Eucalyptus tereticornis*) and Cabbage Gum (*E. amplifolia*), with a sub-canopy of *Allocasuarina*, *Melaleuca* or *Leptospermum*, and a sparse shrub layer. Climbers and vines, including Common Silkpod (*Parsonsia straminea*) and Native Sarsaparilla (*Smilax australis*), often occur between the mid-storey and canopy. Grasses, forbs, ferns, sedges and scramblers make up the diverse groundcover, with high coverage of litter and woody debris present in intact patches. Not all characteristic species are present at each site, with some species present only underground as seed or dormant structures (Department of Agriculture, Water and the Environment, 2020).

Relevant commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant commonwealth statutory document considered for this ecological community is the approved Conservation Advice for the River-flat Eucalypt Forest on Coastal Floodplains of southern New South Wales and eastern Victoria Ecological Community (Threatened Species Scientific Committee 2006).

Specific impacts

Much of this EPBC TEC corresponds with the River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions NSW-listed community, with some areas of the Hunter and Central Coast corresponding to the NSW-listed Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions or the Subtropical Coastal Floodplain Forest in NSW North Coast Bioregion communities.

The following vegetation types recorded within the subject land were considered consistent with the EPBC Act River-flat Eucalypt Forest on Coastal Floodplains listing:

- PCT 3328 – Lower Hunter Red Gum-Paperbark Riverflat Forest
- PCT 4039 – Hunter Range Creekflat Apple-Red Gum Forest.

Based on these assessments, the project is estimated to impact on 1.36 hectares of River-flat Eucalypt Forest on Coastal Floodplains.

Significant impact criteria

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*

Within the subject land the TEC occurs in the NSW Yengo and Hunter IBRA subregions. The current extent of the community within NSW is estimated at 10,600 hectares and 20,600 hectares nationally with a median patch size of 0.8 hectares. The approved conservation advice for the TEC states that the community is highly fragmented with 90% of the patches smaller than 10 hectares.

The project will result in clearing of 0.01% of the extent of the community in NSW and 0.007%, nationally. Given the small area to be impacted it is unlikely the project would significantly reduce the extent of the River-flat Eucalypt Forest on Coastal Floodplains.

- *fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines*

This ecological community is highly fragmented, with 90% of remnant patches less than 10 hectares in size. The project will require the removal and/or disturbance of 1.36 hectares River-flat Eucalypt Forest on Coastal Floodplains. Within the subject land, River-flat Eucalypt Forest on Coastal Floodplains generally occurs within a fragmented landscape. The project will bisect patches of the TEC and therefore increase existing fragmentation within the subject land and region.

- *adversely affect habitat critical to the survival of an ecological community*

Spatially linked patches are of high importance for functional River-flat Eucalypt Forest on Coastal Floodplains, and patches that are in the best condition are considered habitat critical to the survival of this TEC, with surrounding vegetation and landscape influencing a patch's importance. The approved conservation advice also notes that patches that meet the minimum condition thresholds are also considered important for biodiversity and function of the community and can still represent habitat critical to the community.

Based on the assessment against the TEC condition thresholds the River-flat Eucalypt Forest on Coastal Floodplains was identified as a large or contiguous patch in good condition with arboreal mammals and therefore considered habitat critical to the survival of the community. The loss of vegetation is likely to affect habitat critical to the survival of the River-flat Eucalypt Forest on Coastal Floodplains ecological community.

- *modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns*

The project would result in the removal of up to 1.36 hectares of River-flat Eucalypt Forest on Coastal Floodplains. Construction of the access roads and towers may require some excavation works; however, these are not expected to alter groundwater levels or substantially change surface water drainage patterns to the extent that would impact the community's survival. Furthermore, mitigation measures will be implemented during the construction phase and ongoing maintenance to minimise disturbance and reduce surface water impacts (e.g. controls for sedimentation and hydrological impacts).

- *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, for example through regular burning or flora or fauna harvesting.*

The project does not include regular burning or flora and fauna harvesting or other activities that would substantially change the species composition of the community. Mitigation measures such as weed and pathogen control, controls for sedimentation and hydrological impacts will be put in place to limit indirect impacts of the proposed development surrounding vegetation. The project is considered unlikely to substantially alter the species composition of the retained vegetation, or to substantially impact fauna occurring within this habitat. Therefore, the project is considered unlikely to substantially change the species composition of an occurrence of this community.

- *will the action 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 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.*

River-flat Eucalypt Forest on Coastal Floodplains within the subject land is currently subject to weed and pest invasion. Additionally, most of the project occurs within previously disturbed land. Therefore, it is considered unlikely that the project would substantially reduce the quality or integrity of the community or significantly increase the spread of invasive species. In addition, mitigation measures (weed and sedimentation controls) will be implemented during construction and ongoing maintenance to minimise the likelihood of spread of weeds or pathogens into the subject land, and minimise sedimentation and hydrological impacts.

- *interfere with the recovery of an ecological community*

To date, no recovery plan has been developed by the DCCEEW for River-flat Eucalypt Forest on Coastal Floodplains. However, approved Conservation Advice for the TEC outlines the priority conservation actions required for this community. These include:

- protect the ecological community to prevent further losses including conserve remaining patches, manage actions to minimise detrimental impacts, apply buffer zones, and prevent the introduction and spread of exotic species
- restore and manage the ecological community by active abatement of threats, appropriate management, restoration and other conservation initiatives including manage weeds, pests and pathogens, manage trampling, browsing and grazing, manage fire, undertake restoration
- communicate, engage and support people to increase understanding of the value and function of the ecological community and encourage their efforts in its protection and recovery including raise awareness, gather and provide information, and coordinate efforts
- research and monitoring to improve our understanding of the ecological community and the best methods to aid its management and recovery including mapping, options for management, and monitoring.

The project would involve clearing of this TEC and therefore it is likely the project would interfere with the recovery of this TEC.

Conclusion

Within the subject land, this community occurs in the Hunter, Wyong and Yengo IBRA subregions, with 10,600 hectares of the TEC remaining in NSW. The project will clear 1.36 hectares of habitat (equivalent to 0.01% of the extent of the community in NSW and 0.007% nationally) and is likely to marginally fragment the patches within the locality. Whilst the impacts are considered small, the project will adversely impact habitat critical to the survival of the community. Therefore, the project is likely to have a significant residual impact on the River-flat Eucalypt Forest on Coastal Floodplains ecological community.

B2.1.3 Warkworth Sands Woodland of the Hunter Valley

Warkworth Sands Woodland of the Hunter Valley is listed as a critically endangered ecological community under the EPBC Act.

Warkworth Sands Woodland occurs in the Hunter River catchment, in the Central Hunter region of the Hunter Valley. It occurs in the Hunter Valley IBRA1 subregion (SYB02), in the north of the Sydney Basin Bioregion (SYB). In 2016 the ecological community was known to occur in the Hunter Local Land Services region; confined to small areas west of Singleton, in the Singleton Local Government Area, on areas of sandy soil classified as part the Warkworth Land System (Threatened Species Scientific Committee 2016).

The ecological community is a mid to low woodland (occasionally forest), typically dominated by *Angophora floribunda* (Rough-barked Apple) and *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia). The occurrence and composition of Warkworth Sands Woodland (the number of species and the above ground relative abundance) at a particular site is influenced by many factors, including: the size of the site, recent rainfall, or drought conditions and by its disturbance history (including clearing, grazing and fire). At any one-time, above ground individuals of some species may be absent, but the species may be represented below ground in the soil seed bank or as dormant structures such as bulbs, corms, rhizomes, rootstocks, or lignotubers (Threatened Species Scientific Committee 2016).

Relevant commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant commonwealth guidelines and policy statements available for this community is as follows:

- Listing advice: Commonwealth Listing Advice on Warkworth Sands Woodland of the Hunter Valley (Threatened Species Scientific Committee 2010). In effect under the EPBC Act from 05 May 2016.
- Approved conservation advice: Approved Conservation Advice for the Warkworth Sands Woodland of the Hunter Valley (Department of the Environment Water Heritage and the Arts 2010). In effect under the EPBC Act from 05 May 2016.

Specific impacts

Plant community type 3636 (Warkworth Sands Woodland in the Sydney Basin Bioregion) is considered to align (in part) with the EPBC Act Warkworth Sands Woodland listing within the subject land.

Based on these assessments, the project is estimated to impact upon 12.37 hectares of the Warkworth Sands Woodlands.

Significant impact criteria

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*

The community occurs as very small, scattered remnants within the locality. The project will result in a reduction of the extent of the Warkworth Sands Woodlands. Approximately 12.37 hectares of this community would be impacted by the project. These potential impacts are likely to reduce the extent of the community within the region.

- *fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines*

The project will require the removal and/or disturbance of 12.37 hectares of Warkworth Sands Woodlands within areas of existing disturbance. Warkworth Sands Woodlands generally occurs within a fragmented landscape and part of a mosaic of other woodlands (surrounded by a highly modified landscape), but the bisection of patches for linear clearing will marginally increase fragmentation of Warkworth Sands Woodlands within the locality.

- *adversely affect habitat critical to the survival of an ecological community*

The approved conservation advice (including listing advice) for the Warkworth Sands Woodland of the Hunter Valley ecological community (Threatened Species Scientific Committee 2016) outlines that: 'All remaining patches that meet the description are critical to the survival of the ecological community. In addition, buffer zones are considered critical to the survival of the ecological community.'

Based on the conservation advice for the community, PCT 3636 meets the description of habitat critical to the survival of the ecological community. The project would result in the loss of 12.37 hectares of habitat critical to the survival of the community.

- *modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns*

The project would require the removal of up to 12.37 hectares of Warkworth Sands Woodlands. Construction of the access roads and towers may require some excavation works; however, these are not expected to alter groundwater levels or substantially change surface water drainage patterns to the extent that would impact the community's survival. Furthermore, mitigation measures will be implemented during the construction phase and ongoing maintenance to minimise disturbance and reduce surface water impacts (e.g. controls for sedimentation and hydrological impacts).

- *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, for example through regular burning or flora or fauna harvesting.*

The project will require the removal and/or disturbance of 12.37 hectares of Warkworth Sands Woodlands within areas of existing disturbance. The project will require ongoing maintenance within the string corridor; however, this is expected to be minor in scale and nature and unlikely to result in a change in the species composition of the ecological community. Therefore, the project is considered unlikely to substantially change the species composition of an occurrence of this community.

- *will the action 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 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.*

Warkworth Sands Woodlands within the subject land is currently subject to weed and pest invasion. Most of the project occurs within previously disturbed land. Therefore, it is considered unlikely that the project would substantially reduce the quality or integrity of the Warkworth Sands Woodland's occurrence or significantly increase the spread of invasive species. In addition, mitigation measures would be implemented during construction to minimise the likelihood of spread of weeds or pathogens into the subject land and minimise sedimentation and hydrological impacts.

- *interfere with the recovery of an ecological community*

To date, no recovery plan has been developed by the DCCEEW for Warkworth Sands Woodlands. The approved conservation advice for the Warkworth Sands Woodlands recognises the main ongoing threats to this TEC to include: incremental clearance of vegetation; agriculture; mining; weed invasion; altered fire regimes and climate change (Threatened Species Scientific Committee, 2016). The approved conservation advice also sets out several research priorities, and priority recovery and threat abatement actions aimed at protecting remaining areas of the community. The project would contribute to key threats as it involves clearing of the 12.37 hectares of the TEC and therefore the project has the potential to interfere with the recovery of this TEC.

Conclusion

The community occurs as small, scattered remnants within the locality. Although mitigation measures will be implemented, the project will result in the loss of 12.37 hectares of the Warkworth Sands Woodlands which is likely to fragment the community and reduce its extent within the locality. Therefore, it is likely that the project will have a significant residual impact on Warkworth Sands Woodland of the Hunter Valley.

B3. Threatened flora subject to assessment

Nineteen threatened flora species were identified as having a high to moderate likelihood of occurrence within the subject land. Significance assessments for these species have been completed in accordance with the *Matters of National Environmental Significance - Significant Impact Guidelines 1.1* (Department of the Environment Water Heritage and the Arts 2013).

B3.1 Critically endangered flora

B3.1.1 Brachyscome brownii

Brachyscome brownii is listed as critically endangered under the EPBC Act, with no current listing under the NSW BC Act. *Brachyscome brownii* is a daisy which grows up to 30 centimetres tall. Its leaves are mostly hairless to the naked eye, with distinct serrated edges or 'teeth'. The species has a single purple flowerhead which grows from the tip of the stem. This species has been recorded in association with sandy soils in dry sclerophyll forests, within 100 metres of watercourses.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant Commonwealth guidelines and policy statement available for this species is the approved conservation advice: Conservation Advice for *Brachyscome brownii* (DCCEEW, 2024).

Significant impact criteria

An action is likely to have a significant impact on a critically 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*

Brachyscome brownii was known from four possibly extant populations between Windsor and Cessnock, which were 14–34 kilometres of each other. It is unknown how many individual plants occurred in any of the four extant populations before the 2019–2020 bushfires. The approved conservation advice for the species notes surveys in 2021 revisited 3 of the 4 populations, excluding the Pokolbin population since it hadn't been affected by the 2019–2020 bushfires. Individuals were only identified at 1 of the 3 surveyed populations, with 94 mature plants identified at the Mellong Creek population.

Within the subject land, a population of *Brachyscome brownii* was identified within Pokolbin State forest (SF) (Yengo and Hunter IBRA subregions). This area was subjected to a low intensity 'cool burn' by NSW Forestry in the Spring of 2023, with the species detected during targeted survey in February 2025. This species was often detected in areas of PCT 3241, with a few individuals detected in PCT 3239. Individuals were frequently recorded along roadsides, with some detected over 50 metres from these trails.

In total the project is estimated to impact on 25.42 hectares of confirmed habitat for this species in the form of PCTs 3239 and 3241 in recorded areas. Within NSW, the remaining extent of PCT 3239 is 46,086 hectares and the remaining extent of PCT 3241 is 55,109 hectares. The removal of 25.42 hectares therefore represents less than 0.03% of the remaining extent of these PCTs. Habitat for this species is also well represented within the locality with approximately 7806.58 hectares of the associated PCTs occurring within a 10 kilometre buffer of the subject land. Given

the number of records from targeted surveys for the project, the extent of habitat in NSW and within the immediate vicinity of the subject land (i.e. 10 kilometre buffer), and the small area of habitat to be impacted, it is unlikely that the project will lead to a decrease in the size of a population of this species.

- *reduce the area of occupancy of the species*

The extent of occurrence is estimated at 14 square kilometres, with the area of occupancy of the known distribution estimated to be 12 square kilometres. Given the geographic distribution of the species is highly restricted, it is likely the project would reduce the area of occupancy for the species.

- *fragment an existing population into two or more populations*

The project is estimated to impact on 25.42 hectares of confirmed habitat for this species in the form of recorded PCTs 3239 and 3241. The project will involve micro-siting towers with transmission lines spanning large tracts of habitat. Given the low number of records, the restricted distribution of the species, the area of habitat to be impacted, and the nature of the project it is unlikely that this project impact would result in fragmentation of a population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Brachyscome brownii* or included in the Register of Critical Habitat. '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 (Department of the Environment 2013).

Until further information is available, all habitat for this species in all known extant and historical populations should be considered as habitat critical to the survival of *B. brownii*. In addition, areas identified as suitable for translocations should also be considered as habitat critical to the survival. Areas of suitable habitat where the species is likely to occur, or may occur, should be considered assumed habitat for the species. Given the close proximity of the project to one of the few known extant populations of the species, it is possible that the habitat to be impacted may be important for facilitating dispersal and contributing to species recovery. Therefore, the project may impact habitat critical to the survival of the species.

Within NSW, the remaining extent of PCT 3239 is 46,086 hectares and the remaining extent of PCT 3241 is 55,109 hectares. The removal of 25.42 hectares of confirmed habitat therefore represents less than 0.03% of the remaining extent of these PCTs and 0.3% of the habitat within the locality (10 kilometre buffer of the subject land). The loss of 25.42 hectares of confirmed habitat is unlikely to significantly impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The species has been recorded within the subject land. The project is estimated to impact on 25.42 hectares of confirmed habitat for this species in the form of associated PCTs 3239 and 3241. Given the area of assumed habitat to be removed, and the number of records during targeted surveys to date, it is unlikely that the project would directly impact on the seed dispersal or disrupt the ecological processes and functions important for the life 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*

The project would result in the loss of 25.42 hectares of confirmed habitat for the species. Given the area of assumed habitat to be impacted, and the number of records, it is unlikely the project will modify, destroy, remove, or isolate or decrease the availability or quality of 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*

Adhering to mitigation measures which will be put in place for the project, such as pest management, weed and pathogen controls, is expected to prevent potentially harmful invasive weeds and vertebrate pests such as rabbits, cats and foxes establishing in *Brachyscome brownii* habitat. It is therefore unlikely that the project would result in the establishment or spread of invasive species, provided mitigation measures for the project are adhered to.

- *introduce disease that may cause the species to decline*

There is no known disease that infects *Brachyscome brownii*, however other *Brachyscome* species, such as *B. uliginosa,* are susceptible to *Phytophthora cinnamomi* and declines have been observed in infested populations. Mitigation measures will be implemented including vegetation clearing protocols, installation of vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species identifies major threats including fire regimes that cause declines in biodiversity, climate change and potential disease. Other potential threats include habitat disturbance and modification where the species occurs in State Forests and on private property. As the project involves removal of individuals and habitat for the species, the project is likely to interfere with the recovery of the species.

Conclusion

The species has been recorded within areas of PCT 3239 and 3241, with its occurrence linked with areas subject to recent low intensity fires. Based on the assessment above it is likely the project would have a significant residual impact on *Brachyscome brownii* due to the loss of 25.42 hectares of confirmed habitat for the species.

B3.1.2 Rhodamnia rubescens (Scrub Turpentine)

Rhodamnia rubescens is listed as critically endangered under the EPBC Act. *Rhodamnia rubescens*, also known as Scrub Turpentine or Brown Malletwood, is a shrub or small tree up to 25 metres high. The species is known to occur from coastal districts of NSW north from Batemans Bay to Bundaberg in Queensland. The distribution of *R. rubescens* occasionally extends inland onto the escarpment up to 600 metres above sea level in areas with rainfall of 1000–1600 millimetres. The approved conservation advice for this species (Threatened Species Scientific Committee, 2020) notes that the assessment for the species was undertaken prior to the 2019–2020 bushfires, and the impact of the bushfires on the species and its habitat are not fully known. Approximately 18.19 hectares of habitat for the species was burnt within the subject land, with 264.25 hectares unburnt.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory documents used for this assessment is the approved conservation advice: The approved Conservation Advice for *Rhodamnia rubescens* Scrub Turpentine (Threatened Species Scientific Committee, 2020). Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/15763-conservation-advice-11122020.pdf. In effect under the EPBC Act from 11 December 2020.

Significant impact criteria

An action is likely to have a significant impact on a critically 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*

Within the subject land, *Rhodamnia rubescens* was recorded extensively between Olney State Forest and Corrabare North Flora Reserve, with individuals also recorded in parts of Pokolbin. Over 2511 individuals were recorded during targeted threatened flora surveys of which 1164 confirmed individuals have been identified within the subject land. In addition, based on assumed habitat, a further 1230 individuals may be impacted (total of 2394 individuals). The loss of 2394 individuals for this species is likely to lead to a decrease in the size of an important population.

- *reduce the area of occupancy of the species*

The species is known to occur from coastal districts from Batemans Bay, NSW to Bundaberg, Queensland. The approved conservation advice for the species notes that the extent of occurrence was estimated to be 147,340 square kilometres, with an area of occupancy estimated at 3360 square kilometres. It is estimated that 18.19 hectares of habitat was lost during the 2019–2020 bushfires within the subject land, representing 0.005% of the area of occupancy for the species.

The total impact on the species is expected to be loss of 1164 confirmed individuals and equivalent habitat, therefore the project is likely to reduce the area of occupancy for *Rhodamnia rubescens*.

- *fragment an existing population into two or more populations*

Given the pollination and seed dispersal mechanisms of this species and stringing work designed to mitigate fragmentation of habitat, it is unlikely that the project would fragment an important population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Rhodamnia rubescens* or included in the Register of Critical Habitat. ‘Habitat critical to the survival of a species or ecological community’ refers to areas that are necessary:

- for activities such as breeding
- or dispersal for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development,
- for the reintroduction of populations or recovery of the species or ecological community.

Given the location of the recorded populations, and the projected reduction of the population, it is possible that this habitat may be important for facilitating population dispersal and contributing to genetic diversity and species recovery. Therefore, the project is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The project is likely to result in direct impact to individuals occurring within the impact footprint which may have some impact on genetic diversity of local populations. Therefore, as a precautionary approach, any disturbance is likely to result in direct disruptions to the ecological processes and functions important for the life cycle of the species, including 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*

The project will result in the predicted loss of up to 2394 individuals (of which 1164 are confirmed individuals) and equivalent habitat for this species. Although mitigation measures will be implemented to minimise the impacts, including micro-siting towers to avoid known occurrences, it is likely the project will modify, destroy, remove, or decrease the availability or quality of habitat to the extent that the species is likely to decline. It is noted that approximately 75.94 hectares were impacted to varying degrees of severity by the 2019–2020 bushfires, however 264.25 hectares remain intact.

- *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*

Adhering to mitigation measures which will be put in place for the project, such as pest management, weed and pathogen controls, is expected to prevent potentially harmful invasive weeds in *Rhodamnia rubescens* habitat. As such, the project is not expected to result in the introduction of invasive species that are harmful to the species ability to establish.

- *introduce disease that may cause the species to decline*

Rhodamnia rubescens is a known host of *Austropuccinia psidii* (Zauza *et al.* 2010) and is characterised as 'Highly to Extremely Susceptible' to infection (Pegg *et al*. 2014). *Austropuccinia psidii* is already established within the landscape, but while the majority of the plants recorded within the subject land were affected to some extent, several individuals were identified as beginning to, were, or had gone to flower. Mitigation measures such as weed and pathogen control will be implemented by the project to minimise the likelihood of spread of disease that could have a cumulative effect that could potentially result in species decline. Therefore, it is unlikely the project would result in the introduction of a disease that could cause the species to decline.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority recovery and threat abatement actions that can be done to support the recovery of *Rhodamnia rubescens*. As the project involves the removal of 2394 individuals, including 1164 confirmed individuals, and equivalent habitat for this species, the project is likely to interfere with the recovery of the species.

Conclusion

Due to the known decline in size and distribution of existing populations of this species (Threatened Species Scientific Committee, 2020), as well the size and extent of the recorded populations within the subject land, the project is likely to have a significant residual impact on *Rhodamnia rubescens*.

B3.1.3 Rhodomyrtus psidioides (Native Guava)

Rhodomyrtus psidioides is listed as critically endangered under the EPBC Act. The species occurs from Broken Bay, approximately 90 kilometres north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to 120 kilometres inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. It's a pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised as being extremely susceptible to infection by *Austropuccinia psidii*, which can affect all parts of the plant (Threatened Species Scientific Committee, 2020b).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory document used in this assessment is the approved conservation advice for *Rhodomyrtus psidioides* Native Guava (Threatened Species Scientific Committee, 2020b).

Rhodomyrtus psidioides is known and recorded throughout the subject area within Watagan State Forest and Corrabare State Forest. However, the project's current design takes known distribution into account to mitigate clearing of known individuals. Assumed habitat for *Rhodomyrtus psidioides* within the project is located across 12 PCTs.

Associated PCTs for *Rhodomyrtus psidioides* within the subject land have not been assessed via field surveys, however, using a precautionary approach, all areas of the associated PCTs are considered assumed habitat for *Rhodomyrtus psidioides*. Therefore, the project would require the removal and/or disturbance of 1.69 hectares of confirmed habitat and 18.3 hectares of assumed habitat (total of 19.99 hectares) for *Rhodomyrtus psidioides* within subject land.

Significant impact criteria

An action is likely to have a significant impact on a critically 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*

Eight individuals of *Rhodomyrtus psidioides* were recorded within the subject land in the Watagan State Forest. The project will result in the loss 19.99 hectares of habitat for this species. Habitat for the species was impacted by the 2019–2020 bushfires with 75.94 hectares of the species habitat within the subject land burnt. Given the project is at the western limit of the species range, habitat for *Rhodomyrtus psidioides* within the subject land is likely to be necessary for dispersal and maintaining genetic diversity across the region, and it is therefore assumed to form part of an important population. Therefore, it is likely that the project will lead to a decrease in the size of an important population.

- *reduce the area of occupancy of the species*

Rhodomyrtus psidioides is known to occur from coastal districts from Gosford, NSW to Maryborough, Queensland. The approved conservation advice for the species notes that the extent of occurrence was estimated to be 134,428 square kilometres, with an area of occupancy estimated at 884 square kilometres. Given the project is at the western limit of the species range it is likely the loss of 19.99 hectares of assumed habitat will reduce the area of occupancy for *Rhodomyrtus psidioides*.

- *fragment an existing population into two or more populations*

Given the nature of the project (stringing across tracts of habitat), it is unlikely the project would result in fragmentation of an important population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Rhodomyrtus psidioides* or included in the Register of Critical Habitat. '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.

Given the project is at the western limit of the species known distribution, the location of the recorded populations, and the projected reduction of the population, it is possible that this habitat may be important for facilitating population dispersal and contributing to genetic diversity and species recovery. Therefore, the project is likely to impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The project is likely to result in a direct impact on individuals occurring within the subject land which may have some impact on genetic diversity of local populations. Therefore, as a precautionary approach, it is considered that any disturbance is likely to result in direct disruptions to the ecological processes and functions important for the life 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*

The project will result in the loss of 19.99 hectares of habitat for the species. Given the disjunct nature of known patches and records of the species it is likely that the loss of 19.99 hectares of habitat will modify, destroy, remove, or decrease the availability or quality of 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*

Adhering to mitigation measures which will be put in place for the project, such as weed control, will prevent potentially harmful invasive weeds establishing in *Rhodomyrtus psidioides* habitat. As such, the project is unlikely to result in the establishment of invasive species that are harmful to the species habitat.

- *introduce disease that may cause the species to decline*

Rhodomyrtus psidioides is a known host of *Austropuccinia psidii* (Zauza *et al.* 2010) and is characterised as 'Extremely Susceptible' to *Austropuccinia psidii* infection (Pegg et al. 2014). *Austropuccinia psidii* is already established within the landscape. Mitigation measures such as weed, and pathogen control will be implemented by the project to minimise the likelihood of spread of disease that could have a cumulative effect that could potentially result in species decline. Therefore, it is unlikely the project would result in the introduction of a disease that could cause the species to decline.

- *interfere substantially with the recovery of the species*

No Recovery Plan has been prepared for this species at this stage. The approved conservation advice provides sufficient direction to implement priority actions and mitigate against key threats. As the project involves removal of individuals and habitat for the species, the project is likely to interfere with the recovery of the species.

Conclusion

Based on the assessment above it is likely the project would have a significant residual impact on *Rhodomyrtus psidioides* due to the loss of 19.99 hectares of habitat for the species.

B3.2 Endangered flora

B3.2.1 *Cynanchum elegans* (White-flowered Wax Plant)

Cynanchum elegans is listed as endangered under the EPBC Act. The species occurs primarily at the transition zone (ecotone) between dry subtropical rainforest and sclerophyll forest/woodland communities in eastern NSW, from Brunswick Heads on the north coast to the Illawarra region. It inhabits rainforest gullies, scrub and scree slopes. Seeds are wind dispersed. Seed production is variable and unreliable, and it is unlikely that a soil seed bank exists for this species. The fire response of this species is unknown.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved Conservation Advice: The approved Conservation Advice for *Cynanchum elegans* White-flowered Wax Plant (Department of the Environment, Water, Heritage and the Arts, 2008) was reviewed as part of this assessment.
- Adopted/Made threat abatement plans:
  - Threat abatement plan for competition and land degradation by rabbits (Department of the Environment and Energy, 2016).
  - Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Department of the Environment and Energy, 2017).
  - Threat abatement plan for competition and land degradation by unmanaged goats (Department of the Environment, Water, Heritage and the Arts, 2008).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery (Department of the Environment 2013). Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

No important populations are currently listed for *Cynanchum elegans.* The project occurs near the limit of the species range. Given this, and taking a precautionary approach, any potentially occurring population within the subject land could be considered an important population.

Significant impact criteria

An action is likely to have a significant impact on an 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 no available information regarding the species' population. Given the nature of the project (i.e. towers will be micro-sited and transmission lines will span across large tracts of habitat) it is unlikely the loss of 9.75 hectares of assumed habitat for the species would lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of the species*

The extent of occurrence is estimated to be 81,000 square kilometres with an estimated area of occupancy of 500 square kilometres. Approximately 4.49 hectares of potential habitat for the species was burnt in the 2019–2020 bushfires. While the species' response to fire is largely unknown, *Cynanchum elegans* has been seen to regrown after low intensity fire (NSW Scientific Committee, 2009). The 2019–2020 bushfires ranged in intensity from high to low, with the majority of the habitat subjected to a moderate to low intensity burn. The project would result in the loss of 9.75 hectares of assumed habitat, which when combined with the impact of the 2019–2020 bushfires would represent a loss of 0.02% of the species' area of occupancy.

The project has the potential to slightly reduce the area of occupancy and current extent of the species. However, the impacts will not result in the species being lost from any 2 x 2 kilometre grid cells currently forming part of the area of occupancy. Any changes in the area of occupancy are considered likely to be negligible.

- *fragment an existing population into two or more populations*

Given the pollination and seed dispersal mechanisms (via wind) of this species, stringing work to mitigate fragmentation of habitat under the project and micro-siting of the towers it is unlikely the project would result in fragmentation of a population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Cynanchum elegans* or included in the Register of Critical Habitat. '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 (Department of the Environment Heritage Water and the Arts 2009).

The species was not recorded despite targeted seasonal surveys. Habitat for the species is well represented within the locality with 6800.79 hectares within the immediate vicinity of the subject land (10 kilometre buffer zone of the subject land). Therefore, it is unlikely the loss of 9.75 hectares of habitat would adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The approved conservation advice for the species states that the species' seeds are wind dispersed. Given the nature of the project, it is unlikely it would create a barrier to seed dispersal. The project is unlikely to result in direct disruptions to the ecological processes and functions important for the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The project is likely to impact 9.75 hectares of habitat for the species across the project. Given the nature of the project, (micro-siting to avoid and minimise impacts on threatened species, and transmission lines spanning large tracts of habitat) it is unlikely to modify, destroy, isolate or decrease the availability or quality of 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*

Adhering to mitigation measures that will be put in place for the project such as pest management, weed and pathogen controls, would prevent potentially harmful invasive weeds establishing in *Cynanchum elegans* habitat. As such, the project is not likely to result in invasive species becoming established in the threatened species' habitat.

- *introduce disease that may cause the species to decline*

Pre-dispersal seed predation by unidentified moth larvae (Lepidoptera) has been observed at a number of sites and may affect the fecundity of some sub-populations (NPWS, 2002). Defoliation of plants by *Dichromia quinqualis* moth-larvae has also been observed at a number of sites (NPWS, 2002). Mitigation measures such as weed and pathogen control will be implemented by the project to minimise the likelihood of spread of disease or pathogens that could have a cumulative effect that could potentially be harmful to this species.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority recovery and threat abatement actions that can be implemented to support the recovery of *Cynanchum elegans*. The loss of 9.75 hectares is unlikely to substantially interfere with the recovery of the species.

Conclusion

Based on the assessment above it is considered unlikely the project would result in a significant residual impact on *Cynanchum elegans*.

B3.2.2 Tarengo Leek Orchid *(Prasophyllum petilum and Prasophyllum sp. Wybong (C.Phelps ORG 5269))*

Prasophyllum petilum is listed as endangered under the EPBC Act. *Prasophyllum* sp. Wybong is listed as Critically Endangered under the EPBC Act.

There is considerable taxonomic uncertainty surrounding these two species. Some authorities consider *Prasophyllum petilum* to be restricted to the southern tablelands and western slopes of New South Wales and the Australian Capital Territory. The NSW Herbarium treats *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) as a synonym of *Prasophyllum petilum* (i.e. the same species).

Between 14 May 2015 and 7 July 2017, the SPRAT profile for *Prasophyllum* sp. Wybong (C.Phelps ORG 5269) treated the species as a synonym of *Prasophyllum petilum*. Although that treatment has been accepted by the NSW Herbarium, it has not been accepted by the national authority, the Australian Plant Census. The taxonomic recognition of *Prasophyllum petilum* and *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) as the same species will be released in the next Orchidaceae taxonomic update via the Australian Plant Census, which provides a list of currently accepted names. As it stands, the two species are treated as one for NSW regulatory purposes, with the distinction maintained under Commonwealth legislation. Any plants impacted by the project will be classed as one species, but this assessment applies to both *Prasophyllum petilum* and *Prasophyllum* sp. Wybong as listed under the EPBC Act.

Prasophyllum petilum occurs in grasslands and grassy woodlands on fertile soils at flat or gently sloping sites of the western slopes and southern tablelands of NSW among native and (to a lesser extent) exotic grasses. This preferred habitat, indicating its extent of occurrence, has been reduced by large scale degradation and fragmentation in these regions (Department of Environment, Climate Change and Water 2010).

Currently, natural populations are limited to 1 population on the northern border of the ACT and to 4 known locations in NSW: Tarengo Travelling Stock Route in Boorowa, Captains Flat Cemetery in Queanbeyan, Ilford Cemetery and Steves Travelling Stock Route in Delegate. However, both the Delegate and Captains Flat populations are potentially misidentified as *Prasophyllum petilum* (Department of Agriculture Water and the Environment, 2021).

Prasophyllum sp. Wybong (C. Phelps ORG 5269) is a terrestrial orchid that grows to approximately 30 centimetres high. It has a single, tubular, fleshy, dull-green leaf and a single flower spike with numerous fragrant flowers (Department of the Environment, Water, Heritage and the Arts, 2009). *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) is known from seven populations in open eucalypt woodland and grassland in New South Wales. This species occurs within the Sydney Basin, New England Tablelands, Brigalow Belt South and NSW South Western Slopes IBRA Bioregions and the Border Rivers–Gwydir, Namoi, Hunter–Central Rivers and Central West Natural Resource Management Regions. This species is endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements used to assess the species is as follows:

- Approved conservation advice: Conservation Advice for *Prasophyllum petilum* (Tarengo Leek Orchid) (Department of Agriculture Water and the Environment 2021), Approved Conservation Advice for *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) (a leek-orchid) (Department of the Environment, Water, Heritage and the Arts, 2009).
- Listing advice: There is no relevant Listing advice for *Prasophyllum petilum*, Commonwealth Listing Advice on *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) (a leek-orchid). (Threatened Species Scientific Committee (TSSC), 2009).
- Adopted/Made Threat Abatement Plans: Threat Abatement Plan for competition and land degradation by rabbits (2016) (Department of Environment and Energy 2016).

Significant impact criteria

An action is likely to have a significant impact on a critically 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*

Given the taxonomic uncertainty surrounding *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) the true population size is unknown. The estimated population size based on surveys in 2006 was 460 mature individuals (Department of the Environment, Water, Heritage and the Arts, 2009). These numbers likely to apply to the Mangoola site at Wybong.

The known population sizes for *Prasophyllum petilum* are shown in Table B.1.

The impacts assessed from the project are in relation to assumed habitat and none of the known populations will be impacted by the project, therefore it is considered unlikely that the project will lead to a long-term decrease in the size of a population.

Table B.1 Known population sizes for *Prasophyllum petilum* (Source: Department of the Environment, Climate Change & Water, 2010)

Site	Numbers	Year
Hall Cemetery	26	2009
Captains Flat Cemetery	Only leaves (i.e. numbers not known accurately)	2009
Ilford Cemetery	6	2009
Tarengo TSR	Approx. 45,000	2009
Steves TSR	19	2009

— *reduce the area of occupancy of the species*

Prasophyllum sp. Wybong (C. Phelps ORG 5269) is eligible for listing as critically endangered under the EPBC Act as it has a very restricted geographic distribution with an estimated area of occupancy of 1.5 square kilometres (Department of the Environment, Water, Heritage and the Arts, 2009). For *Prasophyllum petilum*, the area of occupancy is about 4.5 hectares. At Ilford, Captains Flat, and Hall Cemetery the plants occur in a very limited area.

Approximately 11.88 hectares of *Prasophyllum* sp. Wybong habitat was burnt by 2019–2020 bushfires with an estimated 296.48 hectares unburnt with the subject land. The approved conservation advice for the *Prasophyllum* sp. Wybong notes that it is not dependent on fire nor is it a factor in the species populations size.

The project has the potential to slightly reduce the area of occupancy and current extent of the species. However, noting the species is only known from a restricted area outside of the subject land, it is unlikely the project would result in the species being lost from any 2 x 2 kilometre grid cell currently forming part of the area of occupancy. Any changes in area of occupancy are considered likely to be negligible.

— *fragment an existing population into two or more populations*

The project would not present a significant barrier to this species. It is considered unlikely that the project would fragment an existing population into two or more populations given that a known population is not being impacted and the current fragmented state of assumed habitat.

— *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Prasophyllum petilum* or *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) or included in the Register of Critical Habitat.

For *Prasophyllum petilum*, due to the species' eligibility for listing (highly restricted range, severe fragmentation, and small population size), all habitat is considered critical to the survival of the species. This habitat includes the area of occupancy of known populations, all areas of the species' historical occurrence and all areas of assumed habitat (habitat areas with attributes necessary for the species' persistence) throughout its geographic and ecological range (Department of Agriculture Water and the Environment, 2021). Given this broad definition it is likely the project would adversely impact habitat critical to the survival of the species.

— *disrupt the breeding cycle of a population*

The generalist Thynnine Wasp has been identified as an important pollinator for the *Prasophyllum petilum*. It is likely that *Prasophyllum* sp. Wybong (C. Phelps ORG 5269) would also be pollinated by the Thynnine Wasp. Given the nature of the project and clearing protocols (i.e. micro-siting towers to minimise impact to threatened species) it is unlikely to introduce any significant barriers to dispersal of seeds or pollinators given that the power lines will span habitats.

— *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Any plants impacted by the project will be classed as one species but both species are recognised by the Australian Plant Census and separate EPBC Act listings. The predicted habitat impact to both species is 30.99 hectares.

It is important to recognise that this estimated impact is to assumed habitat based on broad PCT associations inflating the impact significantly. The impacts of tower locations and access tracks will be minimal. The habitats will mostly be spanned by wires and the micro-siting process undertaken before construction begins would further minimise impacts to the greatest extent possible. While these species are known west of the subject land they were not recorded within the subject land. Given the proposed mitigation measures and lack of records the project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat.

- *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 project is unlikely to result in an invasive species harmful to these species becoming established in the habitat. Due to previous land use (i.e. agriculture), invasive species are well established in the landscape. The project will implement mitigation measures including weed control to minimise the impacts. Consequently, there is no real chance or possibility that the project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- *introduce disease that may cause the species to decline*

There are no known diseases that are specific to these species. Biosecurity measures will be implemented to reduce the likelihood of introducing diseases or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for *Prasophyllum petilum* or *Prasophyllum* sp. Wybong (C. Phelps ORG 5269).

Conclusion

The project is likely to adversely impact habitat critical to the survival of species. Therefore, it is likely the project would have a significant residual impact on *Prasophyllum petilum* and *Prasophyllum* sp. Wybong (C. Phelps ORG 5269).

B3.2.3 *Pterostylis gibbosa* (Illawarra Greenhood)

Pterostylis gibbosa is listed as Endangered under both the NSW BC Act and the EPBC Act. The species is known from a small number of populations in the Hunter region, the Illawarra region and the Shoalhaven region. It is apparently extinct in western Sydney which is the area where it was first collected (1803). All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage (Threatened Species Scientific Committee, 2016b).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Threatened Species Scientific Committee (2016). Conservation Advice *Pterostylis gibbosa* Illawarra greenhood. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/4562-conservation-advice-16122016.pdf. In effect under the EPBC Act from 16 Dec 2016.
- Adopted or made recovery plan: National Parks and Wildlife Service (2002). *Pterostylis gibbosa* (R.Br.) Illawarra Greenhood Orchid Recovery Plan. NSW National Parks and Wildlife Service, Hurstville. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/pterostylis-gibbosa-rbr-illawarra-greenhood-orchid-recovery-plan. In effect under the EPBC Act from 19 Feb 2004 as Pterostylis gibbosa.
- Adopted or made Threat Abatement Plan/s: 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. In effect under the EPBC Act from 07 Jan 2017.

Significant impact criteria

An action is likely to have a significant impact on an 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*

Pterostylis gibbosa is known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra) of New South Wales. The approved conservation advice for the species notes that the population in the Hunter Valley was estimated at 400 plants

The species was recorded within the Singleton Military Area in PCT 3431. The project will result in the loss of 1.97 hectares of confirmed habitat and 0.21 hectares of assumed habitat (total of 2.18 hectares of habitat). Given the nature of the project (i.e. towers will be micro-sited to avoid and minimise impacts) and scale of the impacts (2.18 hectares), it is unlikely the project would lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of the species*

The species is only known from the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra) in New South Wales. The project is located at the northern extent of the species distribution. The species was identified by DCCEEW as a fire priority species after the 2019–2020 bushfires. It is estimated that 0.01 hectares of the subject land experienced a low intensity burn during the 2019–2020 bushfires (Department of the Environment and Energy, 2020). When combined with the project's impacts this would represent 2.19 hectares of habitat for the species. It is unlikely the loss of 2.18 hectares would reduce the area of occupancy for the species.

- *fragment an existing population into two or more populations*

The project is estimated to impact on 1.97 hectares of confirmed habitat for this species, with a further 0.21 hectares of assumed habitat. Given the nature of the project (micro-siting transmission line infrastructure and transmission lines spanning over the habitat) it is unlikely project would fragment a population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Leionema lamprophyllum* subsp. *fractum* or included in the Register of Critical Habitat. '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, 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.

Pterostylis gibbosa was recorded within the subject land. Given the species is only known from three location in NSW it is likely habitat within the subject land would represent habitat critical to the survival of the species. However, the loss of 2.81 hectares is unlikely to compromise habitat availability for the species significantly given the extent of available habitat within the immediate vicinity of the subject land (approximately 15,619.92 hectares of habitat for the species occurs within a 10 kilometre buffer of the subject land). Therefore, the loss of 2.18 hectares is unlikely to adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The approved conservation advice for the species notes *Pterostylis gibbosa* is likely to be pollinated by male fungus gnats of the genus *Mycomya* species. The seeds appear to be wind dispersed and can remain dormant for up to two seasons. The seeds require the presence of a specific strain of the mycorrhizal fungus *Ceratobasidium cornigerum* for successful germination, which is associated with leaf litter. While the project will disturb and/or remove habitat for the gnat and mycorrhizal fungus, including leaf litter, these species are considered common and widespread. Therefore, it is unlikely the project would disrupt the breeding cycle of a 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 species has a highly restricted distribution and is known to occur within the subject land. However, the loss of 2.18 hectares is unlikely to compromise the habitat significantly given the extent of available habitat within the immediate vicinity of the subject land (approximately 15,619.92 hectares of habitat for the species occurs within a 10 kilometre buffer of the subject land. Therefore, it is unlikely the project would modify, destroy, remove or isolate or decrease the availability or quality of 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*

Invasive species currently exist within the landscape. It is unlikely that the project would result in the establishment or spread of invasive species, provided mitigation measures such as such as clearing protocols, and,where relevant installation vehicle wash stations, are implemented.

- *introduce disease that may cause the species to decline*

There are no diseases known to infect *Pterostylis gibbosa*. Furthermore, mitigation measures will be implemented such as clearing protocols, installation of vehicle wash stations and sediment and control measures to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

The recovery plan for the species notes that the objective of the plan is to protect known populations of *Pterostylis gibbosa* from decline and to develop a management regime, based on current knowledge, designed to promote the plants' conservation and evolutionary potential in situ. The project is unlikely to interfere with the objective of the recovery plan or any action to meet the objective. Therefore, it is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

Pterostylis gibbosa was recorded within the subject land. Habitat for the species is widespread within the locality (15,619.92 hectares). Mitigation measures including micro-siting towers to avoid impact on threatened species, biosecurity measures and pest control will be implemented to minimise impacts associated with the project. Providing the mitigation measures are implemented, it is unlikely that the removal of 2.18 hectares would result in a significant residual impact on *Pterostylis gibbosa*.

B3.2.4 *Rhizanthella slateri (Eastern Australian Underground Orchid)*

Rhizanthella slateri is listed as endangered under the EPBC Act. The species is described as a 'terrestrial saprophytic' (grows on and derives its nourishment from dead or decaying organic matter) herb and is restricted to NSW. It is currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks Nature Reserve and near Nowra. The population in the Great Lakes area occurs at the known northern limit of the species' range and is disjunct from other known populations of the species.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant available Commonwealth guidelines and policy statements used in the assessment of this species is as follows:

- Approved Conservation advice: Department of the Environment (2014). Approved Conservation Advice for *Rhizanthella slateri* (eastern underground orchid). Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/11768-conservation-advice.pdf. In effect under the EPBC Act from 11 April 2014.
- Listing advice: Threatened Species Scientific Committee (2007). Commonwealth Listing Advice on *Rhizanthella slateri*. Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/352963-listing-advice.pdf. In effect under the EPBC Act from 19 December 2007.

Significant impact criteria

An action is likely to have a significant impact on an 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*

Since the species' discovery, approximately 90 individuals have been recorded, with the largest known population consisting of approximately 60 individuals. *Rhizanthella slateri* is a cryptic a species and there is limited information regarding the population or preferred habitat. The project is likely to impact 9.45 hectares of assumed habitat for the species and as a result of excavation works for the construction of the access roads and towers. Without further information on the species population and habitat requirements it is considered likely the loss of habitat could lead to a long-term decrease in the size of a population if present within the subject area.

- *reduce the area of occupancy of the species*

Based on currently available information, *Rhizanthella slateri* has a relatively large extent of occurrence, from the NSW south coast to the mid north coast. However, the species is likely to have a very restricted area of occupancy, as it is known from fewer than 10 small, isolated populations within its extent of occurrence. Approximately 54.56 hectares of habitat for the species was impacted by the 2019–2020 bushfires within the subject land. Given the extent of the habitat impacted during the 2019–2020 bushfires, the loss of 9.45 hectares associated with the project may reduce the area of occupancy for this species.

- *fragment an existing population into two or more populations*

Construction of the access roads and towers may require some excavation works which may impact on the species. Therefore, without further information on the species, there is a real chance or possibility that the works combined with the clearing could fragment an existing population into two or more.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Rhizanthella slateri* or included in the Register of Critical Habitat. Little is known about the species habitat requirements and/or preferences. A conservative approach has been applied, and any assumed habitat is considered to represent habitat critical to the survival of the species. The project would result in the loss of 9.45 hectares of habitat for the species.

- *disrupt the breeding cycle of a population*

Given the lack of information on the species and the potential for excavation works, the project may disrupt the breeding cycle of a population.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Rhizanthella slateri is a cryptic a species and there is limited information regarding the population or preferred habitat. The project is likely to impact 9.45 hectares of assumed habitat for the species and would involve excavation works for the construction of the access roads and towers. Without further information on the species population and habitat requirements there is a real chance or probability that the project would modify, destroy, remove or isolate or decrease the availability or quality of 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*

Adhering to mitigation measures which will be put in place for the project, such as weed controls, would prevent potentially harmful invasive weeds establishing in *Rhizanthella slateri* habitat.

- *introduce disease that may cause the species to decline*

There are no known diseases identified for this species. Biosecurity measures will be implemented to minimise the likelihood of spread of disease or pathogens that could be potentially harmful to this species.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for *Rhizanthella slateri*. The approved conservation advice for the species identifies recovery actions for the conservation of the species including identifying populations of high conservation priority and ensuring there is no disturbance in areas where the Eastern Underground Orchid occurs. There are no populations of high conservation priority. The species has not been recorded in the subject land, and there are no known records of the species. There is a chance that excavation works may disturb individuals, however if detected, mitigation measures will be implemented to minimise impacts on any populations, therefore it is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

Based on the assessment completed above, and without further information on the species population and habitat requirements, it is likely the project would have a significant residual impact on *Rhizanthella slateri*, due to the loss of habitat and potential fragmentation.

B3.3 Vulnerable flora

B3.3.1 *Angophora inopina* (Charmhaven Apple)

Angophora inopina is listed as vulnerable under the EPBC Act. *Angophora inopina* is found in open dry sclerophyll woodland of *Eucalyptus haemastoma* and *Corymbia gummifera* with a dense shrub understorey. The woodland occurs on deep white sandy soils over sandstone, often with some gravelly laterite. This species has a patchy distribution across the Hunter-Central Rivers region of NSW, ranging from Lake Macquarie to north of the Hunter River (Department of the Environment Water Heritage and the Arts 2008c).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Approved Conservation Advice for *Angophora inopina* (Department of the Environment Water Heritage and the Arts 2008c).
- Listing Advice: Listing assessment information may be available in the approved Conservation Advice.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The southern portion of the subject land occurs within the western extent of the species known range. Taking a precautionary approach, considering the largest population of this species occurs in the Lake Macquarie area to the southeast of the subject land, any individuals occurring in the subject land have been considered to form part of an important population for the purpose of this assessment.

Significant impact criteria

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*

Angophora inopina has not been recorded during surveys of the subject land to date. The project is likely to impact on 1.74 hectares of habitat for this species in the form of associated PCT 3315 (Thinned condition). The remaining extent of PCT 3315 within NSW is 55,939 hectares. The removal of 1.74 hectares for this project (in modified condition) therefore represents around 0.003% of the remaining extent of this PCT. The subject land generally falls within the western limit of the species known range. Considering this, and the extent of habitat to be removed for the project, it is unlikely the project will lead to a decrease in the size of an important population, if present.

- *reduce the area of occupancy of an important population*

The species has not been recorded within the subject land to date, with most of the population being recorded across an area of 1250 hectares of mapped, occupied habitat to the east of the subject land (Department of the Environment Water Heritage and the Arts 2008c). Approximately 1.59 hectares of habitat for this species was impacted by the 2019–2020 bushfires within the subject land, with 27.54 hectares left unburnt.

The removal of 1.74 hectares of assumed habitat (PCT 3315) from the project represents around 0.003% of the remaining extent of the PCT, and the species is also known to occur in a number of other PCTs. Considering this, it is unlikely that the project would significantly reduce the area of occupancy of an important population, if present.

- *fragment an existing important population into two or more populations*

This species has not been recorded within the study area to date. However, the project is likely to impact on up to 1.74 hectares of habitat for the species. Similar habitat for the species is extensive in the wider locality and region, and the known populations of this species generally occur to the east of the subject land. Considering this, and the small area of habitat to be impacted, the project is considered unlikely to result in fragmentation of an important population.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Angophora inopina* or included in the Register of Critical Habitat. '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.

The subject land falls within the known or predicted distribution of the species so would likely not be significant in terms of geographic isolation, genetic diversity or dispersal. The species has not been recorded during survey of the subject land to date and considering the small area of habitat to be impacted, it is unlikely that a population occurs within the subject land that would be of sufficient size to maintain genetic diversity or facilitate recovery efforts such as propagation. The habitat to be impacted is not restricted to the subject land and the species is known to occur in other habitats, available more broadly in the region. Consequently, it is unlikely that the project would impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

This species has not been recorded in surveys of the subject land to date. The subject land generally occurs to the west of known populations of the species. Given the small area of assumed habitat to be removed and the lack of records within the subject land to date, the project is generally unlikely to result in direct disruptions to the populations or to the ecological processes and functions important for the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Assumed habitat impacts total 1.74 hectares and given the lack of targeted survey in these habitats; it is difficult to discern if a population occurs within this habitat. However, the species has not been recorded in targeted surveys to date, with most records falling far to the east of the subject land and assessed impact to this species is assumed habitat only. Similar habitat for the species occurs broadly across the locality and region. Given the small area of assumed habitat to be impacted, and the lack of records to date, it is unlikely the project will modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. It is noted that approximately 1.59 hectares were impacted to varying degrees of severity by the 2019–2020 bushfires, however 27.54 hectares were left unburnt.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Adhering to mitigation measures which will be put in place for the project such as pest management, weed and pathogen controls, would prevent potentially harmful invasive weeds establishing in *Angophora inopina* habitat. It is unlikely that the project would result in the establishment or spread of invasive species, provided mitigation measures for the project are adhered to.

- *introduce disease that may cause the species to decline*

Mitigation measures will be recommended, such as weed and pest management plans, vegetation clearing protocols, installation of vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority recovery and threat abatement actions can be implemented to support the recovery of *Angophora inopina*. The project is unlikely to interfere with any of the actions outlined.

Conclusion

This species has not been recorded within the subject land during surveys to date. The project is estimated to impact on 1.75 hectares of assumed habitat for this species in the form of associated PCT 3315. Within the subject land, this PCT is thought to occur in modified condition, with historical thinning and canopy removal. The extent to be impacted is small (representing ~0.003% of the remaining extent of PCT 3315) in terms of similar habitat available to the species locally and the subject land generally occurs outside of the known range of the species. The project is unlikely to impact on habitat critical for survival of, or interfere with the recovery of the species. Consequently, the project is considered unlikely have a significant residual impact on *Angophora inopina.*

B3.3.2 Asperula asthenes (Trailing Woodruff)

Asperula asthenes is listed as vulnerable under the EPBC Act. The species is found in scattered locations within NSW from Bulahdelah to Kempsey, with several records from the Port Stephens/Wallis Lakes are and is known to occur within the Hunter–Central Rivers and Northern Rivers (NSW) Natural Resource Management Regions.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory document considered in this assessment is the approved Conservation Advice for *Asperula asthenes* Trailing Woodruff (Department of the Environment, Water, Heritage and the Arts, 2008d).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

No important populations are currently listed for *Asperula asthenes.* The project occurs near the limit of the species range. Given this, and taking a precautionary approach, any potentially occurring population within the subject land could be considered an important population.

Significant impact criteria

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*

Given the records for this species occur within small populations or as individuals that occur near the subject land and the extent of the habitat for *Asperula asthens* within the subject land, it is likely to be necessary for maintaining genetic diversity or dispersal across the region and is assumed to form part of an important population. The project may have a direct impact on a recorded locally occurring population and will impact up to 2.29 hectares of assumed habitat for this species. Therefore, it is unlikely that the project will lead to a decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Asperula asthens has been recorded from scattered locations within NSW including the Bulahdelah/Kempsey, Port Stephens and Wallis Lakes region and the project is near the limit of the species distribution. Within the subject land approximately 17.92 hectares of habitat for the species was impacted by the 2019–2020 bushfires, with over 45 hectares unburnt. The loss of 2.29 hectares would represent 5% of the remaining unburnt habitat in the subject land.

Given the small area to be impacted and additional habitat for the species within the Biodiversity study area, the project impact will not result in the species being lost from any 2 x 2 kilometre grid cell currently forming part of the area of occupancy. Any changes in area of occupancy are considered likely to be negligible.

- *fragment an existing important population into two or more populations*

Populations of *Asperula asthens* occur in scattered locations across NSW. The project will result in the loss of 2.29 hectares of habitat across the extent of the project. Towers will be micro-sited to minimise impact on threatened species habitat. Therefore, it is unlikely the project would result in fragmentation of an important population.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Asperula asthens* or included in the Register of Critical Habitat. 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as breeding, 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, 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.

There is a general paucity of information for this species regarding population size and demographics. The subject land may provide habitat that is important for facilitating population dispersal and contributing to genetic diversity and species recovery. However, the loss of 2.29 hectares of habitat across the subject land is unlikely to adversely to impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

Asperula asthens flowers in spring (PlantNET, 2024). Little information is available about the species' life cycle and ecology. Given the small area to be impacted, the project is unlikely to result in direct disruptions to the ecological processes and functions important for the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The project will result in the loss of 2.29 hectares and given the disjunct known populations and the location of the project near the limit of the species distribution, there is a real chance or possibility that the project may decrease the availability of habitat for the species. However, the project will implement mitigation measure to further avoid the impacts. Therefore, the project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is unlikely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

Mitigation measures will be used, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No Recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority research, recovery and threat abatement actions can be done to support the recovery of *Asperula asthens*. As the project involves removal of a small area of assumed habitat for the species, the project is unlikely to substantially interfere with the recovery of the species.

Conclusion

Based on the assessment above it is considered unlikely the project would result in a significant residual impact on *Asperula asthens*.

B3.3.3 Eucalyptus pumila (Pokolbin Mallee)

Eucalyptus pumila is listed as vulnerable under the EPBC Act. The species is known to occurs in two locations near Singleton, NSW: the northern end of the Broken Back Range, west of Pokolbin (southeast of Singleton) and the Singleton Military Area. The species is known to occur on a very steep hill on sandy soil over sandstone with conglomerate outcrops (Quinn et al., 1995). It appears to grow only on the north and northwest aspects of the hill.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory documents used for this assessment is the approved conservation advice: Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Eucalyptus pumila* (Pokolbin Mallee). Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/16510-conservation-advice.pdf. In effect under the EPBC Act from 03 July 2008.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

As noted above the species occurs from two location within the Hunter Region. The project occurs within the known and predicated distribution of the species, therefore the species is considered to be an important population

Significant impact criteria

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*

The project occurs within the known and predicted area distribution of the Broke population. The project will result in the loss of 17.68 assumed hectares of assumed habitat for the species. Given the restricted areas of known population, it is likely the project could lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Habitat for the species was impacted by the 2019–2020 bushfires with 72.07 hectares burnt within the subject land. The severity of the fires varied across the habitat with 2.6 hectares experiencing an extreme severity, 47.14 hectares a moderate severity, and 22.6 a low severity burn. The project occurs at the limit of the species range, and given the small area of occupancy, and loss of habitat due to fires, there is a real chance or possibility the loss of 17.68 assumed hectares of habitat will reduce the area of occupancy for the species.

- *fragment an existing important population into two or more populations*

The project will be located within the known and predicted distribution of the Broke populations. However, given the nature of the project (i.e. towers will be micro-sited to minimise impacts to threatened species, and transmission lines will span across areas of habitat), it is unlikely the project would result in fragmentation of an important population. Barriers to dispersal will not be introduced.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Eucalyptus pumila* or included in the Register of Critical Habitat. Given the restricted extent of the species population, it is likely that any habitat within the range could be considered habitat critical to the survival of the species. The project would result in the loss of 17.68 hectares of that may be habitat critical to the survival of the species. Given the limited known distribution, it is likely this loss could adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

Given the nature of the project (i.e. towers will be micro-sited and transmission lines will span across large tracts of habitat) it is unlikely the project would present a barrier to the species dispersal and propagation. Therefore, it is unlikely the project would 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 project occurs within the known and predicted area distribution of the Broke population. The project will result in the loss of 17.68 hectares of assumed habitat for the species. Given the restricted areas of known population, it is likely the project may modify, destroy or decrease the availability of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

There are no known diseases that are specific to this species. Mitigation measures will be used, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for *Eucalyptus pumila*. The approved conservation advice for the species outlines a number of local and regional priority research, such a monitoring the known population and threats to the species, implementing weed management recovery and to ensure development does not adversely impact known populations of the species. The project will remove habitat for the species within the known and predicted distribution range of the broke population. Providing mitigation measures are implemented it is unlikely the project would substantially interfere with the recovery of *Eucalyptus pumila*.

Conclusion

Based on the assessment completed above, the project is likely to have a significant residual impact on *Eucalyptus pumila*, due to the loss of habitat within the predicted and known distribution of Broke populations.

B3.3.4 Melaleuca biconvexa (Biconvex Paperbark)

Melaleuca biconvexa is listed as vulnerable under the EPBC Act. The approved conservation advice for the species notes that *Melaleuca biconvexa* occurs in coastal districts and adjacent tablelands in NSW, from Jervis Bay to Port Macquarie The species occurs within the Hawkesbury-Nepean, Northern Rivers, Hunter-Central Rivers and Southern Rivers NSW Natural Resource Management (NRM) regions (TSSC 2008cg).

The approved conservation advice states that the species occurs in damp places, often near streams and rivers or low-lying areas on alluvial soils of low slopes or sheltered aspects. It occurs in coastal districts and adjacent tablelands. *Melaleuca biconvexa* may occur in dense stands forming a narrow strip adjacent to watercourses, in association with other Melaleuca species or as an understorey species in wet forest types.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory documents used in the assessment of this species is approved conservation advice: Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Melaleuca biconvexa* (Biconvex Paperbark). Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/5583-conservation-advice.pdf. In effect under the EPBC Act from 26 March 2008.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

Melaleuca biconvexa is described as occurring as 'disjunct populations' across the species' range. Based on SPRAT the known predicted species mapping for the species shows the distribution of the species occurring closer to the coast. The main concentration of records occurs around the Gosford/Wyong area The southern portion of the project occurs near with the limit of the western distribution of the species. Therefore, the species is considered to be an important population.

Significant impact criteria

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*

The key population of the species occurs around Gosford and Wyong which is outside of the subject land. The project is likely to remove 9.35 hectares of assumed habitat for the species. Given the area to be impacted and location of the project near the limit of the species range, it is considered the habitat may be necessary for maintaining genetic diversity or dispersal across the region. Therefore, the project may lead to the long-term decline in the size of an important population.

- *reduce the area of occupancy of an important population*

Approximately 15.33 hectares of habitat for the species was impacted by the 2019–2020 bushfires, with 61.75 hectares remaining intact. Given the species occurs near the western limit of the species range, there is a real chance or possibility that the clearing of 9.35 hectares of assumed habitat may reduce the area of occupancy for the species.

- *fragment an existing important population into two or more populations*

The project would not present a significant barrier to this species, given the nature of the project (i.e. towers will be micro-sited and transmission lines will span across large tracts of habitat). Therefore, it is unlikely that the project would fragment an existing population into two or more populations

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Melaleuca biconvexa* or included in the Register of Critical Habitat. 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.

The subject land contains assumed habitat and is located near the limit of the species range. Therefore, without further information the habitat could be considered necessary for the dispersal, long term maintenance or habitat for the species reintroduction. The loss of 9.35 hectares of assumed habitat within the subject land is likely to adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The project is unlikely to provide a barrier to seed dispersal for the species, however, approve conservation advice for the species notes that multiple stems may arise from single rootstock. The project will require excavation works during the construction of the project which may disrupt the breeding cycle of a 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 key population of the species occurs around Gosford/Wyong are which is outside of the subject land. The project is likely to remove 9.35 hectares of assumed habitat for the species. Given the area to be impacted and location of the project near the limit of the species range, it is considered the habitat may be necessary for maintaining genetic diversity or dispersal across the region. Therefore, the project may modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

There are no known diseases that are specific to this species. Mitigation measures will be used, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. The project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for this species. The approved conservation advice for the species sets out research priorities including monitoring; protection of known populations, management of threat; local and regional priorities. The project is unlikely to interfere with these recovery actions.

Conclusion

Given the area to be impacted and location of the project near the limit of the species range, the project may lead to the long-term decline in the size of an important population and reduce the area of occupancy for the species. Therefore, based on the assessment completed above, it is likely the project would result in a significant residual impact on *Melaleuca biconvexa*.

B3.3.5 *Olearia cordata*

Olearia cordata is listed as vulnerable under the EPBC Act. *Olearia cordata* occurs in woodland on exposed Hawkesbury Sandstone ridges. It grows in shallow or skeletal soils that are neutral to slightly acidic. It is recorded at altitudes from 150–500 metres above sea level on steep to gentle slopes.

The species is generally restricted to the southwestern Hunter and eastern Colo Plateau, with southern outliers recorded in the far northwest of the Hornsby Plateau, near Wisemans Ferry and South Maroota, and one record near Sackville, adjoining the Hawkesbury-Nepean River (Department of the Environment Water Heritage and the Arts, 2008e).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant Commonwealth statutory document considered in the assessment of the species is the Approved Conservation Advice for *Olearia cordata* (Department of the Environment Water Heritage and the Arts, 2008e).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

No important populations are currently listed for *Olearia cordata* (Department of the Environment Water Heritage and the Arts, 2008e). The project occurs at the eastern and northern limit of the species range. Given this and taking a precautionary approach, any potentially occurring population within the subject land could be considered an important population.

Significant impact criteria

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*

Olearia cordata has not been recorded within the subject land and the majority of extant records for the species occur to the south of the subject land in areas managed by the National Parks and Conservation Service (Department of the Environment Water Heritage and the Arts, 2008e). The project will remove approximately 4.03 hectares of assumed habitat for the species. The area to be impacted by the project is small in terms of similar habitat available to the species within the immediate locality (approximately 28,189.59 hectares within a 10 kilometre buffer of the subject land) and the species was not recorded in the subject land despite seasonal surveys. Therefore it is unlikely that these impacts would lead to a significant or long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Olearia cordata has not been recorded within the subject land, however species presence has been assumed within the Yengo IBRA subregion where survey not undertaken. In total the project is estimated to impact on 4.03 hectares of assumed habitat for this species representing a small proportion of similar habitat available within the locality (approximately 28,189.59 hectares within 10 kilometre buffer of the subject land). Given the lack of records for the species and extensive habitat in the immediate vicinity, it is considered unlikely to reduce the area of occupancy for an important population.

- *fragment an existing important population into two or more populations*

The project is likely to impact on up to 4.03 hectares of habitat for this species, part of which occurs within larger patches of woodland. The project will micro-site towers to avoid and minimise impacts to threatened species, with transmission lines spanning across the habitat. Therefore it is unlikely the project would fragment an existing population into two or more.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Olearia cordata* or included in the Register of Critical Habitat. '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.

This species has not been recorded in surveys of the subject land to date. Given the extent of habitat within the immediate vicinity of the subject land (approximately 28,189.59 hectares within a 10 kilometre buffer of the subject land), it is unlikely that the area to be impacted would be important habitat for facilitating population dispersal and contributing to genetic diversity and species recovery. Therefore, the project is unlikely to impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

This species has not been recorded in surveys of the subject land to date. The subject land generally occurs to the east of known populations of the species. Given the small area of habitat to be removed and the lack of records within the subject land, the project is unlikely to result in direct disruptions to the ecological processes and functions important for the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The project is likely to result in the loss of 4.03 hectares of habitat for the species. *Olearia cordata* has a highly restricted distribution, and is known to occur in Pokolbin State Forest, adjacent to the subject land, although the species has not recorded during surveys to date, therefore assessed impact to this species is assumed habitat only. Approximately 69.18 hectares of habitat was impacted by the 2019–2020 bushfires, with 134.24 hectares remaining intact. The project would result in the loss of 3% of the remaining unburnt area. Given the small area of assumed habitat to be impacted, and the lack of records to date, it is unlikely the project will modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Adhering to mitigation measures which will be put in place for the project such as pest management, weed and pathogen controls, would prevent potentially harmful invasive weeds and vertebrate pests such as rabbits, cats and foxes establishing in *Olearia cordata* habitat. It is unlikely that the project would result in the establishment or spread of invasive species, provided mitigation measures such as vegetation clearing protocols, installation vehicle wash stations and sediment and control measures are implemented.

- *introduce disease that may cause the species to decline*

There are no diseases known to impact *Olearia cordata*. Furthermore, mitigation measures will be implemented, such as vegetation clearing protocols, installation vehicle wash stations and sediment and control measures to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority recovery and threat abatement actions can be done to support the recovery of *Olearia cordata*. The project is unlikely to interfere with any of the actions outlined.

Conclusion

Olearia cordata has not been recorded within the subject land to date. The project is estimated to impact on 4.03 hectares of assumed habitat for this species. The extent to be impacted is small in terms of similar habitat available to the species locally (28,189.59 hectares) and is unlikely to impact on habitat critical for survival or interfere with the recovery of the species. Consequently, the project is considered unlikely to have a significant residual impact on *Olearia cordata.*

B3.3.6 Ozothamnus tesselatus

Ozothamnus tesselatus is listed as vulnerable under the EPBC Act. The species is restricted to a few locations north of Rylstone, NSW, and is conserved within the Goulburn River National Park and Munghorn Gap Nature Reserve. This species has been collected at eight sites in a restricted area over a range of 300 square kilometres.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory document relevant to the assessment of this species is the Approved Conservation Advice for *Ozothamnus tesselatus* (Department of the Environment Water Heritage and the Arts, 2008f).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

There is little information regarding the population of the species. Noting the project occurs withing the known and predicted distribution of the species and without further population information a conservative approach has been undertaken, therefore the species is considered to be part of an important population.

Significant impact criteria

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*

The project is located within the known and predicted range of the species, however the species was not recorded despite targeted seasonal surveys. Given the restricted species distribution, it is likely the subject land may be necessary for maintaining genetic diversity or dispersal across the region. Therefore there is a real chance or possibility that the loss of 7.69 hectares of assumed habitat could lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Habitat within the subject land was impacted by the 2019–2020 bushfires, with approximately 1.59 hectares burnt. The project is likely to impact on up to 7.69 hectares of habitat for this species. Parts of the project are at the limit of the species range and given the loss of habitat due to the bushfires, it is likely the project would reduce the area of occupancy for an important population.

- *fragment an existing important population into two or more populations*

The project is likely to impact on up to 7.69 hectares of assumed habitat for this species, which is also mapped either side of the subject land. Given the area of habitat to be impacted, the project is considered likely to result in fragmentation of an important population.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Ozothamnus tesselatus* or included in the Register of Critical Habitat. 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as breeding, 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 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 (Department of the Environment Heritage Water and the Arts 2009).

There is a general paucity of information for this species regarding population size and demographics. Known habitat for the species is restricted; therefore, it is likely that any population occurring within this habitat may be important for facilitating population dispersal and contributing to genetic diversity and species recovery. Therefore, the loss of 7.69 hectares is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

Given the large extent and nature of impact, there is a real chance or possibility the project could cause disruptions to the ecological processes and functions important for the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Part of the project occurs at the limit of the species range, therefore given the small extent of occurrence it is likely the loss of habitat associated with the project would modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

There are no known diseases that are specific to *Ozothamnus tesselatus.* Mitigation measures will be used, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. The project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority research, recovery and threat abatement actions can be done to support the recovery of *Ozothamnus tesselatus.* The removal of 7.69 hectares of habitat for the species is likely to interfere with the recovery of the species.

Conclusion

Based on the assessment above, there is a real chance or possibility that the project is likely to have a significant residual impact on *Ozothamnus tesselatus*.

B3.3.7 Prostanthera cineolifera (Singleton Mint-bush)

Prostanthera cineolifera is listed as vulnerable under the EPBC Act. *Prostanthera cineolifera* occurs in sclerophyll forests and open woodlands on exposed sandstone ridges and is often found in association with shallow or skeletal sands.

Prostanthera cineolifera occurs within the Hawkesbury–Nepean, Hunter–Central Rivers and Northern Rivers (NSW) Natural Resource Management Regions. Its distribution is uncertain, but it is considered to be restricted to only a few localities near Walcha, Scone and St Albans, NSW.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved Conservation Advice: Approved Conservation Advice for *Prostanthera cineolifera* (Department of the Environment, Water, Heritage and the Arts, 2008g).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

Prostanthera cineolifera is restricted to only a few localities near Scone, Cessnock and St Albans. However, it is now believed that the Scone and St Albans populations are likely undescribed taxon. Within the subject land, *Prostanthera cineolifera* was recorded extensively within Pokolbin State Forest and neighbouring private properties (Yengo IBRA subregion). Given the restricted range of the species, it is considered that the species within the subject land would represent an important population.

Significant impact criteria

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*

Prostanthera cineolifera was recoded within the subject land. In total the project is estimated to impact on 30.01 hectares of confirmed habitat and 27.71 hectares of assumed habitat (57.72 hectares of habitat total) for this species over PCTs 3237, 3239, 3315, 3438, 3444 and 3605.

Given the extent of habitat for *Prostanthera cineolifera* within the impact area, potentially occurring populations may be necessary for maintaining genetic diversity or dispersal across the region. Therefore, the project is considered likely to lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Approximately 78.74 hectares of habitat for the species was impacted during the 2019–2020 bushfires. The project is likely to impact on up to 57.72 hectares of habitat for this species. Given the species' restricted distribution and known location, and loss of habitat due to the bushfires, it is likely the project would reduce the area of occupancy of an important population.

- *fragment an existing important population into two or more populations*

The project is likely to result in fragmentation impacts associated with the construction of access roads and the towers. Mitigation measures will be implemented to minimise these impacts, however the loss of 57.72 hectares of habitat on the western side of an important population may result in an existing important population being fragmented into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Prostanthera cineolifera* or included in the Register of Critical Habitat. '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.

There is a general paucity of information for this species in regard to population size and demographics. Given the species was recorded within the subject land, and the restricted range of the species, it is likely that habitat within the subject land would represent habitat critical to the survival of the species. The loss of 57.72 hectares is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

Prostanthera cineolifera flowers predominately between September to October (PlantNET, 2023) and is likely to pollinate from beetles and flies. While habitat will be removed, the project is unlikely to significantly impact the pollinators, therefore is unlikely to result in direct disruptions to the ecological processes and functions important for the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The project will impact 57.72 hectares of habitat for the species. Given the limited extent of the species distribution, it is likely that the project would decrease the availability of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be implemented to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

Dieback associated with *Phytophthora cinnamon* is identified as a possible threat to this species within the Conservation Advice. Mitigation measures will be implemented, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority research, recovery and threat abatement actions that can be done to support the recovery of *Prostanthera cineolifera*. As the project involves removal of habitat for the species, the project is likely to interfere with the recovery of the species according to the approved conservation advice.

Conclusion

This species has been recorded within the subject land, with the project likely to impact on up to 57.72 hectares of habitat for this species. Considering the extent of species distribution and scale of the impacts the project is likely to significantly residual impact *Prostanthera cineolifera*.

B3.3.8 Velleia perfoliata

Velleia perfoliata is listed as vulnerable under the EPBC Act. The species is only known from the Hawkesbury district and upper Hunter Valley, near Munghorn Gap Nature Reserve.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory document relevant to the assessment of this species is the Approved Conservation Advice for *Velleia perfoliata* (Department of the Environment Water Heritage and the Arts, 2008h).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

There is little information regarding the population of the species, however nine populations are known to exist. The project occurs outside the known and predicted distribution of the species. Given this and taking a precautionary approach, any potentially occurring population within the subject land could be considered an important population.

Significant impact criteria

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*

The project is located outside the known and predicted range of the species. Given the lack of records, it is unlikely the loss of 4.02 hectares would lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

The project occurs outside of the known distributed populations. Given the species was not recorded despite targeted seasonal surveys, it is unlikely the loss of 4.02 hectares of assumed habitat would reduce the area of occupancy for an important population.

- *fragment an existing important population into two or more populations*

The project is likely to impact on up to 4.02 hectares of habitat for this species, which is also mapped either side of the subject land. The subject land is outside the distribution of the known populations for the species; therefore, it is unlikely the project would fragment an important population into two or more populations. In addition, the project will implement mitigation measures such as micro-sitting of towers to avoid and minimise impacts on threatened species.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Velleia perfoliata* or included in the Register of Critical Habitat. 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as breeding, 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 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.

There is a general paucity of information for this species regarding population size and demographics. The species was not recorded within the subject land, and the project is considered to be outside of the known distribution of the current populations. Therefore, it is unlikely the loss of 4.02 hectares of assumed habitat would adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The subject land falls outside if the distribution of known populations for the species. Therefore, it is unlikely the project would disrupt the breeding cycle of an important population. Furthermore, mitigation measures will be implemented to further reduce potential impacts on the assumed habitat including micro-siting of towers to avoid threatened species, and implementing biosecurity and pest species controls.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Approximately 38.94 hectares of habitat was impacted to varying degrees of severity by the 2019–2020 bushfires. The project occurs outside the distribution of the species' known population, therefore it is unlikely the loss of 4.02 hectares of assumed habitat associated with the project would modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, such as delineation of 'no go' zones and project clearing boundaries to ensure works are contained, vegetation clearing protocols, and wash down protocols. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

There are no known diseases that are specific to *Velleia perfoliata.* Mitigation measures will be used, such as weed and pest controls such as vehicle wash stations, vegetation clearing protocols, and sediment and erosion control. These will help to minimise the likelihood of introduction or spread of pathogens into the site. The project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No Recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority research, recovery and threat abatement actions can be done to support the recovery of *Velleia perfoliata* , including monitoring of known populations, managing threats to the species, minimising adverse impacts, implementing weed removal and developing suitable fire management strategy for the species. The loss of 4.02 hectares associated with the project is unlikely to substantially interfere with the recovery of the species.

Conclusion

Given the project occurs outside of the known population distribution for the species, the small scale of impacts and mitigation measures to further reduce impacts on threatened species habitat, it is unlikely the project would have a significant residual impact on *Velleia perfoliata.*

B3.3.9 Zieria involucrata

Zieria involucrata is listed as vulnerable under the EPBC Act. The species is restricted to a disjunct distribution north and west of Sydney. The species distribution is primarily in the Central Coast botanical subdivision of NSW, except for the Blue Mountains populations which are within the Central Tablelands subdivision.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory document relevant to the assessment of this species is the adopted/made recovery plan: *Zieria involucrata* recovery plan (Department of the Environment and Conservation, 2006).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

There is limited information regarding the population of the species, however there are 26 recognised extant or historical populations, varying between a single individual to more than 500 plants. Part of the project occurs at the limit of the species range. Given this and taking a precautionary approach, any potentially occurring population within the subject land could be considered an important population.

Significant impact criteria

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*

Part of the project occurs at the limit of the species range. Given the restricted species distribution, it is likely the subject land could be necessary for maintaining genetic diversity or dispersal across the region, if a population exists. The project would result in the loss of 4.03 hectares of habitat for the species. Mitigation measures will be implemented to avoid and minimise impacts on threatened species including micro-siting of towers to avoid threatened species. Therefore, given the lack of records, small area to be impacted and mitigation measures, it is unlikely the project would lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Habitat for the species was impacted by the 2019–2020 bushfires, with 68.93 hectares of habitat burnt within the subject land. The project is likely to impact on up to 4.03 hectares of assumed habitat for this species. Part of the project occurs at the limit of the species' range, however the species was not recorded despite targeted seasonal surveys. Mitigation measures will be implemented to avoid and minimise impacts on threatened species including micro-siting of towers to avoid threatened species. Therefore it is unlikely that the loss of 4.03 hectares would reduce the area of occupancy for an important population.

- *fragment an existing important population into two or more populations*

The project is likely to impact on up to 4.03 hectares of habitat for this species, which is also mapped either side of the subject land. The species was not recorded despite targeted seasonal surveys and no populations have been identified within the subject land. Given the area of habitat to be impacted and lack of records, the project is considered unlikely to result in fragmentation of an important population.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Zieria involucrata* or included in the Register of Critical Habitat. 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as breeding, 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 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.

There is a limited amount of recent information for this species regarding population size and demographics. The species was not recorded within the subject land despite targeted seasonal surveys. Therefore it is unlikely the subject land would be important for facilitating population dispersal and contributing to genetic diversity and species recovery. Habitat within the subject land is not considered to represent habitat critical to the survival of the species, therefore the loss of 4.03 hectares is unlikely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The species was not recorded within the subject land despite targeted seasonal surveys. Given the small extent, nature of impact and implementation of mitigation measures (micro-siting of towers to avoid threatened species and transmission lines spanning large tracts of habitat), it is unlikely the project would disrupt the life 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*

Approximately 68.93 hectares of habitat was impacted to varying degrees of severity by the 2019–2020 bushfires, with 100.72 hectares remaining intact. Part of the project occurs at the limit of the species range; however, the species was not recorded despite targeted seasonal surveys. Mitigation measures will be implemented to avoid and minimise impacts on threatened species including micro-siting towers to avoid threatened species. Therefore it is unlikely that the loss of 4.03 hectares would modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

There are no known diseases that are specific to *Zieria involucrata.* Mitigation measures will be used, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. The project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

A recovery plan for *Zieria involucrata* has been prepared for this species. The plan includes 6 recovery objectives that will each contribute to achieving the overall goal of maintaining or improving the current conservation status of *Z. involucrata*. These objectives are:

- conserve *Z. involucrata* using land-use and conservation planning mechanisms
- implement a survey and monitoring program that will provide information on the extent, viability and habitat of *Z. involucrata*
- identify and minimise the operation of threats at sites where *Z. involucrata* occurs
- provide public authorities and the community with information that assists in conserving the species
- raise awareness of the species and involve the community in the recovery program; and
- promote research that will assist future management decisions.

The removal of large area of 4.03 hectares of assumed habitat for the species is unlikely to substantially interfere with the recovery of the species.

Conclusion

Based on the assessment above, it is unlikely the project would have a significant residual impact on *Zieria involucrata*, if a population is present.

B3.3.10 Eucalyptus glaucina (Slaty Red Gum)

Eucalyptus glaucina is listed as Vulnerable under the EPBC Act. *Eucalyptus glaucina* is a small to medium sized woodland tree which was originally known from the Rappville district, south of Casino, and in a number of localities in the Taree, Stroud, Dungog and Paterson districts, NSW. This species is only conserved in a flora reserve in Bremer State Forest, south of Casino. One of the records from Taree is of a single tree that was washed away in a flood and the species has not been recorded at the site since. This species occurs within the Hunter Central Rivers and the Northern Rivers (NSW) Natural Resource Management Regions.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant available Commonwealth statutory document used in the assessment of this species is the Approved Conservation Advice for *Eucalyptus glaucina* Slaty Red Gum. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: https://www.environment.gov.au/biodiversity/threatened/species/pubs/5670-conservation-advice.pdf. In effect under the EPBC Act from 03 July 2008.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

Given the records occur near the western limit of the species range and the extent of the recorded presence and assumed habitat for *Eucalyptus glaucina* within the subject land, it is likely to be necessary for maintaining genetic diversity or dispersal across the region and is assumed to form part of an important population.

Significant impact criteria

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*

Although *Eucalyptus glaucina* has not been recorded within the subject land, this species has been recorded previously south of the Singleton Military Area. The project will disturb habitat for the species, and it is assumed that 1176 individuals could be lost.

Given the lack of information available on the specific population count for this species, a precautionary approach has been applied; therefore, the assumed loss of 1176 individuals is likely to lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

Assumed habitat for this species will be reduced by 23.52 hectares within the subject land. Given that the species has a restricted distribution and this population is located on the western extent of its range it will likely reduce the area of occupancy of an important population.

- *fragment an existing important population into two or more populations*

The project is likely to result in fragmentation impacts associated with the construction of access roads and the towers. Mitigation measures will be implemented to minimise these impacts. The loss of 23.52 hectares of assumed habitat has the potential to fragment an important population, however given the pollination and seed dispersal mechanisms of this species, this linear based project is unlikely to result in impeding cross-pollination of remaining individuals. As such it is considered unlikely that the project will result in the fragmentation of an existing important population in two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified for *Eucalyptus glaucina* or included in the Register of Critical Habitat. '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.

There is a general paucity of information for this species regarding population size and demographics. Given the location of the recorded populations at or near the limit of the species range, and the number of individuals recorded, it is possible that this habitat may be important for facilitating population dispersal and contributing to genetic diversity and species recovery. Therefore, the project may adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

Eucalyptus glaucina flowers between August and December by beetles, flies and flying foxes. While habitat will be removed, the project is unlikely to significantly impact the pollinators. Therefore, it is unlikely the project would disrupt the life 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 project will impact 23.52 hectares of habitat for the species. Given the limited extent of the species distribution, it is likely that the project would decrease the availability of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be implemented to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

There are no diseases known to impact *Eucalyptus glaucina*. Furthermore, mitigation measures will be recommended, such as vegetation clearing protocols, installation vehicle wash stations and sediment and control measures to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

No Recovery plan has been prepared for this species at this stage. The approved conservation advice for the species outlines a number of local and regional priority recovery and threat abatement actions can be done to support the recovery of *Eucalyptus glaucina*. As the project involves the removal of assumed habitat for the species and an estimated 1176 individuals, the project is likely to interfere with the recovery of the species.

Conclusion

Little information is currently known about the size and distribution of existing populations of this species (Department of Climate Change Energy the Environment and Water 2023), however, considering the size and extent of recorded populations within the project area and the location of individuals near the western extent of the species known range, the project is likely to impact on an important population of *Eucalyptus glaucina*.

Although *Eucalyptus glaucina* has not been recorded within the subject land to date, it was recorded in the immediate locality of the subject land. The project is estimated to impact 1176 individuals of this species in the form of associated PCTs 3152, 3239, 3314, 3315, 3431, 3438, 3466, 3605 and 3636. As a precautionary approach this estimated impact is considered to have a significant residual impact on an important population.

B3.3.11 Syzygium paniculatum (Magenta Lilly Pilly)

Syzygium paniculatum is listed as vulnerable under the EPBC Act. *Syzygium paniculatum* is a rainforest tree with a total population of at least 1500 plants spread across a 400 kilometre stretch of coastal NSW. Its bright pink edible fruit is dispersed by flying foxes and rainforest birds. The Magenta Lilly Pilly is superficially similar to *Syzygium australe* (Brush Cherry), *S. oleosum* (Blue Lilly Pilly) and *Syzygium smithii* syn. *Acmena smithii* (Lilly Pilly), which also occur within the natural range of the Magenta Lilly Pilly.

The Magenta Lilly Pilly is endemic to New South Wales and is distributed along a 400 kilometre coastal stretch between Conjola National Park in the south and Taree in the north. The Magenta Lilly Pilly occurs in restricted habitats that have been extensively cleared or modified, including lowland and littoral rainforest.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Conservation Advice for *Syzygium paniculatum* (magenta lilly pilly) (Department of Climate Change, Energy, the Environment and Water, 2023)
- Recovery Plan: National Recovery Plan Magenta Lilly Pilly *Syzygium paniculatum* (Office of Environment and Heritage 2012).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The project lies at the western (inland) extent of the known range of *Syzygium paniculatum* within a largely coastal distribution of records which covers a distance of 66 kilometres. In addition to this, the approved conservation advice for the species states that 'All naturally occurring populations, and the full range of genetic diversity they contain, are considered to be important.' As such, it is considered that any species occurring within the subject land would form part of an important population for the purpose of this assessment.

Significant impact criteria

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*

The population size of *Syzygium paniculatum* is estimated at a minimum of 1500 plants. Whilst the species has not been recorded during surveys of the subject land to date, the presence of the species is associated with PCTs 3029, 3087, 3150 and 3242 within the subject land, and therefore it is assumed to be present. This amounts to an area of 10.24 hectares. Based on density data for this species, an estimated loss of 513 individuals is therefore assumed as a result of the project. A loss of 513 plants would consist of around 30% of the total population. Whilst this is likely to be a considerable overestimate, even a much smaller loss of individuals, which cannot be ruled out at this stage, would potentially contribute to a long-term decline in an important population by reducing genetic diversity and the number of reproducing individuals.

- *reduce the area of occupancy of an important population*

The area of occupancy for the species is estimated at approximately 200 square kilometres or 20,000 hectares according to the approved conservation advice. The removal of 10.24 hectares of assumed habitat would constitute a potential reduction in area of occupancy for the species of 0.05% and as such would not be considered a significant reduction in area of occupancy.

- *fragment an existing important population into two or more populations*

This species has not been recorded within the subject land to date; however, the project is likely to impact on up to 10.24 hectares of habitat for the species. Considering the existing disjunction of the current population into multiple populations and sub-populations it is unlikely that the project would result in fragmentation of an important population into two or more populations. In addition, mitigation measures will be implemented to avoid and minimise impacts on threatened species including micro-siting of towers to avoid threatened species.

- *adversely affect habitat critical to the survival of a species*

According to the approved conservation advice for the species, habitat critical to the survival of the species includes ‘all habitat in which Magenta Lilly Pilly populations occur’. Whilst the species has not been recorded within the subject land to date, the species is assumed present in 10.24 hectares of suitable habitat which will be impacted by the project, and as such the project has the potential to adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

This species has not been recorded in surveys of the subject land to date. The subject land generally occurs to the west of known populations of the species. The approved conservation advice for the species notes that it is able to produce seed both sexually (through pollination) and asexually (without pollination). There are a range of known pollinators for the species including flying foxes, possums, honeyeaters, bees, beetle, moths and butterflies. It is unlikely the project would significantly reduce the pollinators such that the species would not be able to reproduce sexually. It is unlikely the project would disrupt the life cycle of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Assumed habitat impacts total 10.24 hectares. The species has not been recorded in targeted surveys to date, with most records falling far to the east of the subject land and assessed impact to this species is assumed habitat only. Similar habitat for the species occurs broadly across the locality and region. Given the lack of records to date, it is unlikely the project will modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Mitigation measures will be used to limit the spread of weeds, pathogens and disease. Given these measures, the project is unlikely to significantly contribute to the introduction or spread of invasive species not currently present in surrounding areas.

- *introduce disease that may cause the species to decline*

Mitigation measures will be implemented, such as weed and pest management plans, vegetation clearing protocols, installation vehicle wash stations and sediment and control measures. These will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

Then National Recovery Plan for *Syzygium paniculatum* lists the following major threats to the species:

- habitat clearing and fragmentation
- low genetic diversity
- inappropriate grazing regimes
- weed infestations
- inappropriate fire regimes
- climate change
- introduced vertebrate pests
- recreational activities
- pathogens
- changes to local water regimes through water extraction.

The removal of large area of 10.24 hectares of assumed habitat for the species is unlikely to substantially interfere with the recovery of the species.

Conclusion

This species has not been recorded within the subject land during surveys to date. The project is estimated to impact on 10.24 hectares of assumed habitat for this species in the form of associated PCTs 3029, 3087, 3150 and 3242, resulting in a potential loss of up to 513 individuals. A loss of 513 plants would consist of around 30% of the total population therefore taking a conservative approach it is likely the project would result in a significant residual impact on *Syzygium paniculatum.*

B4. Threatened fauna species subject to assessment

28 listed threatened fauna species were identified to have a moderate or higher likelihood of occurrence. Significance assessments for these species have been completed in accordance with the Matters of National Environmental Significance - Significant Impact Guidelines 1.1 (Department of the Environment Water Heritage and the Arts 2013).

B4.1 Critically endangered and Endangered fauna

B4.1.1 Littlejohn's Treefrog (Litoria littlejohni)

Littlejohn's Treefrog is listed as endangered under the EPBC Act and NSW BC Act.

The Littlejohn's Tree Frog is a medium sized tree frog, that breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath-based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground. Eggs are laid in loose gelatinous masses attached to small, submerged twigs. Eggs and tadpoles are mostly found in still or slow flowing pools that receive extended exposure to sunlight but will also use temporary isolated pools.

Littlejohn's Tree Frog has a distribution that includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 kilometres north of Sydney) south to the end of the Woronora Plateau. Most of the records are from within the Sydney Basin Bioregion. Records are isolated and tend to be at high altitude (elevations from 100–1160 metres).

Littlejohn's Tree Frog tadpoles and metamorphs were identified near the Olney substation (Wyong IBRA subregion) during targeted surveys.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species that have bene considered in this assessment is as follows:

- Approved conservation Advice: Conservation advice for *Litoria littlejohni* (Littlejohn's tree frog) (Department of Agriculture, Water and the Environment, 2022).
- Adopted/made recovery plan: There is no adopted or made Recovery Plan for this species.
- Adopted/made threat abatement plan: Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (Department of the Environment and Energy, 2016b).

Significant impact criteria

An action is likely to have a significant impact on an 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*

The total number of mature individuals is not known with certainty, however Mahony et al. (2020) has recorded population declines. Thirty-eight records of the species were identified during the targeted surveys, with most records within Olney State Forest and Jilliby Conservation area. The project will avoid impacts to streams with towers placed outside of the riparian zones limiting impact to the construction of access roads that will cross creek lines.

The project may result in the removal of 63.53 hectares of confirmed habitat Littlejohn's Tree Frog habitat. Habitat for this species is well represented within the locality with approximately 20,424.53 hectares of the associated PCTs occurring within a 10 km buffer of the subject land. Therefore, given the avoidance and minimisation of impacts to the species habitat and extent of habitat within the locality, it is unlikely the project would lead to a long-term decrease in the size of a local population.

- *reduce the area of occupancy of the species*

The approved conservation advice for the species estimates the area of occupancy at 272–296 square kilometres, with an estimated extent of occurrence of 10,122–12,084 square kilometres (Department of Agriculture, Water and the Environment, 2022). The project is located at the northern extent of the species distribution, and approximately 40.96 hectares of habitat for the species was burnt within the subject land during the 2019–2020 bushfires. Given the species is at the northern limit of its range, it is likely the project would reduce the area of occupancy for this species.

- *fragment an existing population into two or more populations*

The towers will be micro-sited to ensure minimal impact on the species habitat, and riparian habitats will be largely avoided. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. powerlines will be above the habitat) it is unlikely the project would result in a barrier to movement or fragment an existing population into two or more important populations.

- *adversely affect habitat critical to the survival of a species*

There is no specifically mapped habitat critical to the survival of the Littlejohn's Tree Frog as non-breeding habitat preferences are poorly understood. However, the approved Conservation Advice for *Litoria littlejohni* (Littlejohn's tree frog) (Department of Agriculture, Water and the Environment, 2022) indicates that the species is only reliably found at just a few locations. Key aspects of the breeding habitat are considered to be habitat critical to the survival of the species. This includes ponds that have an area of 1–3000 square metres and less than 1.5 metres deep, with a low salinity and high levels of leaf litter. The project will avoid impacts to streams with towers placed away outside of the riparian zones limiting impact to the construction of access roads that will cross creek lines. Therefore, it is unlikely the project would adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

Typical breeding habitat of Littlejohn's Tree Frog includes ponds of an area between 1–3000 square metres and less than 1.5 metres deep. With a low salinity (0.25 parts per thousand), and slight acidity (between 4.5–7 pH) these ponds contain high levels of leaf litter, while lacking fish (invasive or native) and with little algae (Klop-Toker et al. 2021). Reduction to suitable breeding habitat or impacting of rain fed water bodies where tadpoles may be present has the potential to disrupt the breeding cycle of a population. The project will avoid impacts to streams with towers placed outside of the riparian zones limiting impact to the construction of access roads that will cross creek lines. Mitigation measure will be implemented to reduce impacts associated with access roads such as increase in run-off and sedimentation. Therefore, the project is unlikely to disrupt the breeding cycle of a 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 project will avoid impacts to streams with towers placed outside of the riparian zones limiting impact to the construction of access roads that will cross creek lines. Habitat for this species is also well represented within the locality with approximately 20,424.53 hectares of the associated PCTs occurring within a 10 kilometre buffer of the subject land. Given the extent of habitat within the locality it is unlikely the project would modify, destroy, remove or isolate or decrease the availability or quality of 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*

Due to previous land use (e.g. agriculture), invasive species are already known to occur within the landscape. Adhering to mitigation measures which will be put in place for the project such as weed controls, would prevent further harmful invasive weeds establishing in the species habitat.

- *introduce disease that may cause the species to decline*

There is the risk of the introduction or spread of chytrid fungus during project implementation, however this is unlikely to be a significant risk. Mitigation actions including the implementation of best practice hygiene protocols, included in the construction environmental management plan, will reduce the introduction or spread of pathogens. Consequently, it is considered highly unlikely that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There is no made or adopted recovery plan for Littlejohn's tree Frog. The species approved conservation advice outlines primary conservation outcomes for Littlejohn's Tree Frog, including:

- minimise habitat disturbance
- bushfire response
- reduce the spread of chytrid fungus.

The project will potentially disturb 63.53 hectares of Littlejohn's Tree Frog habitat and therefore has the potential to interfere with the recovery of the species. Towers will largely avoid waterbodies and be micro-sited to minimise impacts on species habitats. In addition, mitigation measures will be implemented to further reduce impacts on the species habitats. With the implementation of such measures, it is likely that the impacts will be reduce to the extent that the project will not interfere with the recovery of the species.

Conclusion

Although the project will avoid breeding habitat and habitat critical to the survival of the species, it is likely that the loss of 63.53 hectares of habitat will reduce the available resources for the species and therefore potentially lead to a long-term decrease in the size of a local population and reduce the area of occupancy for the species. Therefore, the project is likely to result in a significant residual impact on Littlejohn's Tree Frog.

B4.1.2 Regent Honeyeater (Anthochaera phrygia)

The Regent Honeyeater is a nomadic and partially migratory woodland bird, which has a patchy distribution between south-east Queensland and central Victoria. Some predictable seasonal movements have been observed, and breeding varies between regions and corresponds with flowering of key eucalypt and mistletoe species.

The species is predominantly found along inland slopes of the Great Dividing Range in areas containing moist, fertile soils. It prefers box-ironbark eucalypt woodland and dry sclerophyll forest but also inhabits riparian vegetation including She-oak (*Casuarina* spp.). Lowland coastal forest may also act as a refuge habitat during periods of drought, and they may also be found in remnant patches of farmland and urban areas (Department of Environment, 2015).

The Regent Honeyeater primarily feeds on nectar which it obtains from eucalyptus flowers and mistletoes but also feeds on invertebrates and their exudates (lerp, honeydew), and occasionally fruit. This species roosts communally in small groups or large flocks, in trees with dense foliage, and foraging trees are rarely used for roosting (Department of Environment, 2015).

Breeding appears to correspond with the flowering of key eucalypt and mistletoe species and varies between regions, usually occurring from August to January. Cup shapes nests are constructed usually in the canopy of mature trees with rough bark, and a clutch consists of two to three eggs (Department of Environment, 2015).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved Conservation Advice*:* Conservation Advice for *Anthochaera Phrygia*, Regent Honeyeater (Department of Environment, 2015)
- Adopted/made recovery plan: National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (Department of the Environment, 2016)
- Adopted/made threat abatement plan: Threat abatement plan for competition and land degradation by rabbits (Department of Environment and Energy, 2016)
- Relevant Survey Guidelines: Survey Guidelines for Australia's Threatened Birds (Department of the Environment Water Heritage and the Arts, 2010b).

Significant impact criteria

An action is likely to have a significant impact on a critically 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*

Approximately 101.85 hectares of Regent Honeyeater habitat was impacted within the subject land during the 2019–2020 bushfires. The subject land includes area of important mapped habitat and Key Biodiversity Areas for the species; the area was identified as a KBA because it regularly supports significant numbers of the Regent Honeyeater.

The project is likely to impact 93.77 hectares of habitat for the Regent Honeyeater. As a population of the species is known to occur in the area and the project is likely to substantially reduce the amount of foraging and breeding habitat available to this species within the location, it is possible that the project would significantly contribute to a long-term decline in the size of a population of these species.

- *reduce the area of occupancy of the species*

The Regent Honeyeater has a patchy distribution which extends from south-east Queensland, through NSW and the ACT, to central Victoria. Based on the approved conservation advice for the species the extent of occurrence is estimated at 600,000 square kilometres and the area of occupancy at 300,000 square kilometres. Habitat for this species is also well represented within the locality with approximately 78,017.03 hectares of the associated PCTs occurring within a 10 kilometre buffer of the subject land.

Given the mobility of these bird species, and the extent of similar habitats in the locality, it is likely the removal of 93.77 hectares of confirmed habitat would reduce the area of occupancy for these species.

- *fragment an existing population into two or more populations*

The subject land is already largely fragmented, and habitat remaining occurs as disjunct remnant patches and as scattered paddock trees within the locality. Regent Honeyeater is a highly mobile species and is known to disperse widely (Higgins, Peter, & Steele, 2001), and consequently is unlikely that the project would present a significant barrier to this species. Therefore, it is considered unlikely that the project would fragment an existing population into two or more populations given the ecology of the species, the existing fragmented state of potential foraging habitat, and that the clearing would occur at the edge of important breeding habitat.

— *adversely affect habitat critical to the survival of a species*

The recovery plan defines habitat critical to the survival as any breeding or foraging habitat in areas where the species is likely to occur and any newly discovered breeding or foraging locations. Key areas of critical habitat listed for the species includes the Bundarra-Barraba, Pilliga Woodlands, Mudgee-Wollar and the Capertee Valley and Hunter Valley areas in New South Wales, and the Chiltern and Lurg-Benalla regions of north-east Victoria, inclusive of a number of subsidiary areas within these regions.

The subject land footprint occurs within a mapped area of important breeding habitat for the Regent Honeyeater within the Hunter Valley area and is anticipated to clear up to 93.77 hectares of this confirmed mapped habitat. The project would also clear a large amount of potential foraging habitat for the species. Consequently, the project is likely to adversely impact habitat critical to the survival of the Regent Honeyeater.

— *disrupt the breeding cycle of a population*

The project is likely to impact on 93.08 hectares of mapped breeding habitat for the Regent Honeyeater. Removal of this habitat would reduce the breeding opportunities available to individuals occurring in this area, which is known to be utilised by populations of the species. Consequently, the project is likely to disrupt the breeding cycle of a 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 project is likely to impact on 93.77 hectares of mapped important habitat for the Regent Honeyeater. Removal of these foraging and breeding resources for the Regent Honeyeater are likely to reduce breeding opportunities and result in a significant reduction in the overall habitat available to the species within the locality, likely reducing the overall area of occupancy of the species. Given the overall extent of habitat impacted by the project, it is likely that the project would modify, destroy, remove or isolate habitat for this species to the extent that is likely to cause the species 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*

Given the previous agricultural land use, many of the invasive species are already present in the landscape. Adhering to mitigation measures which will be put in place for the project such as pest management, weed and pathogen controls, would prevent potentially harmful invasive weeds and vertebrate pests such as rabbits, cats and foxes establishing in Regent Honeyeater habitat. Therefore, it is unlikely the project would result in further invasive species becoming established within the species habitat.

— *introduce disease that may cause the species to decline*

The key disease likely to impact these species is *Psittacine Circovirus* Disease (PCD). The disease is believed to have evolved with wild psittacines and is widespread in wild psittacines, including many common Australian species. Noting PCD is already within the landscape, and given the nature and scale of the project it is unlikely it would introduce a disease that may cause the species to decline

— *interfere substantially with the recovery of the species*

No recovery plan is currently in force for the Regent Honeyeater. Previous Recovery Plan actions (Department of the Environment 2016) include:

— improve the extent and quality of regent honeyeater habitat
— bolster the wild population with captive-bred birds until the wild population becomes self-sustaining
— increase understanding of the size, structure, trajectory, and viability of the wild population
— maintain and increase community awareness, understanding and involvement in the recovery program.

Based on the potential impacts of the project on this species, as discussed above, it is likely that the project would be in conflict with the objectives and the first strategy of the recovery plan by reducing the extent of Regent Honeyeater habitat and impacting on the breeding opportunities and habitat condition for the species.

Conclusion

The project is likely to impact on 93.77 hectares of mapped breeding habitat, outlined in the National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (Department of the Environment, 2016) as habitat critical to the survival of the species as well as a large amount of potential foraging habitat that occurs within the subject land. The removal of this habitat is likely to impact on both foraging and breeding resources for the species and impact on known areas of occurrence, likely reducing the overall area of occupancy of the species. Considering the above information, the project is considered likely to have a significant residual impact on the Regent Honeyeater.

B4.1.3 Gang-gang Cockatoo (Callocephalon fimbriatum)

The Gang-gang Cockatoo is listed as endangered under the NSW BC Act and EPBC Act. The Gang-gang Cockatoo is distributed from southern Victoria through south and central eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the southeast coast to the Hunter region, and inland to the Central Tablelands and southwest slopes. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee.

In spring and summer, this species is generally found in tall mountain forests and woodlands, mainly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas, and is often found in urban areas. The species favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 centimetres in diameter or larger in eucalypts and 3 metres or more above the ground.

Gang-gang Cockatoos have been recorded between Olney and Pokolbin State Forests (Wyong and Yengo IBRA subregions).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

The relevant Commonwealth statutory document available for this specie and used in this assessment is the approved Conservation Advice for *Callocephalon fimbriatum* (Gang-gang Cockatoo). Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/768-conservation-advice-02032022.pdf. In effect under the EPBC Act from 02 March 2022.

Significant impact criteria

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*

The approved conservation advice for Gang-gang Cockatoo notes that the species population had declined by 69% between 1999–2019. It is estimated that the 2019–2020 bushfires impacted between 28% to 36% of the species distribution, resulting in a 10% reduction in the overall population size. Estimates of the impacts of the 2019–2020 bushfires on populations of native animal species (Legge, et al., 2021) identified that the population three years post fire generation would still be 25% lower than the pre-fire population size.

The project will result in the loss of 2.96 hectares of confirmed habitat and 90.27 hectares of assumed habitat (total of 93.23 hectares) for the species. In addition, the Gang-Gang Cockatoo was identified as one of the species at risk of collision with the transmission lines. Mitigation measures will be implemented to reduce the risk of collision including installing bird diverters. However given the known population declines, it is likely the loss of habitat associated with the project would lead to a long-term decrease in the size of a population.

— *reduce the area of occupancy of the species*

The species is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. However, the range has contracted with records north of Sydney occurring rarely. The project would result in the loss of 2.96 hectares of confirmed habitat and 90.27 hectares of assumed habitat for the Gang-Gang Cockatoo. Given the project is located at the northern extent of the species distribution, it is likely to significantly reduce the area of occupancy for this species.

— *fragment an existing population into two or more populations*

The maximum cleared area for a single tower footprint or laydown area would not exceed 0.5 hectares, and the easement width of the transmission line would be a maximum of approximately 200 metres wide which allows for micro-siting of the transmission line easement and transmission towers to avoid significant environmental constraints. Given the ability of this species to disperse over and around these cleared areas, it is considered unlikely that the project would fragment an existing population into two or more populations.

— *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been included in the register of Critical Habitat. The approved conservation advice for the species identifies habitat critical for the survival of the Gang-Gang Cockatoo as all foraging habitat during both the breeding and non-breeding season. The species relies on stands of suitable hollow bearing trees with known or potential hollow chambers that are generally around 20 centimetres in floor diameter, 50 centimetres deep and around 7.5 metres above the ground (Department of Agriculture, Water and the Environment, 2022). Therefore, as defined by the approved conservation advice, habitat critical to the survival of the species is present and is likely to be impacted or modified by the project.

— *disrupt the breeding cycle of a population*

Gang-gang Cockatoos nest in the hollows of tree trunks and limbs, or within the dead sprout of large, living eucalypts often near water. The approved conservation advice notes that the species prefers hollows that generally have an entrance height of 21.3 centimetres (minimum entrance height 12 centimetres) and an average entrance width of 13.1 centimetres (range 9–24 centimetres; Davey & Mulvaney 2020). The hollow chambers are generally around 20 centimetres in floor diameter, around 50.5 centimetres deep (range 22–90 centimetres) and occur around 7.5 metres (range 5–9.4 metres) above the ground. Breeding aggregations are reliant on stands of suitable hollow bearing trees.

The project will result in the loss of 93.23 hectares that may include suitable breeding hollows for the species. However, the towers will be micro-sited to avoid sensitive habitat features and largely avoid the riparian habitats. Therefore, it is unlikely the project would significantly disrupt the breeding cycle of the species.

In addition, to minimise the impacts on suitable nesting trees a supplementary hollow and nest strategy will be developed and implemented for the creation of nest boxes or other hollow creation method to provide alternative roosting and/or nesting habitat for threatened fauna displaced during clearing. Nest box/hollows are to be installed prior to commencement of clearing works where practicable in each construction area. Where supplementary hollows are proposed to be established on land adjacent to the easement, these will be subject to landowner agreement and captured in any property management plan.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The project would result in the loss of 2.96 hectares of confirmed habitat and 90.27 hectares of assumed habitat (93.23 hectares total) for this species. This habitat has been previously modified and is similar habitat occurs in the surrounding locality (approximately 142,174.73 hectares within a 10 kilometre buffer of the subject land). In addition, impacts of tower locations and access tracks will be minimal. The habitats will mostly be spanned by wires and the micro-siting process undertaken before construction begins which would further minimise impacts to the greatest extent possible.

Noting the condition of the habitat, mobility of the species, scale and nature of the project it is unlikely that the project would modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the Gang-gang Cockatoo would likely 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*

Many assumed habitat patches in the subject land are dominated by exotic ground species. Weed and pest faunal species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. There is potential for the project to introduce additional weeds and pathogens within the subject land and surrounding locality. Mitigation measures outlined in section 8.4 of the BDAR will be implemented for the project to address potential invasive species introduction. As such the project is considered unlikely to result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered habitat.

- *introduce disease that may cause the species to decline*

The key disease likely to impact these species is *Psittacine Circovirus* Disease (PCD). The disease is believed to have evolved with wild psittacines and is widespread in wild psittacines, including many common Australian species. Noting PCD is already within the landscape, and given the nature and scale of the project it is unlikely it would introduce a disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There are currently no adopted or made recovery plans for the Gang-gang Cockatoo. The approved conservation advice (Department of Agriculture Water and the Environment, 2022b) outlines the primary conservation objective for the species as 'To prevent further declines and support increases in the population size of the Gang-gang Cockatoo' with a number of priority actions for conservation and management, survey and monitoring and research also outlined. The project is likely to impact one of the recovery objectives outlined, namely: protect and enhance the quality of assumed habitat (both breeding and foraging) of the Gang-gang Cockatoo.

Conclusion

Based on the assessment above the loss of 93.23 hectares of habitat associated with the project is likely to result in a significant residual impact on the Gang-gang Cockatoo.

B4.1.4 Swift Parrot (*Lathamus discolor*)

Swift Parrots breed in Tasmania. In Autumn, the majority of the population migrates to mainland Australia. Overwintering occurs predominantly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. Until recently it was believed that in New South Wales, Swift Parrots forage mostly in the western slopes region along the inland slopes of the Great Dividing Range but are patchily distributed along the north and south coasts including the Sydney region. However, new evidence indicates that the forests on the coastal plains from southern to northern NSW also provide extremely important foraging habitat.

On mainland Australia Swift Parrots are semi-nomadic, foraging on flowering eucalypts and in eucalypt associations, particularly box-ironbark forests and woodlands. The species prefers sites with flowering *Acacia pycnantha*, or sites with highly fertile soils where large trees have high nectar production, such as sites along drainage lines and isolated rural or urban remnants. Swift Parrot use foraging sites inconsistently across years (Garnett and Crowley 2000, Swift Parrot Recovery Team 2001).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Threatened Species Scientific Committee (2016). Conservation Advice *Lathamus discolor* Swift Parrot. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/744-conservation-advice-05052016.pdf. In effect under the EPBC Act from 05 May 2016.
- Adopted/made recovery plan: Department of Climate Change, Energy, the Environment and Water (2024). National Recovery Plan for the Swift Parrot (*Lathamus discolor*). Department of Climate Change, Energy, the Environment and Water, Canberra. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/swift-parrot-2024. In effect under the EPBC Act from 30 April 2024.
- Adopted/made threat abatement plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

Significant impact criteria

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*

The subject land includes area of important mapped habitat and Key Biodiversity Areas for the species; the area was identified as a KBA because it regularly supports significant numbers of the Swift Parrot. The most recent population estimate for the Swift Parrot is 2000 birds, which is considered low. Approximately 10% to 30% of habitat for the Swift Parrot within the species distribution range was impacted by the 2019–2020 bushfires. The impact of the bushfires within the subject land was estimated at 134.36 hectares. The project is likely to impact 42.76 hectares of important foraging habitat for the Swift Parrot Therefore it is possible that the project would significantly contribute to a long-term decline in the size of a population of these species.

- *reduce the area of occupancy of the species*

The non-breeding range of this species includes much of the east coast of mainland Australia, primarily forested areas of Vicotria and NSW but ranging up to southeast QLD. The full extent of occurrence for this species was estimated at 5,700,000 hectares. The area of occupancy for the species is estimated at 1850–35,500 square kilometres. The project would result in the loss of 42.76 hectares of habitat for the species, which represents between approximately between 0.001% – 0.02% of the species geographic range.

Given the mobility of these bird species, it is unlikely the removal of 42.76 hectares of habitat would reduce the area of occupancy for these species. Habitat for this species is also well represented within the locality with approximately 13,5002.60 hectares of the associated PCTs occurring within a 10 km buffer of the subject land.

- *fragment an existing population into two or more populations*

Habitat removal is unlikely to result in fragmentation of habitat for the Swift Parrot. This species is highly mobile and regularly flies long distances over open areas to move between suitable foraging habitats. The action will not affect the movement of the Swift Parrot between habitat patches or fragment the population in two or more.

- *adversely affect habitat critical to the survival of a species*

According to the *National Recovery Plan for the Swift Parrot (Lathamus discolor)*, habitat critical to the survival of the Swift Parrot includes 'those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot or are otherwise identified by the recovery team'. Swift Parrot has important habitat maps, as identified in NSW BioNet which identify land that is considered important to support critical life stages of the species (i.e. key areas that migratory species forage/over-winter in, or sites where multiple records have been located over multiple years).

Important foraging habitat is mapped within the greater region; the project would result in the loss of 42.76 hectares of confirmed habitat with the subject land. Consequently, the project is likely to adversely impact habitat critical to the survival of the Swift Parrot.

- *disrupt the breeding cycle of a population*

Swift Parrots breed in Tasmania during spring and summer, migrating to south-eastern Australia during autumn and winter. While Swift Parrots are dependent on flowering resources across a wide range of habitats (woodlands and forests) within their NSW wintering grounds, the removal of a small amount of potential foraging habitat is unlikely to disrupt their movements to Tasmanian breeding grounds. As such the project is unlikely to affect their breeding cycle.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

As a large-scale migrant, the Swift Parrot has the ability to cover vast areas of its winter range, seeking suitable flowering eucalypt habitat. The species is an occasional visitor to the region and may utilise trees in the subject land for foraging intermittently. The action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of 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*

Given the previous land use (i.e. agriculture) within the subject land, many invasive species are already present in the landscape. Adhering to mitigation measures such as pest management, weed and pathogen controls, would prevent further invasive species establishing in Swift Parrot habitat.

- *introduce disease that may cause the species to decline*

The key disease likely to impact these species is *Psittacine Circovirus* Disease (PCD). The disease is believed to have evolved with wild psittacines and is widespread in wild psittacines, including many common Australian species. Noting PCD is already within the landscape, and given the nature and scale of the project it is unlikely it would introduce a disease that may cause the species to decline

- *interfere substantially with the recovery of the species*

A National Recovery Plan for the Swift Parrot *Lathamus discolor* was prepared in 2024. Recovery strategies outlined in this plan include:

- maintain known Swift Parrot breeding and foraging habitat at the local, regional and landscape scales
- reduce impacts from Sugar Gliders at Swift Parrot breeding sites
- monitor and manage other sources of mortality
- develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions
- improve understanding of foraging and breeding habitat use at a landscape scale in order to better target protection and restoration measures
- engage community and stakeholders in Swift Parrot conservation
- coordinate, review and report on recovery progress.

Based on the potential ecological impacts of the project on the Swift Parrot it is unlikely the project would be in conflict with the Recovery Actions outlined above. Therefore it is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

The project is likely to impact on with 42.76 hectares of mapped important habitat for the Swift Parrot. Based on the assessment above it is considered that the project will result in a significant residual impact on the Swift Parrot.

B4.1.5 South-eastern Hooded Robin (Melanodryas cucullata cucullata)

Hooded Robins are shy and largely sedentary birds and are mostly seen in pairs or small groups. They prefer dry eucalypt and acacia woodlands and shrublands with an open understory, some grassy areas and a complex ground layer. They tend to avoid woodlands with tall trees or dense tree cover but sometimes occur in tall, dense heaths with scattered open areas

The species generally forms monogamous pairs and occupies territories during the breeding season (between July and November) and non-breeding season. The birds usually return to the same breeding site where they nest in small, neat cups of bark and grasses bound with webs, that are generally situated in a tree fork or crevice, from less than 1 metre to 5 metres above the ground. The south-eastern species (*Melanodryas cucullata cucullata*) occurs in south-eastern Australia from Brisbane, Queensland to Adelaide in South Australia and through much of inland NSW.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Melanodryas cucullata cucullata* (hooded robin (south-eastern)). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/67093-conservation-advice-31032023.pdf. In effect under the EPBC Act from 31 March 2023.

- Adopted/made threat abatement plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

Significant impact criteria

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*

The Hooded Robin was not recorded during the targeted surveys, however habitat for the species was identified in association with PCT 3150, 3151, 3152, 3230, 3242, 3244, 3489, 3599, 3605, 3617, 3636 and 4015 in the Yengo and Hunter IBRA subregions. The approved conservation advice for the species notes that the population has declined by more than 50% over the last ten years.

Approximately 83.7 hectares of habitat for the species was impacted within the subject land during the 2019–2020 bushfires. While the species is known to occur in Broke and Jerry plains which are located outside of the subject land, the project may provide foraging and breeding resources necessary to maintain the population. Therefore, there is a real chance or possibility that the loss 248.82 of hectares of assumed habitat for the Hooded Robin within the subject land would lead to long-term decrease in the size of the Hooded Robin population.

- *reduce the area of occupancy of the species*

The species ranges from far southeast Queensland to Yorke Peninsula in South Australia. The extent of occurrence is estimated at 1,200,000 square kilometres and the area of occupancy for the species is 30,000 square kilometres. The project will result in the loss of 248.82 hectares of assumed habitat for the species, which represents 0.008% of the area of occupancy for the species. Given the mobility of the species, and the extent of similar habitats in the locality, it is unlikely the project would reduce the area of occupancy for these the Hooded Robin. In addition, approximately 60,963.9 hectares of assumed habitat for the species occurs within a 10 kilometre buffer of the subject land.

- *fragment an existing population into two or more populations*

The species is a small bird that is known to avoid tall vegetation and forages in from the ground. Given the behaviour of the species and nature of the project (i.e. towers will be micro-sited to ensure minimal impact on the species habitat, and powerlines will largely span the habitat) it is unlikely the project would result in a barrier to movement or fragment an existing population into two or more important populations.

- *adversely affect habitat critical to the survival of a species*

The approved conservation advice for the species define habitat critical to the survival as areas of dry eucalypt and acacia woodlands and shrublands remnants with an open understory, some grassy areas and a complex ground layer, often in or near clearings or open areas; structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses; standing dead or live trees and tree stumps are also essential for nesting, roosting and foraging; and moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat. The project will remove 248.82 hectares of habitat for the species that is likely to represent habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

A population of the species is known to occur in Broke and Jerry Plains which are located outside of the subject land. There are no records of the Hooded Robin occurring within the subject land, and while there are Eucalyptus trees that may provide nesting opportunities for the Hooded Robin no nesting was observed during the surveys. In addition, the project will not form a barrier to the species movement. Based on the above it is unlikely the project would disrupt the breeding cycle of the species.

- *modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The project would result in the loss of 248.82 hectares of assumed habitat for this species. This habitat has been previously modified and similar habitat occurs in the surrounding locality (approximately 60,963.9 hectares within a 10 kilometre buffer of the subject land). In addition, impacts of tower locations and access tracks will be minimal. The habitats will mostly be spanned by wires and the micro-siting process undertaken before construction begins would further minimise impacts to the greatest extent possible. Therefore, it is unlikely the project would modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the Hooded Robin would likely decline.

- *result in invasive species that are harmful to a critically endangered or endangered species becoming species established in the established in the endangered species habitat.*

Many assumed habitat patches in the subject land are dominated by exotic ground species. Weed and pest faunal species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. There is potential for the project to introduce additional weeds and pathogens within the subject land and surrounding locality. Mitigation measures outlined in Section 8.4 of the BDAR would be implemented for the project to address potential invasive species introduction. As such the project is considered unlikely to result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.

- *introduce a disease that may cause the species to decline*

The key disease likely to impact these species is *Psittacine Circovirus* Disease (PCD). The disease is believed to have evolved with wild psittacines and is widespread in wild psittacines, including many common Australian species. Noting PCD is already within the landscape, and given the nature and scale of the project it is unlikely it would introduce a disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There is no recovery plan for the Hooded Robin, the approved conservation advice for the species sets out several conservation and management priorities to stabilise or increase the population across the species range. This includes ceasing land clearing within areas of habitat critical to the survival of the species. Therefore, the project may sustainably interfere with the recovery of the species.

Conclusion

Based on the assessment above the project is likely to remove habitat critical to the survival of the species, therefore it is considered the project would have a significant residual impact on the Hooded Robin.

B4.1.6 Australasian Bittern (Botaurus poiciloptilus)

Australasian Bittern is listed as endangered under the EPBC Act. The Australasian Bittern is a large, stocky, thick-necked, heron-like bird that occurs in mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. The species favours wetlands with tall dense vegetation, particularly those dominated by sedges, rushes and reeds, where it forages in still, shallow water up to 0.3 metres deep.

The Australasian Bittern occurs from southeast Queensland to southeast South Australia as far as the Adelaide Region, southern Eyre Peninsula. In New South Wales, the species is known to occurs along the coast and is also frequently recorded in the floodplain wetlands of the Murray, Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Threatened Species Scientific Committee (2019). Conservation Advice *Botaurus poiciloptilus* Australasian Bittern. Canberra, ACT: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/1001-conservation-advice-18012019.pdf. In effect under the EPBC Act from 18 January 2019.
- Listening advice: Threatened Species Scientific Committee (TSSC) (2011). Commonwealth Listing Advice on *Botaurus poiciloptilus* (Australasian Bittern). 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/1001-listing-advice.pdf. In effect under the EPBC Act from 03 March 2011.
- Adopted/made recovery plan: Department of Climate Change, Energy, the Environment and Water (2022). National Recovery Plan for the Australasian Bittern (*Botaurus poiciloptilus*). Department of Climate Change, Energy, the Environment and Water, Canberra. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/australasian-bittern. In effect under the EPBC Act from 24 February 2023.
- Adopted/made threat abatement plans:
  - Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
  - Department of the Environment, Water, Heritage and the Arts (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. In effect under the EPBC Act from 01 October 2008.

Significant impact criteria

An action is likely to have a significant impact on an 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*

The *Action Plan for Australian Birds 2010* (Garnett *et al*. 2011) suggested there were less than 1000 mature Australasian Bitterns within the Australian population, and that the population was likely declining. The species was not recorded within the subject land despite targeted ecological surveys.

The project will result in the clearing of approximately 22.08 hectares of assumed habitat for the species in the form of associated PCTs 4015, 4039, 4072 and 4089 in the Yengo and Hunter IBRA subregions. Given the mobility of the species and larger areas of known habitat in the surrounding region it is unlikely the project would reduce the resources within the species range such that it would lead to a long-term decrease in the population.

- *reduce the area of occupancy of the species*

The area of occupancy for Australasian Bittern is estimated to be approximately 1150 square kilometres. This equates to an area of 115,000 hectares. The project will result in the loss of 22.08 suitable hectares which represents 0.019% of the area of occupancy for the species. In addition, approximately 5993.37 hectares of associated PCTs habitat for the species was identified within a 10 kilometre buffer of the subject land. Therefore, it is unlikely the project would reduce an area of occupancy for the species.

- *fragment an existing population into two or more populations*

The Australasian Bittern population can be divided into two subpopulations, the southeastern and southwestern subpopulations. This species is highly mobile and capable of long distance flights to move between suitable wetland habitats. Therefore, it is considered unlikely that the project would introduce a barrier to movement, which would result in the southeastern subpopulation being fragmented into two or more populations.

- *adversely affect habitat critical to the survival of a species*

The approved conservation advice states that as a guide, habitat critical to the survival of the Australasian Bittern can be considered to include any natural wetland habitat where the species is known or likely to occur (breeding or foraging habitat) within the indicative distribution map.

The subject land does not contain any natural wetland habitat, therefore does not represent habitat critical to the survival of the species. The project will not adversely impact habitat critical to the survival for the species.

- *disrupt the breeding cycle of a population*

The species nests in densely vegetated freshwater wetlands, building its nests within dense cover over shallow water placed about 30 centimetres above the water level. The species was not recorded during the ecological surveys, and no evidence of nesting was observed. The project will remove 22.08 hectares of assumed habitat for the species. However, mitigation measures will be implemented to minimise the impacts on species habitat including micro-siting the towers and largely avoiding waterway and major wetlands. Therefore, it is unlikely the project would it disrupt the breeding cycle of the Australasian Bittern.

- *modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Due to their considerable ability to move very long distances, Australasian Bittern individuals that may be present within the habitat in the impact area would be part of the broader population that is known to occur in local areas of habitat across the Hunter. In light of the demonstrated absence of Australasian Bitterns from the subject land, it is considered unlikely that impacts from in the project would be highly significant to the habitat preferences of Australasian Bitterns in the region. The project is therefore unlikely to modify, destroy, remove or isolate or decrease the availability or quality of 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 species established in the established in the endangered species habitat.*

Weed and pest faunal species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. As such the project is considered unlikely to result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.

- *introduce a disease that may cause the species to decline*

There are no known diseases impacting this species that would be introduced by the project.

- *interfere substantially with the recovery of the species*

The objective of the *National Recovery Plan* is to demonstrate, by 2032, an increasing trend (compared to 2020 baseline counts) in the number of mature individuals being recorded in annual surveys at key locations, and to ensure that habitat critical to the survival of the Australasian Bittern is protected and managed to meet the ecological requirements of the species. The strategies to achieve objectives include:

- implement management actions that mitigate or reduce threats to Australasian Bittern and their habitat
- enhance the quality, extent and protection of assumed habitat for the Australasian Bittern
- undertake research and monitoring to improve knowledge of the biology, ecology and population trends of Australasian Bittern
- increase stakeholder participation in Australasian Bittern conservation and management
- coordinate, review and report on recovery progress.

Approximately 22.08 hectares of habitat for Australasian Bittern would be impacted by the project and this is likely to contribute to the known threats to the species and as such interfere with the recovery of the species. However, in the context of the habitat to be removed the impact is likely to be minimal as the habitat has been demonstrated through considerable survey effort to be suboptimal for the species. Therefore, it is unlikely the project would result in an adverse impact on the Australian Bittern.

Conclusion

Based on the assessment above the project is unlikely to result in a significant residual impact on the Australasian Bittern. However, the 22.08 hectares of assumed habitat (PCTs) to be removed will require ecosystem credits in accordance with the NSW Biodiversity Offsets Scheme (see Table 11.1 of the BDAR). This will provide habitat resources for the species.

B4.1.7 Australian Painted Snipe (Rostratula australis)

Australian Painted Snipe is listed as endangered under the EPBC Act. The species is a stocky wading bird that occurs in both ephemeral and permanent shallow freshwater wetlands, such as lakes, swamps, claypans, inundated or waterlogged grassland/saltmarsh, dams, rice crops, sewage farms and bore drains. The habitats generally have a good cover of grasses, rushes and reeds, low scrub, *Muehlenbeckia* spp. (lignum), open timber or samphire.

The Australian Painted Snipe has been recorded in all states and territories, however important areas for this species in the past have included the Murray-Darling Basin (particularly the Riverina of Victoria and New South Wales), Queensland Channel Country, Fitzroy Basin of Central Queensland, southeastern South Australia and adjacent parts of Victoria. Records published over the past twenty years provide evidence for Australian painted snipe occurring more widely and frequently in the remote arid and tropical regions of Australia.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Department of Sustainability, Environment, Water, Population and Communities (2013). Approved Conservation Advice for *Rostratula australis* (Australian painted snipe). Canberra: Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/77037-conservation-advice.pdf. In effect under the EPBC Act from 15 May 2013.

- Listening advice: Threatened Species Scientific Committee (TSSC) (2013). Commonwealth Listing Advice on *Rostratula australis* (Australian Painted Snipe). Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/77037-listing-advice.pdf. In effect under the EPBC Act from 15 May 2013.
- Adopted/made recovery plan: Department of Climate Change, Energy, the Environment and Water (2022). National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*). Department of Climate Change, Energy, the Environment and Water, Canberra. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/australian-painted-snipe-2022.
- Adopted/made threat abatement plans: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
- *Survey Guidelines for Australia's Threatened Birds. EPBC Act survey guidelines 6.2* (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010).

Significant impact criteria

An action is likely to have a significant impact on an 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*

The national recovery plan for the Australian Painted Snipe notes that the estimated population in 2020 was between 240–410 mature individuals. The species was not recorded within the subject land despite targeted ecological surveys.

The project will result in the clearing of approximately 22.08 hectares of assumed habitat for the species in the form of associated PCTs 4015, 4039, 4072 and 4089. Given the mobility of the species and larger areas of known habitat in the surrounding locality (6858.62 hectares within a 10 kilometre buffer of the subject land) it is unlikely the project would reduce the resources within the species range such that it would lead to a long-term decrease in the population.

- *reduce the area of occupancy of the species*

The estimated extent of the species occurrence is 4,500,000 square kilometres with and estimated area of occupancy of 1000 square kilometres. This equates to an area of 100,000 hectares. The project will result in the loss of 22.08 hectares of assumed habitat which represents 0.02% of the area of occupancy for the species. Given the distribution of the species, and proposed avoidance measures such as micro-siting the towers outside of wetland habitats, it is unlikely the project would reduce an area of occupancy for the species.

- *fragment an existing population into two or more populations*

The Australian Painted Snipe is highly mobile and capable of long distance flight to move between suitable wetland habitats. Therefore, it is considered unlikely that the project would introduce a barrier to movement, which would result in a population being fragmented into two or more populations.

- *adversely affect habitat critical to the survival of a species*

The recovery plan states that, as a guide habitat critical to the survival of the Australian Painted Snipe can be considered.

- any natural wetland habitat where the species is known or likely to occur (especially with suitable breeding habitat) within the indicative distribution of the species
- any location outside the above area that may be periodically occupied by Australian Painted Snipe when wetland conditions are favourable.

Mitigation measures will be implemented to minimise the impacts on species habitat including micro-siting the towers and largely avoiding waterway and major wetlands. Therefore, it is unlikely the project would adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The national recovery plan for the Australian Painted Snipe notes that breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and mixed heights of low vegetation. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, with a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. The project will remove 22.08 hectares of assumed habitat for the species. However, mitigation measures will be implemented to minimise the impacts on species habitat including micro-siting the towers and largely avoiding waterway and major wetlands. Therefore, it is unlikely the project would it disrupt the breeding cycle of the Australian Painted Snipe.

- *modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Although the species was not recorded during the surveys project would result in the loss of 22.08 hectares of assumed habitat for the species. Given the mobility of the species and extent of the species distribution, it is unlikely the loss of 22.03 hectares of assumed habitat would modify, destroy, remove, isolate, or decrease the availability or quality of 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 species established in the established in the endangered species habitat*

Weed and pest faunal species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. As such the project is considered unlikely to result in invasive species that are harmful to Australian Painted Snipe habitat.

- *introduce a disease that may cause the species to decline*

There are no known diseases impacting this species that would be introduced by the project. Clearing protocols, installation vehicle wash stations and sediment and control measures will help to minimise the likelihood of introduction or spread of pathogens into the site. Consequently, the project is unlikely to introduce disease or pathogens that may contribute to the decline of the species.

- *interfere substantially with the recovery of the species*

The national recovery plan for the species lists a number of strategies for the recovery of the Australian painted Snipe including:

- 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
- 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.

Approximately 22.08 hectares of habitat for Australian Painted Snipe would be impacted by the project and this is likely to contribute to the known threats to the species and as such interfere with the recovery of the species. However, in the context of the habitat to be removed the impact is likely to be minimal as the habitat has been demonstrated through considerable survey effort to be suboptimal for the species. Therefore, it is unlikely the project would substantially interfere with the recovery of the Australian Painted Snipe.

Conclusion

Based on the assessment above the project is unlikely to result in a significant residual impact on the Australian Painted Snipe. However, the 22.08 hectares of assumed habitat to be removed will require ecosystem credits in accordance with the NSW Biodiversity Offsets Scheme (Table 11.1 of the BDAR). This will provide habitat resources for the species.

B4.1.8 Southern Greater Glider (Petauroides volans)

The Southern Greater Glider (southern and central) is listed as endangered under the EPBC Act. The species has a broad distribution in Eastern Australia from around Proserpine in Queensland, south through NSW and the ACT, to Wombat State Forest in central Victoria. An arboreal nocturnal marsupial, that is predominantly solitary, this species is largely restricted to eucalypt forests and woodlands within its range. This species is most abundant in tall, montane, moist eucalypt forests on fertile soils, that feature relatively old trees with abundant hollows.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Department of Climate Change, Energy, the Environment and Water (2022). Conservation Advice *for Petauroides volans* (greater glider (southern and central)). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-05072022.pdf. In effect under the EPBC Act from 05 July 2022.
- Adopted /made threat abatement plans: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

Significant impact criteria

An action is likely to have a significant impact on 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*

The approved conservation advice for the species notes that approximately 40% of the distribution of the Southern Greater Glider was impacted during the 2019–2020 bushfires. High severity fires have the potential to damage tree hollows or result in the loss of hollow-bearing trees entirely and may also trigger the collapse of hollow bearing trees (Green, 2024). Approximately 53.24 hectares of habitat for the species within the subject land experienced a moderate to extreme severity burn during the 2019–2020 bushfires.

The project will result in the direct removal or modification of 477.12 hectares of confirmed habitat for the Southern Greater Glider (southern and central). Thirty-two observations of southern greater glider were recorded across the Pokolbin, Watagan and Corrabare State Forests. Given the loss of habitat already impacted by the bushfires there is a real chance or possibility that the project would lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of the species*

The extent of occurrence of the Southern Greater Glider is estimated at 1,586,870 square kilometres and the area of occupancy estimated at 16,164 square kilometres. Habitat for this species is well represented within the locality with approximately 42,513.84 hectares of the associated PCTs occurring within a 10 km buffer of the subject land.

The project is likely to remove 477.12 hectares of confirmed habitat for the species representing a 0.03% of the area of occupancy for the species. Given the species distribution and large area of occupancy it is unlikely the project would result in a significant reduction in the area of occupancy of the species.

- *fragment an existing population into two or more populations*

The project has the potential to limit connectivity due to clearance requirements under the transmission lines. Where the construction area will impact habitat connectivity the areas are to be investigated and where appropriate glider poles will be installed. The exact location and design of under-transmission line glider poles and/or rope bridges will be nominated as part of a connectivity strategy. Where poles are proposed to be installed on land adjacent to the easement, they will be subject to landowner agreement and captured in the property management plan. These measures have been used in previous linear project and are considered effective in maintaining connectivity for the species. Providing these measures are implemented it is unlikely the project would fragment an existing population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

The approved conservation advice for the species states that the habitat critical to their survival is:

- large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region
- smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization
- cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes)
- areas identified as refuges under future climate changes scenarios
- short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonize burnt areas.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Based on this broad definition, 477.12 hectares of confirmed habitat within the subject land could be defined as critical to the survival of the Southern Greater Glider (southern and central), therefore the project could adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

From March to June, female individuals of this species give birth to a single young. It takes until the second year for them to reach sexual maturity. The estimated lifespan for this species is around 15 years, while the generation length is estimated to be between 6 to 8 years. The species utilises tree hollows in both dead and live tree for denning. The loss of these trees combined with the potential fragmentation may 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*

The loss of 477.12 hectares of confirmed habitat including the potential loss of tree hollows, associated with the project, is considered likely to modify, destroy, remove or isolate or decrease the availability or quality of 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*

Many assumed habitat patches in the subject land are dominated by exotic ground species. Weed and pest faunal species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. There is potential for the project to introduce additional weeds and pathogens within the subject land and surrounding locality. Mitigation measures outlined in Section 8 of the BDAR would be implemented for the project to address potential invasive species introduction. As such the project is considered unlikely to result in invasive species becoming established in the habitat.

- *introduce disease that may cause the species to decline*

There are no known disease issues affecting this species in relation to the project. The project would be unlikely to increase the potential for significant disease vectors to affect the species. It is the intention to use current best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. Consequently, there is no real chance or possibility that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There is currently no recovery plan for the Southern Greater Glider. The species' approved conservation advice outlines the following conservation and management priorities:

- habitat loss, disturbance and modification (including fire)
- climate change
- invasive species (including threats from predation, grazing, trampling).

As the project will affect 477.12 hectares of confirmed habitat, it is possible that it will interfere with the recovery of the species.

Conclusion

Based on the assessment above the, it likely that the removal of 477.12 hectares of Southern Greater Glider habitat associated with the project would result in a significant residual impact on the species.

B4.1.9 Koala (Phascolarctos cinereus)

The range of the Koala differs slightly between the biological species range and listed species range. The biological species range extends from northeastern Queensland to the southeast corner of South Australia. Several sub-populations of the biological species occur outside this range in southeastern South Australia (i.e., Kangaroo Island) and some parts of Victoria, due to translocations. The listed species range extends from northeastern Queensland to the Victorian border. Distribution of the Koala is influenced by altitude (generally limited to <800 metres above sea level) and tied to temperature. Distribution is also influenced by leaf moisture at the western and northern ends of the range. Koala population density is typically greater towards the coast than inland in these areas.

In NSW, Koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests and some smaller populations on the plains west of the Great Dividing Range. Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species. They are a leaf-eating specialist that feed primarily during dawn, dusk or night.

Koalas feed primarily on the foliage of Eucalyptus species; though may sometimes consume *Corymbia spp*., *Angophora spp*. and *Lophostemon spp*. and occasionally *Leptospermum spp*. and *Melaleuca spp*. Individual Koalas typically get their nutrition from just one or a few species present at a site. Koalas typically give birth between October and May and can potentially produce one offspring each year. Young remains in the pouch for 6–8 months and remain with their mothers until they become independent at approximately 12 months of age.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Conservation Advice for *Phascolarctos cinereus* (combined populations in Queensland, New South Wales and the Australian Capital Territory) (Department of Agriculture Water and the Environment, 2022).
- Adopted/made recovery plan: National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (Department of Agriculture, 2022).
- Adopted/made threat abatement plan: No threat abatement plan has been identified as being relevant for this species.
- Policy Statements and Guidelines: Identifying habitat for the endangered Koala (Department of Climate Change, Energy, the Environment and Water, 2022); Referral guidance for the endangered Koala (Department of Climate Change, Energy, the Environment and Water, 2023).

Significant impact criteria

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*

The Koala's distribution includes Queensland, New South Wales, the Australian Capital Territory, Victoria, and South Australia. The Koala's distribution is not continuous across this range, and it occurs in several subpopulations that are separated by cleared land or unsuitable habitat. In NSW, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains and southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Estimated populations in the NSW southwestern slopes was 2310 individuals in 2012. The loss of 244.24 hectares of confirmed Koala habitat and 40.50 of assumed habitat (284.74 hectares total) is unlikely to lead to a long-term decrease in the size of the species population.

- *reduce the area of occupancy of the species*

The listed population of the Koala has a wide but patchy distribution that spans the coastal and inland areas of Queensland north to the Herberton area, extending westwards into hotter and dryer semi-arid climates of central Queensland, New South Wales, and the Australian Capital Territory.

The area of occupancy for Koala is estimated at 19,400 square kilometres, based on the mapping of point records from 2000 from state governments, museums, and CSIRO. Approximately 10% to 30% of the Koala's modelled likely and known distribution was impacted by the 2019–2020 bushfires. Within the subject land 38.61 hectares was impacted by the bushfires.

The project would result in the loss of 284.74 hectares of Koala habitat (244.24 hectares of confirmed habitat and 40.50 of assumed habitat), which represents 0.01% of the estimated area of occupancy for the species, and 0.02% taking to account of the habitat impacted by the bushfires. Given the species mobility and areas of surrounding habitat it is unlikely the project would significantly reduce the area of occupancy for the species.

— *fragment an existing population into two or more populations*

Koalas do utilise agricultural land and will cross fences and cleared paddocks (see Kavanagh & Stanton, 2012) and use of scattered trees in paddocks is also documented (see Barth et al., 2019). Given the nature of the project (towers will be micro-sited, avoidance of riparian areas and transmission lines will span large area of vegetation), the current level of landscape permeability for Koala will not likely be impacted. The powerline corridor will be highly permeable and will not provide a barrier to Koala movement. There is a limited likelihood that the project will fragment an existing population into two or more populations.

— *adversely affect habitat critical to the survival of a species*

The approved conservation advice the species outlines a number of important criteria to consider in terms of 'habitat critical for survival' of Koala including:

- whether the habitat is used during periods of stress (examples: flood, drought, or fire)
- whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes)
- the extent to which the habitat is used by important populations
- whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development
- whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements
- whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation
- any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.

Part of the subject land has been recognized Area of Regional Koala Significance (ARKS) as outlined by the work done under the Saving our Species Iconic Koala Project. Arks identify the locations and extent of important populations. Therefore, it is considered that the project may adversely impact habitat critical to the survival of the species.

— *disrupt the breeding cycle of a population*

Portions of subject land are recognized ARKS. The project would result in the loss of 284.74 hectares of Koala habitat (244.24 hectares of confirmed habitat and 40.50 of assumed habitat), however given the project will not create a barrier to movement and the availability of habitat in the surrounding area it is unlikely the project would disrupt the breeding cycle of a 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 presence of habitat for Koala is largely assessed here based on habitat surrogates given the presence of Koala use trees in the subject land. Koalas use trees are distributed across an extensive area of the Yengo and Wyong IBRA subregions and to a lesser degree within the Hunter subregion (in relation to the subject land locality). Consequently, the project will result in the loss of 284.74 hectares of Koala habitat (244.24 hectares of confirmed habitat and 40.50 of assumed habitat) therefore may modify, destroy, remove or decrease the availability or quality of 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 project is unlikely to result in an invasive species harmful to the Koala becoming established in the habitat. The potential for weed invasion was considered possible with a project of this nature and appropriate controls are required during construction and operation to reduce this threat. Invasive species would be managed under the construction environmental management plan using best practice methods. Consequently, there is no real chance or possibility that the project will result in invasive species that are harmful to Koala becoming established in the habitat.

- *introduce disease that may cause the species to decline*

Chlamydia bacteria in Koalas and Koala Retrovirus are primarily transmitted between Koala individuals (Department of Environment & Climate Change, 2008). It is likely that the disease is already present within the landscape. The project will implement best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. Therefore, the project is unlikely to further introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

The recovery plan for the species outlines a number of key objectives for the recovery effort of the species including:

- the area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased
- the area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased
- metapopulation processes are maintained or improved
- partners, communities, and individuals have a greater role and capability in listed Koala monitoring, conservation, and management.

The objectives of this recovery plan are underpinned by four supporting strategies and two on-ground (direct) strategies, or action areas, as a way of organising and implementing coordinated action:

- build and share knowledge (Strategy 1)
- engage and partner with the community in listed Koala conservation (Strategy 2)
- increase the area of protected habitat for the listed Koala (Strategy 3)
- integrate listed Koala conservation into policy, statutory and land use plans (Strategy 4)
- strategically restore listed Koala habitat (Strategy 5)
- actively manage listed Koala metapopulations (Strategy 6).

The loss of 284.74 hectares of Koala habitat is unlikely to interfere with the recovery objectives or supporting strategies.

Conclusion

Based on the assessment above it is likely the loss of 284.74 hectares of Koala habitat would result in a significant residual impact on the Koala.

B4.1.10 Spotted-tailed quoll (Dasyurus maculatus)

The Spotted-tailed Quoll (southeastern mainland population) is listed as endangered under the EPBC Act. The Spotted-tailed Quoll (southeastern mainland population) is a nocturnal carnivorous marsupial that occurs from southern Queensland to southwestern Victoria. This species typically feeds on a wide variety of prey including small mammals (<5 kilograms), birds, reptiles, fish, amphibian and invertebrates (Threatened Species Scientific Committee, 2020c). They occur as solitary animals in low density with home ranges of up to a few thousand hectares for males and several hundred hectares for females (Threatened Species Scientific Committee, 2020c). Spotted-tailed Quolls inhabit a wide range of vegetation types including closed forests, tall eucalypt forest, open woodlands, open forests, drier rain shadow woodlands and coastal heathlands (Threatened Species Scientific Committee, 2020c).

Since European settlement, habitat reduction and fragmentation for the Spotted-tailed Quoll has led to an estimated 50–90% reduction in population for mainland Australia and 25–50% reduction for populations in NSW (Threatened Species Scientific Committee, 2020c).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Listing advice: Threatened Species Scientific Committee (TSSC) (2004). Commonwealth Listing Advice on *Dasyurus maculatus maculatus* (Spot-tailed Quoll, Spotted-tailed Quoll, Tiger Quoll). Available from: http://www.environment.gov.au/biodiversity/threatened/species/tiger-quoll.html. In effect under the EPBC Act from 14 May 2004.
- Adopted/made recovery plan: Department of Environment, Land, Water and Planning (2016). National Recovery Plan for the Spotted-tailed Quoll *Dasyurus maculatus*. Australian Government, Canberra. Available from: *http://www.environment.gov.au/biodiversity/threatened/recovery-plans/spotted-tailed-quoll*. In effect under the EPBC Act from 06 May 2016.
- Adopted/made threat abatement plans include:
  - Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
  - Department of the Environment, Water, Heritage and the Arts (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. In effect under the EPBC Act from 01 October 2008.
  - Other: Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed under the Environment Protection and Biodiversity Conservation Act 1999 (Department of Sustainability Environment Water Population and Communities, 2011).

Significant impact criteria

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*

The project is unlikely to have the potential to cause injury or mortality to individuals during clearing works, and it is considered unlikely that the project would lead to a long-term decrease in the size of a population. The project would not impact the carrying capacity of the habitats to the point that prey density would be detrimentally impacted, and the habitat was no longer viable for Spotted-tailed Quoll. The subject land contains poor quality breeding habitat, and the population is more likely to reside in the adjacent habitats in the National Parks, State Conservation Areas, Nature Reserves, and State Forests than the subject land in most cases. There is no real chance or possibility that the project would lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of the species*

The Spotted-tailed Quoll southeastern mainland population is widely distributed in southeastern Queensland, eastern New South Wales, Victoria, and the Australian Capital Territory. The extent of occurrence is estimated at 596,344 square kilometres and the area of occupancy at 2512 square kilometres.

Habitat for the Spotted-tailed Quoll was impacted during the 2019–2020 bushfires. The approved conservation advice for the species notes that based on estimates 29% of the Spotted-tailed Quoll's distribution range was affected by fire. Approximately 139.99 hectares of assumed habitat for the species was impacted by the 2019–2020 bushfires within the subject land.

While the subject land is not located at the edge of the species distribution; given the impact of the bushfires on the species habitat within the subject land, it is considered the loss of 754.03 hectares of assumed habitat is likely to reduce the area of occupancy for the species.

— *fragment an existing population into two or more populations*

The maximum cleared area for a single tower footprint or laydown area would not exceed 0.5 hectares, and the easement width of the transmission line would be a maximum of approximately 200 metres wide which allows for micro-siting of the transmission line easement and transmission towers to avoid significant environmental constraints. Given this species ability to disperse over and around these cleared areas, and their large home ranges (88 to 5512 hectares), it is considered unlikely that the project would fragment an existing population into two or more populations.

— *adversely affect habitat critical to the survival of a species*

The recovery plan for Spotted-tailed Quoll defines habitat critical to the survival as habitat that includes large patches of forest with adequate denning resources and relatively high densities of medium-sized prey. However, thresholds are unknown, therefore it is not possible to define or map habitat critical to the survival for this species. The recovery plan considers all habitat within its distribution range that are known to be occupied as important.

The Spotted-tailed Quoll was not recorded during targeted surveys and has been captured as a predicted ecosystem credit based on habitat surrogates. Therefore, the habitat within the subject land is likely to be habitat critical to the survival of this species. The project is likely to adversely impact habitat critical to the survival of the species.

— *disrupt the breeding cycle of a population*

The Spotted-tailed Quoll was not recorded during targeted surveys. Maternal den sites include rock crevices, caves, boulder tumbles, hollow logs, hollow tree roots and burrow. The project will result in the loss of 754.03 hectares of assumed habitat, that may contain suitable denning habitat for the species. Therefore, there is a chance that the project could disrupt the breeding cycle of a 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 project will modify, destroy and/or remove 754.03 hectares of assumed habitat for the species. The habitat has been subjected to ongoing and historic agricultural and anthropogenic impacts. Given the large home range of the species (88 to 5512 hectares), and available habitat in the locality (145,548.50 hectares of associated PCTs habitat within a 10 kilometre buffer of the subject land) it is unlikely the project would modify, destroy, remove, isolate, or decrease the availability or quality of 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 subject land has been previously disturbed and is subjected to ongoing disturbance such as invasive species. Invasive weeds and vertebrate pests such as rabbits, cats and foxes are already known to occur within the subject land. It is unlikely the loss of foraging habitat would result in additional species that are harmful to the Spotted-tailed Quoll and /or its habitats becoming established.

— *introduce disease that may cause the species to decline*

There is no disease known to impact the Spotted-tailed Quoll. The project will implement biosecurity protocols to minimise the threat of future diseases.

- *interfere substantially with the recovery of the species*

The recovery plan for the Spotted-tailed Quoll includes the following objectives:

- determine the distribution and status of Spotted-tailed Quoll populations throughout the range and identify key threats and implement threat abatement management practices
- investigate key aspects of the biology and ecology of the Spotted-tailed Quoll to acquire targeted information to aid recovery
- reduce the rate of habitat loss and fragmentation on private land
- evaluate and manage the risk posed by silvicultural practices
- determine and manage the threat posed by introduced predators (foxes, cats, wild dogs) and of predator control practices on Spotted-tailed Quoll populations
- determine and manage the impact of fire regimes on Spotted-tailed Quoll populations
- reduce deliberate killings of Spotted-tailed Quolls
- reduce the frequency of Spotted-tailed Quoll Road mortality
- assess the threat Cane Toads pose to Spotted-tailed Quolls and develop threat abatement actions if necessary
- determine the likely impact of climate change on Spotted-tailed Quoll populations
- increase community awareness of the Spotted-tailed Quoll and involvement in the Recovery Program.

The project is unlikely to substantially interfere with the recovery objectives outline above.

Conclusion

Based on the above assessment it is considered that the project would have a significant residual impact on the Spotted-tailed Quoll due to the loss of 754.03 hectares of assumed habitat.

B4.1.11 Large-eared Pied Bat (Chalinolobus Dwyeri)

The Large-eared Pied Bat is listed as endangered under the EPBC Act. The species is usually found in areas with cliffs, escarpments or rocky outcrops for roosting (typically sandstone but also rhyolite), area that have suitable caves, overhangs and cracks for roosting. The species has also been known to roost disused mine shafts and has also been observed roosting in abandoned Fairy Martin (*Petrochelidon ariel*) nests. Roosting habitat for the species is in close association with foraging habitat. The Large-eared Pied Bat been recorded foraging in fertile valleys and plains, as well as areas with moderately tall to taller trees in woodland along watercourses.

The Large-eared Pied Bat s patchily distributed in central eastern New South Wales (NSW) and southeastern and central Queensland (Qld), from the area bounded by Shoalwater Bay north of Rockhampton (Qld), south to Ulladulla, NSW. The species' distribution is fragmented, as most individuals occur in small and relatively isolated subpopulations due to specific requirements for foraging and roosting habitat.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Chalinolobus dwyeri* (large-eared pied bat). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/183-conservation-advice-15112023.pdf. In effect under the EPBC Act from 15 November 2023.

- Adopted or made Recovery Plan: Department of Environment and Resource Management (2011). National recovery plan for the large-eared pied bat *Chalinolobus dwyeri*. Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-large-eared-pied-bat-chalinolobus-dwyeri. In effect under the EPBC Act from 10 February 2012.
- Adopted/made threat abatement plans: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
- Other: Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1 (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010.

Significant impact criteria

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*

The species' total population ranges between 10,000 individuals (Pennay & Thompson 2008) and 20,000 individuals (Woinarski et al. 2014), although the number of mature individuals is lower. The project will impact on 506.36 hectares of habitat for the species. Approximately 125,680.70 hectares of habitat (associated PCTs) occurs within a 10 kilometre buffer of the subject land. Given the mobility of the species and areas of available habitat within the surrounding area, it is unlikely the project would reduce the habitat resources within the subject land such that it would lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of a population*

Much of the known distribution of the Large-eared Pied Bat occurs in NSW (DERM 2011). In NSW, the species occurs in the Sydney sandstone region, Pilliga region and in the north-east at Coolah Tops and Mt Kaputar.
In Warrumbungle National Park and Mount Kaputar National Park. The area of occupancy for the species is estimated at 1500 square kilometres.

The species was impacted by the 2019–2020 bushfires, with 27% of the Large-eared Pied Bat's habitat occurring within fire affected area, and 19% intersecting with severe fires. Habitat within the subject land was burnt during the 2019–2020 bushfires with 4.46 hectares experiencing an extreme severity burn.

The loss of 506.36 hectares of Large-eared Pied Bat habitat represents approximately 0.3% of the species geographic range. Given the mobility and extent of the species range it is unlikely the project would reduce the area of occupancy for the species.

- *fragment an existing population into two or more important populations*

The project may impact the movement of the Large-eared Pied Bat due to the placement of powerlines and towers. To minimise the impacts diverters will be installed on transmission lines within 1 kilometre (at a minimum) of wetland/riverine habitats to reduce impacts from collision with transmission lines and infrastructure. The exact position and diverter model will be finalised during detailed design. The mitigation measures are known to be effective in minimizing aerial species collision with transmission lines and infrastructure therefore if implemented it is unlikely the project would fragment an existing population in two or more populations.

- *adversely affect habitat critical to the survival of a species*

The species is dependent on the presence of diurnal roosts such as caves, overhangs, or other landscape features for shelter. The approved conservation advice for the species notes that any known roost site, or caves that could be roost sites, are considered habitat critical to the survival of the species. These features need to be within reasonable proximity of foraging habitat, which often occurs along water courses in relatively fertile valleys and plains (particularly in NSW) with moderately tall to taller trees. Habitat within the subject land may represent habitat to critical to the survival of the species. The loss of 506.63 hectares associated with the project would adversely impact habitat critical to the survival of a species.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

- *disrupt the breeding cycle of an important population*

The approved conservation advice notes that the Large-eared Pied Bat relies on cliffs, escarpment, cracks or rocky outcrops for shelter for raising young. Maternity caves need to have indentations in the roof and be high and deep enough to allow the young to fly. The project has specific protocols that require surveys to be undertaken prior to any activities within 100 metres of these habitat features during the Large-eared Pied Bat breeding season. If the species is present then an assessment will be undertaken to determine if the activities can be undertaken, and what appropriate mitigation measures can be implemented to reduce disturbance. These measures may include cessation of work or selecting alternative plant equipment. The assessment may also determine that the activities cannot proceed until after the breeding season. In addition, measures will be implemented to reduce fragmentation associated within the transmission lines, therefore removing any barriers to the species movement. Providing the protocols and measures are implemented it is unlikely the project would 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*

Roosting habitat is in close association with foraging habitat, without both foraging and roosting habitat the species is unlikely to occur. Given the mobility of the species and areas of available habitat within the surrounding area (approximately 125,5680.7 hectares) it is unlikely the project would reduce the habitat resources within the subject land such that it would modify the habitat to the extent the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The subject land has been previously disturbed and is subjected to ongoing disturbance such as invasive species. Invasive weeds and vertebrate pests such feral goats, foxes and rates are already known to occur within the subject land. It is unlikely the loss of foraging habitat would result in additional species that are harmful to the Large-eared Pied Bat and /or its habitats becoming established.

- *introduce disease that may cause the species to decline*

Pseudogymnoascus destructans is a fungus that causes white-nose syndrome in cave-dwelling bats. The fungus infects the species muzzle and can result in death. The fungus is not currently known to occur in Australia. Therefore, it is unlikely the project will introduce a disease that may cause the species to decline. Furthermore, the project will implement biosecurity protocols to minimise the threat of future diseases.

- *interfere substantially with the recovery of the species*

The overall objective of the recovery plan for the species is to ensure the persistence of a viable population of the Large-eared Pied Bat throughout its geographic range. The recovery plan set out several specific objectives including:

- identify priority roost and maternity sites for protection
- implement conservation and management strategies for priority sites, including the protection of known roost and associated foraging habitats
- educate the community and industry to understand and participate in the conservation of the large-eared pied bat
- research the Large-eared Pied Bat to augment biological and ecological data to enable conservation management
- determine the meta-population dynamics throughout the distribution of the Large-eared Pied Bat.

The project is likely to conflict with the protection of foraging habitat. and the removal of 506.36 hectares would substantially interfere with the recovery of the species.

Conclusion

Based on the assessment above it is likely the project would result in a significant residual impact on the Large-eared Pied Bat.

B4.1.12 Hunter Valley delma (Delmar vescolineata)

Until recently the Hunter Valley Delma was considered to be a subpopulation of *Delma impar*, however recent morphological and molecular studies have determined have that the Hunter subpopulation is a sperate species.

The Hunter Valley Delma is known almost entirely from a 25 kilometre wide corridor in the Hunter Valley NSW, between Maitland and Muswellbrook (Mahony et al. 2022). A further specimen has been identified from just north of Parraweena on the Liverpool plains, approximately 80 kilometres northwest of Muswellbrook.

The approved conservation advice states that the species is known to occur in secondary native grassland in association with sparse box gum or ironbark woodland. The primary canopy species consists of *Eucalyptus melliodora* (Yellow-box Gum) and *E. crebra* (Narrow-leaved Ironbark), with a diverse ground cover layer containing multiple grasses including *Austrostipa spp*. (Speargrass), *Bothriochloa spp*. (Beardgrass), and *Chloris spp*. (Finger Grass).

It has been found sheltering under rocks and discarded rubbish, including building rubble, metal and organic waste. The approved conservation advice notes that sites where the species has been detected include rehabilitated mine sites and pastoral land used for cattle grazing. The Hunter Valley Delma has also been detected under dried cow pats in agricultural land that is heavily disturbed by livestock and contains no natural surface refugia.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is the approved conservation advice- Department of Climate Change, Energy, the Environment and Water (2024). Conservation Advice for *Delma vescolineata* (Hunter Valley delma*)*. Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/92599-conservation-advice-16072024.pdf. In effect under the EPBC Act from 16 July 2024.

Significant impact criteria

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*

The Hunter Valley Delma was recorded within the subject land. The project is likely to directly impact on 208.12 hectares of confirmed habitat. Therefore, it is likely the project will lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of a population*

The Hunter Valley Delma is known almost entirely from a 25 kilometre wide corridor in the Hunter Valley NSW, between Maitland and Muswellbrook (Mahony et al. 2022). The subject land occurs at the limit of the species distribution. Therefore, given the small area of occupancy for this it is likely the loss 233.04 hectares of confirmed habitat would reduce the area of occupancy of this population.

- *fragment an existing population into two or more populations*

The Hunter Valley Delma is known almost entirely from a 25 kilometre wide corridor in the Hunter Valley NSW, between Maitland and Muswellbrook. The approved conservation advice for the species notes that the two distinct areas the species occur may be considered subpopulations or may represent a larger continuous population. Given this is yet to be confirmed and the scale and nature of the project, there is potential for the project to fragment a population in two or more populations.

- *adversely affect habitat critical to the survival of a species*

Habitat critical to the survival of a species 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
- for the reintroduction of populations or recovery of the species or ecological community.

The approved conservation advice for this species notes that habitat critical to the survival is not well understood but likely to include the secondary native grassland of the Hunter Valley between Maitland and Muswellbrook. The project would remove 233.04 hectares of confirmed habitat within the subject land. Therefore, it is considered the project would adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

The project would result in the loss of 233.04 hectares of confirmed habitat for the species. Given the habitat is likely to represent habitat critical for the species (i.e. necessary to maintain the species it is likely the project will lead to a decrease in the size of a population of Hunter Valley Delma.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Given the small area of occupancy and extent of habitat for this species, the loss of 233.04 hectares of confirmed habitat is likely to decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

It is not likely that invasive species (such as introduced predators) that are harmful to the Hunter Valley Delma would become further established because of the project. Adhering to mitigation measures such as weed and pest management plans, and vehicle weed hygiene, would prevent invasive weeds and pests such establishing in wetland habitat areas.

- *introduce disease that may cause the species to decline*

No. There are no known diseases that are likely to increase in the area as a result of the project.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for this species. The approved conservation advice set out conservation and recovery actions for the species including:

- protect and prevent impacts to habitat for the species in the planning, construction and post construction phases of mining and other developments
- develop and implement fire management strategies that minimise the risk of severe and frequent fires
- management of invasive species.

The project would result in the loss 233.04 hectares of confirmed habitat for the species. Given the small area of occupancy and extent of habitat for this species, the project has the potential to interfere with the recovery of the species.

Conclusion

The Hunter Valley Delma is known almost entirely from a 25 kilometre wide corridor in the Hunter Valley NSW, between Maitland and Muswellbrook. The species was recorded within the subject land. The project will:

- result in the loss of 233.04 hectares of confirmed habitat for the species
- potentially fragment a population into 2 or more
- reduce the area of occupancy for the species.

Therefore, it is considered the project would have a significant residual impact on the Hunter Valley Delma.

B4.2 Listed vulnerable fauna

B4.2.1 Giant Barred Frog (Mixophyes Iteratus)

The Giant Barred Frog is listed as vulnerable under the EPBC Act. The species is distributed along the coast and ranges from Eumundi in southeast Queensland to Warrimoo in the Blue Mountains. Declines appear to have occurred at the margins of the species' range, with no recent records south of the Hawkesbury River and disappearances from a number of streams in QLD. Northern NSW, particularly the Coffs Harbour-Dorrigo area, is a stronghold. Giant Barred Frogs are found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams.

Breeding takes place from late spring to summer. Once eggs are laid and fertilised in the water, the female kicks them out of the water where they stick onto a suitable bank (e.g. overhanging or steeply sloped). Hatchlings drop or wriggle into the water. Although generally found within about 20 metres the stream, outside the breeding season, the Giant Barred Frog may disperse away from the stream (e.g. 50 metres or further). It is a generalist feeder, with large insects, snails, spiders and frogs included in its diet.

Giant Barred Frogs were record during targeted surveys within Olney and Watagan State Forests (Wyong IBRA subregion), with juveniles to adults identified by sub-contractors (Stephen Mahony).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Threatened Species Scientific Committee (2021). Conservation Advice *Mixophyes iteratus* Giant Barred Frog. Canberra: Department of Agriculture, Water and the Environment. Available from: *http://www.environment.gov.au/biodiversity/threatened/species/pubs/1944-conservation-advice-13112021.pdf*. In effect under the EPBC Act from 13 November 2021.
- Adopted /made recovery plan: Hines, H.B. & the South-east Queensland Threatened Frogs Recovery Team (2002). Recovery plan for Stream Frogs of South-east Queensland 2001-2005. Report to Environment Australia, Canberra. Queensland Parks and Wildlife Service, Brisbane. Available from: *http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-stream-frogs-south-east-queensland-2001-2005*. In effect under the EPBC Act from 13 October 2003 as *Mixophyes iteratus.*
- Adopted/made threat abatement plans:
  - Department of the Environment and Energy (2016). Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis. Canberra, ACT: Commonwealth of Australia. Available from: *http://www.environment.gov.au/biodiversity/threatened/publications/tap/infection-amphibians-chytrid-fungus-resulting-chytridiomycosis-2016.* In effect under the EPBC Act from 07 September 2016.
  - Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*). Canberra, ACT: Commonwealth of Australia. Available from: *http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017*. In effect under the EPBC Act from 18 March 2017.
- Other: *Survey Guidelines for Australia's Threatened Frogs. EPBC Act survey guidelines 6.3* (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The approved conservation advice for the Giant Barred Frog notes that in NSW the species has declined severely with the species not recorded from a few areas that's once supported large number of the species. The Giant Barred Frog was recorded within the subject land and therefore it is an important population.

Significant impact criteria

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*

Forty-five giant barred frogs were recorded during targeted surveys within Olney and Watagan State Forests. The conservation advice states that the fires may have accelerated any population decline through direct mortality, and the unfavourable post-fire conditions (loss of shelter, increased susceptibility to predators, and loss of prey), as well as a reduction in future recruitment (egg and tadpole death and breeding site degradation). The project would result in the loss of 2.34 hectares of confirmed habitat and 1.47 hectares of assumed habitat a total of 3.81 hectares within the subject land. Given the scale and nature of the project it is considered unlikely the project would the lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

The approved conservation advice for the species notes the Giant Barred Frog population can be divided into three broad distribution zones separated by intervening dry areas. The northern distribution: north and west of Brisbane, Queensland (including the Sunshine Coast hinterland), within the Mary River and Stanley River catchments; the central distribution: from areas west and southwest of the Gold Coast, Queensland to the ranges northwest of Newcastle, NSW; and the southern distribution: from the Hunter Valley, through the Hawkesbury River catchment, and to the Blue Mountains, NSW.

The extent of occurrence has been estimated at 132,654 square kilometres and the area of occupancy at 1908 kilometres square. Therefore, the loss of 3.81 hectares of habitat associated with the project is unlikely to reduce the area of occupancy of an important population.

- *fragment an existing population into two or more important populations*

The approved conservation advice notes that studies have shown the individuals move up to 100 metres in a night but not more than 20 metres from the stream, with the majority staying within 10 metres. However, adults, especially females, may be found up to 150 metres from water. The towers will be micro-sited to ensure minimal impact on the species' habitat, and riparian habitats will be largely avoided. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. powerlines will be above the habitat) it is unlikely the project would result in a barrier to movement, or in an existing population into two or more important populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act is on the Register of Critical Habitat. Habitat critical for the survival is defined as areas required:

- 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.

The approved conservation advice notes the species is a habitat specialist and stays in the riparian zone all year round, generally confined to a narrow strip of vegetation either side of a stream or river. Therefore, it is likely that riparian habitat within the subject land would be considered habitat critical to the survival of the species. The project will largely avoid the riparian habitats and therefore any impacts on habitat critical to the survival of the species is expected to be minimal.

- *disrupt the breeding cycle of an important population*

The Giant Barred Frog is a stream dwelling frog that lays its egg in the overhanging or steeply sloped banks or rocks of streams. Once hatched, the tadpoles then drop into the stream below. While the project is likely to result in the loss of habitat, breeding habitat will largely be avoided. It is unlikely the project would 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*

Impacts to Giant Barred Frog are based on the loss of 3.81 hectares of confirmed and assumed habitat. The impacts of tower locations will be minimal in riparian areas. These habitats will mostly be spanned by wires and the micro-siting process undertaken before construction begins and would further minimise impacts to the greatest extent possible. Given the extent of habitat within the locality (4,223.60 hectares) it is unlikely the loss of 3.81 hectares would modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The project is unlikely to result in an invasive species harmful to the Giant Barred Frog becoming established in the habitat. Introduced predators are well established. The potential for weed invasion was considered possible with a project of this nature and appropriate controls are required during construction and operation to reduce this threat. Invasive species would be managed under the construction environmental management plan using best practice methods. Consequently, there is no real chance or possibility that the project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- *introduce disease that may cause the species to decline*

Infection of the frog with chytrid fungus (*Batrachochytrium dendrobatidis*) resulting in chytridiomycosis is an issue for this species. However, the project would be unlikely to increase the potential for significant disease vectors to affect the species. Best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens will be implemented. Therefore, there is no real chance or possibility that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

The Recovery plan for Stream Frogs of South-east Queensland 2001–2005 and the approved conservation advice for the giant barred Frog set out conservation measures for the species recovery including:

- monitoring of the geographical range
- further investigations into the species ecology
- increase awareness of the species and its threats across the species range
- fire management to protect unburnt areas
- hygiene protocols for managing disease and invasive species management (invasive weed and feral animals).

Biosecurity protocols will be implemented to reduce further impacts of invasive species and pathogens becoming established in the Giant Barred Frog habitat. Therefore, it is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

Whie mitigation measures will minimise the impacts associated with the project, given the decline in the species and species habitat it is unlikely the loss of 3.81 hectares would result in a significant residual impact on Giant Barred Frog.

B4.2.2 Stuttering Frog (Mixophyes Balbus)

The Stuttering Frog is listed as vulnerable under the EPBC Act. This species is endemic to the southeast coast of Australia. Historically, it occurred in eastern-flowing streams of the Great Diving Range between the Clarence River catchment in northeastern NSW and the Cann River catchment in East Gippsland, Victoria. However, the species has undergone widespread decline and no longer occur in the wild in Victoria.

The approved conservation advice for *Mixophese bablus* (DAWE 2021) notes that the species persists in the New England Tablelands, NSW North Coast, NSW South Western Slopes, South East Corner, South Eastern Highlands and Sydney Basin IBRA bioregions. The Dorrigo region in the NSW North Coast bioregion may be a stronghold for this species.

The Stuttering Frog is associated with flowing creeks and streams in temperate and sub-tropical rainforest, wet sclerophyll forest and Antarctic Beech forests (DAWE 2021). It has also been recorded in dry open tableland riparian vegetation and moist gullies in dry forest (DAWE 2021). The Stuttering Frog is known to prefer the interior of large tracts of forest, in areas with relatively cool mean annual temperatures (DAWE 2021). Such sites are minimally disturbed by land clearance, forest grazing or other anthropogenic influences, suggesting the Stuttering Frog is sensitive to disturbance.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Department of Agriculture, Water and the Environment (2021). Conservation Advice for *Mixophyes balbus* (Stuttering Frog, Southern Barred Frog in Victoria). Canberra: Department of Agriculture, Water and the Environment. (http://www.environment.gov.au/biodiversity/threatened/species/pubs/1942-conservation-advice-23112021.pdf).
- Adopted/made recovery plan: Hunter, D., & G.R. Gillespie (2011). National Recovery Plan for the Stuttering Frog *Mixophyes balbus.* Department of Sustainability and Environment, Melbourne. (http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-stuttering-frog-mixophyes-balbus) In effect under the EPBC Act from 10 February 2012.

- Adopted/made threat abatement plans include:
  - Department of Climate Change, Energy, the Environment and Water (2024). *Threat abatement plan for predation by feral cats 2024.* Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
  - 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. In effect under the EPBC Act from 07 September 2016.
- *Other*: *Survey Guidelines for Australia's Threatened Frogs. EPBC Act survey guidelines 6.3* (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery (Department of the Environment, 2013). Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The approved conservation advice for the Stuttering Frog (DAWE 2021) states that there is insufficient information available to be able to describe, with spatial information, important populations of this species. Further research is needed to do this, if practicable to do so (see conservation actions). Until such information is available, all populations of this species should be considered important. Four-hundred and thirty-four stuttering frog tadpoles and adults were recorded within Olney and Watagan State Forests (Wyong IBRA subregion) during targeted surveys. Based on the survey's results it is considered an important population occurs within the subject land.

Significant impact criteria

An action is likely to have a significant impact on a vulnerable if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population*

In 2009, the estimated population size of the Stuttering Frog was fewer than 10,000 mature individuals (DAWE 2021). Additionally, no subpopulations were estimated to contain more than 1000 mature individuals.

The approved conservation advice for the species note that bushfires are predicted to contribute to declines in stream-dwelling frogs in eastern Australia, by increasing water temperature, altering water chemistry and creating sediment/ash runoff, which can impact aquatic ecosystems up to 80 kilometres downstream of burnt areas. Approximately 15.92 hectares of habitat for the Stuttering Frog was impacted within the subject land during the 2019–2020 bushfires.

The project would result in the loss of 180.09 hectares of confirmed habitat for the species, which has the potential to reduce resources for the species such that the project may lead to a long-term decrease in the size of an important population.

— *reduce the area of occupancy of an important population*

The Stuttering Frog is known to occur within the New England Tablelands, NSW North Coast, NSW South Western Slopes, South East Corner, South Eastern Highlands and Sydney Basin IBRA bioregions. The western extent of the species includes the Wollemi IBRA region which the project occurs north and east of. Therefore, there is a real chance or possibility that the project would reduce habitat in the western extent of the species range, this the area of occupancy for an important population.

— *fragment an existing population into two or more important populations*

Whilst there are no current studies on the movement patterns of the Stuttering Frog, the species may utilise habitats that are a considerable distance away from the riparian areas. This frog has been recorded on roads at least 100 metres from the nearest waterbody (DAWE 2021). The towers will be micro-sited to ensure minimal impact on the species habitat, and riparian habitats will be largely avoided. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. transmission line will be above the habitat) it is unlikely the project would result in a barrier to movement, or in an existing population into two or more important populations.

— *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been included in the Register of Critical Habitat. The approved conservation advice notes that due to the lack of information it is not practical to describe habitat critical to the survival of the species. Given the loss, degradation, and fragmentation of habitat for the species, the approved conservation advice states that all habitat or the species is likely to represent habitat critical for the survival of the species. The loss of 180.09 hectares of habitat associated with the project is likely to adversely affect habitat critical to the survival of the species.

— *disrupt the breeding cycle of an important population*

The Stuttering Frog is an obligate stream breeder and breeds during the spring and summer months, from October to February. The project will largely avoid impacts to stream and riparian habitat. Given the nature of the project, it is unlikely to represent a barrier to the species movement.

Based on the above it is unlikely the project would 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 impacts of tower locations will be minimal in riparian areas. These habitats will mostly be spanned by wires and the micro-siting process undertaken before construction begins would further minimise impacts to the greatest extent possible. Given the extent of habitat within the region it is unlikely the project would modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

— *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The project is unlikely to result in an invasive species harmful to the Stuttering Frog becoming established in the habitat. Introduced predators are well established. The potential for weed invasion was considered possible with a project of this nature and appropriate controls are required during construction and operation to reduce this threat. Invasive species would be managed under the construction environmental management plan using best practice methods. Consequently, there is no real chance or possibility that the project will result in invasive species that are harmful to a vulnerable species becoming established in the species habitat.

- *introduce disease that may cause the species to decline*

Infection of the frog with chytrid fungus (*Batrachochytrium dendrobatidis*) resulting in chytridiomycosis is an issue for this species. However, the project would be unlikely to increase the potential for significant disease vectors to affect the species. It is the intention to use current best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. Consequently, there is no real chance or possibility that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

The recovery plan for the Stuttering Frog states that the specific recovery objectives for the recovery of the species are:

- determine the distribution, habitat requirements, conservation status, taxonomy, population demography and genetic structure of Stuttering Frog populations
- identify and address the causal factors of the decline and prevent the local extinction of important populations of the Stuttering Frog across its geographic range
- build community support for the Stuttering Frog recovery program.

The approved conservation advice for the species notes conservation and management priorities for the species including:

- designate protection zones around known site locations to ensure habitat is not fragmented by roads, timber harvesting or clearing of freehold land. Activities permitted in protection zones should be informed by further research into the effects of disturbance on the Stuttering Frog
- identify and conserve landscape characteristics that facilitate movement between subpopulations
- assess the effectiveness of current forestry management practices in ameliorating disturbance to the habitat of the Stuttering Frog, and revise management practices if necessary
- weed control and habitat restoration may be needed in localised areas to support habitat regeneration. Note that herbicide formulations can be toxic to frogs and tadpoles, particularly if they contain glyphosate and surfactants
- monitor and control damage to riparian areas by feral pigs and domestic stock
- minimise the spread of disease by implementing suitable hygiene protocols to protect priority subpopulations.

The project is unlikely to substantially interfere with the conservation actions for the recovery of the species. In addition, biosecurity (including hygiene) protocols will be implemented to further reduce disease and invasive species becoming established within the species habitat.

Conclusion

The project will result in the clearing of 180.09 hectares of confirmed habitat for the Stuttering Frog, which is likely to result in the loss of habitat critical to the survival of the species and reduce the area of occupancy of an important population. Therefore, it is likely the project would result in a significant residual impact on the Stuttering Frog.

B4.2.3 Giant Burrowing Frog (Heleioporus Australiacus)

The Giant Burrowing Frog listed as vulnerable under the EPBC Act. The species occurs in NSW and Victoria along the coast and adjacent ranges. It occurs in two disjunct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria.

The Giant Burrowing Frog occurs in areas of native vegetation (Penman et al. 2004) and can be found in heath, woodland and open dry sclerophyll forest on a variety of soils, except clay based soils (Department of the Environment, 2014). The species has not been recorded from cleared land**.** The Giant Burrowing Frog spends more than 95% of the time in non-breeding habitats, which are areas up to 300 metres from breeding sites. While in these areas, individuals burrow below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Approved conservation advice: Department of the Environment (2014). Approved Conservation Advice for *Heleioporus Australiacus* (giant burrowing frog). Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/1973-conservation-advice.pdf. In effect under the EPBC Act from 11 April 2014.
- Adopted/made threat abatement plans include:
  - Department of Climate Change, Energy, the Environment and Water (2024*). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available* from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
  - 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. In effect under the EPBC Act from 07 September 2016.
- *Other*: *Survey Guidelines for Australia's Threatened Frogs. EPBC Act survey guidelines 6.3* (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

There are no available population estimates, and it is difficult to estimate declines as there are few historic records and it is difficult to detect the species. The species was recorded within the subject land in the Wyong IBRA subregion. Given the declines in the species population and distribution, for the purpose of this report it is assumed that the population represents an important population.

Significant impact criteria

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*

The Giant Burrowing Frog was recorded within the subject land in the Wyong IBRA subregion. Habitat for the species was impacted by the 2019–2020 bushfires with the initial estimate of 46% of the Giant Burrowing Frog distribution range impacted by the bushfires. Within the subject land 12.35 hectares was impacted by the bushfires.

The project would result in a total loss of 20.53 hectares of confirmed habitat and 6.22 hectares of assumed habitat (26.75 hectares total) for the Giant Burrowing Frog. Approximately 10,686.90 hectares of assumed habitat is mapped within a 10 kilometre buffer of the subject land. Mitigation measures will be implemented to minimise the impacts on threatened species including avoiding riparian zone and micro-siting the towers to minimise impact on threatened species. Given the nature of the project, scale of impact and extent of habitat within the locality it is unlikely the project would reduce resources to an extent that would lead to long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

The approved conservation advice for the Giant Burrowing Frog notes that it occurs in two disjunct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. The disjunct may be due to the species absence from the area between the populations (a gap of 100 kilometres) or may be a result of limited survey effort in the region. The species extent of occurrence is estimated at 80,000 square kilometres.

The project has the potential to reduce the area of occupancy and current extent of the species. However, the impacts will not result in the species being lost from any 2 x 2 kilometre grid cell currently forming part of the area of occupancy. Any changes in area of occupancy are considered likely to be negligible.

- *fragment an existing population into two or more important populations*

The Giant Burrowing Frog spends more than 95% of the time in non-breeding habitats, which are areas up to 300 metres from breeding sites such as soaks or pools within first or second order streams. The frogs are known to move 200–300 metres a night. The towers will be micro-sited to ensure minimal impact on the species habitat, and riparian habitats will be largely avoided. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. powerlines will be above the habitat) it is unlikely the project would result in a barrier to movement, or in an existing population into two or more important populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act is on the Register of Critical Habitat. Habitat critical for the survival is defined as areas required:

- 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.

The project will remove 26.75 hectares of habitat for the Giant Burrowing Frog. These areas may be used by the species for activities such as foraging and dispersal, therefore would represent habitat critical to the survival of the species. Therefore, the loss of this habitat may adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The species' breeding habitat is generally soaks or pools within first or second order stream. The project will largely avoid impacts to stream and riparian habitat. Given the nature of the project, it is unlikely to represent a barrier to the species movement.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Impacts to Giant Burrowing Frog are based on the loss of 20.53 hectares of confirmed habitat and the potential loss of 6.22 hectares of assumed habitat. The impacts of tower locations will be minimal in riparian areas. These habitats will mostly be spanned by wires and the micro-siting process undertaken before construction begins would further minimise impacts to the greatest extent possible.

In addition, approximately 10,686.90 hectares of assumed habitat is mapped within a 10 kilometre buffer of the subject land. Therefore it is unlikely the project would modify, decrease the availability or quality of habitat to the extent that the species is likely to decline at a local scale.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The project is unlikely to result in an invasive species harmful to the Giant Burrowing Frog becoming established in the habitat. Introduced predators are well established. The potential for weed invasion is considered possible with a project of this nature, and appropriate controls will be implemented during construction and operation to reduce this threat. Invasive species will be managed under the construction environmental management plan using best practice methods. Consequently, there is no real chance or possibility that the project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- *introduce disease that may cause the species to decline*

Infection of the frog with chytrid fungus (*Batrachochytrium dendrobatidis*) resulting in chytridiomycosis is an issue for this species. However, the project would be unlikely to increase the potential for significant disease vectors to affect the species. It is the intention to use current best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. There is no real chance or possibility that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There is no made or adopted recovery plan for this species. The approved conservation advice sets out the action required for conservation and recovery of the species, including:

- prepare and implement site specific management plans to protect key giant burrowing frog populations from identified threats
- retain native vegetation and minimise ground disturbance where the species occurs, especially within 300 metres of known breeding sites
- develop a protocol for monitoring populations throughout the species range. Once a monitoring protocol is developed, incorporate it into site management plans
- coordinate implementation, including management and analysis data, reviewing the progress of recovery and effectiveness of management actions, and adapting actions if necessary.

The project will involve the loss of 26.75 hectares of habitat for the Giant Burrowing Frog. However, these impacts may be further minimised during the detail design and siting of the project. In addition, biosecurity protocols will be implemented to reduce further impacts of invasive species and pathogens becoming established in the Giant Burrowing Frog habitat. Therefore, it is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

Based on the above assessment, the loss of 26.75 hectares of habitat for the Giant Burrowing Frog associated with the project is likely to result in significant residual impact due to impacts on habitat critical to the survival of the species.

B4.2.4 Glossy Black-Cockatoo (Calyptorhynchus Lathami)

The Glossy Black-Cockatoo is a small dark cockatoo with a large bill, usually seen in pairs or small groups feeding quietly in sheoaks or calling whilst in flight. This species inhabits eucalypt open forest and woodland with hollow-bearing trees and a midstorey of sheoaks. It nests in tree hollows, and forages exclusively in sheoak species shredding cones with their bill. Important food trees for coastal populations include *Allocasuarina littoralis* and *A. torulosa,* while inland populations rely on *Casuarina cristata, A. verticillata, A. diminuta, and A. gymnathera*. They depend on large hollow-bearing eucalypts for nest sites.

The Glossy Black-Cockatoo is distributed in the eastern third of NSW from the coast to the tablelands, with populations on the western slopes and plains (Pilliga-Goonoo to Weddin Mountains) tenuously (if at all) connected to those on the tablelands. Their distribution is continuous through the forested parts of the Great Dividing Range but becomes more scattered inland, to as far west as the Riverina in NSW.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is the approved conservation advice Approved Conservation Advice for *Calyptorhynchus lathami* lathami (South Eastern Glossy Black Cockatoo) (Department of Climate Change, Energy, the Environment and Water, 2022). This statutory document has been considered in this assessment.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The distribution of this species is reasonably connected through south-eastern Australia and the level of genetic dispersal is likely cohesive that isolated populations are considered rare. It is considered that the eastern NSW is part of a contiguous population. As such it is assumed that the population related to the subject land is part of a key source population and therefore considered important.

Significant impact criteria

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*

The estimated number of Glossy Black-Cockatoos is at 12,000 globally however this is considered uncertain. Some estimations predict the total population may have declined to near 10,000 individuals. On the basis of geographic distribution and density records, about 70% would occur in NSW, or about 8400 birds. The project will result in the loss of 69.50 hectares of assumed habitat for the species. This includes loss of foraging and breeding resources.

Approximately 133.14 hectares of habitat for this species was impacted by the 2019–2020 bushfires within the subject land. Given the decline in population, loss of habitat due to bushfires and scale of the impacts associated with the project, it is likely the project would lead to a long-term decrease in the size of an important population of the Glossy Black-Cockatoo.

- *reduce the area of occupancy of an important population*

The Glossy Black-Cockatoos are uncommon but widespread. They can be found from Mitchell, Queensland, through eastern New South Wales to East Gippsland. The extent of occurrence of the Glossy Black-Cockatoo is estimated at 450,000 square kilometres with an area of occupancy estimated at 40,000 square kilometres. The project will result in the loss of 69.50 hectares of habitat, with areas of preferred habitat available in the surrounding locality (141,819.30 hectares of habitat within 10 kilometre buffer of the subject land).

Given the mobility of the species and the modelled distribution of the species and its habitat (Mitchell, Queensland, through eastern NSW to East Gippsland, Victoria), it is unlikely the loss of habitat would reduce the area of occupancy for the species.

- *fragment an existing population into two or more important populations*

Highly mobile species such as Glossy Black-Cockatoo are expected to be less impacted by fragmentation. This species moves freely over open areas and urban areas. Given the nature of the project (i.e. tower will be micro-sited, and wires span across the landscape) and species ability to move (including in urban areas) it is unlikely the project would be a barrier to movement for the species. Therefore, the project is unlikely to fragment an existing important population into 2 or more.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified in the Register of Critical Habitat.

According to the approved conservation advice for the species assessments relevant to the Glossy Black-Cockatoo must consider that the species:

- has a highly specialised diet and preference of individual feed trees
- nests only occur in very old trees in large hollows, which take centuries to form naturally
- has a specific set of preferences in nesting tree species and hollow characteristics
- nests close to, or within, foraging habitat
- is a long-lived subspecies with a slow life cycle.

Habitat within the subject land is considered to have both foraging and breeding resources for the Glossy Black-Cockatoo. The project will result in the loss 69.50 hectares of assumed Glossy Black-Cockatoo habitat; therefore, it is likely the project would adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The Glossy Black-Cockatoo's nest is a hollow in a eucalypt, live or dead, commonly in a dead spout in a living tree, about 26 centimetres wide and up to 1.4 metres deep. A clutch of usually 1 egg is laid in autumn or winter, raising only a single chick per year if successful. The project will result in the loss of habitat that may contain suitable hollow nesting resources for the species. Therefore, it is likely the project could 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 project will result is the loss of 69.50 hectares of Glossy Black-Cockatoo habitat. Given the scale the impacts there is a real chance or possibility that the impacts would modify, destroy or decrease the quality of the habitat for the species. However, the towers will be micro-sited and mitigation measures will be implemented such as invasive species controls. These measures are likely to further reduce the impacts on the Glossy Black-Cockatoo habitat. In addition, the project will not create barriers to movement, therefore given the species mobility and further habitat resources are available in the surrounding area, it is not predicted that the project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The subject land has been previously disturbed and is subjected to ongoing disturbance such as invasive species. Invasive weeds and vertebrates are already known to occur within the subject land. It is unlikely the loss of foraging habitat would result in additional species that are harmful to the Glossy Black-Cockatoo and /or its habitats becoming established.

- *introduce disease that may cause the species to decline*

Psittacine circoviral disease (PCD) is a virus which affects parrots and related species and is listed as a key threatening process under the EPBC Act. The virus causing the disease has been identified in many wild populations and is believed to occur naturally. This disease is not considered likely to increase in the area because of the project and therefore is unlikely to cause the Glossy Black Cockatoo to decline.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for this species, however the approved conservation advice for the species includes protecting, restoring and enhancing the quality of known assumed habitat and enhancing or restoring regional corridors through strategic revegetation; and two actions to mitigate habitat fragmentation for this species. The project will not interfere substantially with these objectives.

Conclusion

Based on the assessment above the project is likely to adversely affect habitat critical to the survival of the species and may lead to a long-term decline in an important population. Therefore, it is considered the project would have a significant residual impact on the Glossy Black-Cockatoo.

B4.2.5 Pilotbird (Pycnoptilus Floccosus)

Pilotbirds are small, ground dwelling birds that occur in dense forests with heavy undergrowth. The species is largely sedentary and typically seen hopping briskly over the forest floor and foraging on damp ground or among leaflitter. Flight is described as fairly weak, though, if disturbed, birds can sometimes ascend into shrubs (but no more than 1–2 metres from the ground) (Higgins & Peter 2002). The species breeds between August and January in domed nests on or near the ground.

The species is endemic to southeast Australia, and is often recognised as two subspecies of Pilotbird:

- Upland Pilotbird which occurs above 600 metres in the Brindabella Ranges, Australian Capital Territory and in the Snowy Mountain in New South Wales and north-eats Victoria.
- Lowland Pilotbird that occurs in forest from Blue Mountains west of Newcastle around the wetter forest of eastern Australia to the Dandenong Ranes in Victoria.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

Relevant Commonwealth guidelines and policy statements that have been considered in this assessment include:

- Approved conservation advice: Department of Agriculture, Water and the Environment (2022). Conservation Advice for *Pycnoptilus floccosus* (Pilotbird). Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/525-conservation-advice-02032022.pdf. In effect under the EPBC Act from 02 March 2022.
- Adopted/made Threat Abatement Plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The subject land is near the limit of the species range. Although not recorded during the ecological surveys, if the species is present, it would represent an important population. Therefore, it has been considered as an important population for the purposes of this assessment.

Significant impact criteria

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*

The approved conservation advice for the species notes that there are estimated to be 77,000 (range 9,000–125,000) mature individuals in the lowland Pilotbirds wild population and 11,000 upland Pilotbirds. The project would result in the loss of 217.72 hectares of assumed habitat for the species. This includes loss of foraging and breeding resources. Approximately 33,396.42 hectares of habitat (based on PCTs) is mapped within 10 kilometres of the subject land. Given the extent of available habitat it is considered unlikely that the project will lead to a long-term decrease in the size of an important population of the Pilotbird.

- *reduce the area of for the species*

The area of occupancy for the species is estimated to be 26,600 square kilometres (Upland Pilotbird: range 300–3700 kilometres square); Lowland Pilotbird range 3400–30,800 square kilometres). The approved conservation advice notes that the area of occupancy for the species has contracted.

Approximately 76.55 hectares of habitat for the species was impacted by the 2019–2020 bushfires. Given the subject land is located at the limit of the species distribution and the loss of habitat due to bushfires, the removal of 217.72 hectares of assumed habitat would reduce the area of occupancy for the Pilotbird.

- *fragment an existing population into two or more important populations*

The species is largely a sedimentary ground dwelling species and flight has been described as week. Although the towers will be micro-sited and transmission lines will span across the habitat, there is potential for the project to result in fragmentation of the species habitat e.g. through access roads.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. The approved conservation advice notes that habitat critical to the survival of the species includes:

- wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth and
- dry sclerophyll forests and woodlands occupying dry slopes and ridge.

It also includes any breeding or foraging habitat in areas where the species in known or likely to occur as defined by the distribution map in the approved conservation advice. The subject land is located within the distribution map, therefore would remove 271.72 hectares of assumed habitat for the species. Therefore, the project is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

Pilotbirds build their nest on the ground. The project will implement measures to minimise the impacts on sensitive habitats for threatened species including micro-siting towers. Providing theses measure are implemented it is unlikely the project would 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*

Approximately 33,396.42 hectares of habitat (based on PCTs) is mapped within 10 kilometres of the subject land. Therefore given the extent of available resources it is considered unlikely the project would modify, destroy, remove or decrease the availability or quality of 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 subject land has been previously disturbed and is subjected to ongoing disturbance such as invasive species. Invasive weeds and vertebrate pests such as cats and foxes are already known to occur within the subject land. It is unlikely the loss of foraging habitat would result in additional species that are harmful to the Pilotbird and/or its habitats becoming established.

- *introduce disease that may cause the species to decline*

There is no disease known to impact the Pilotbird. The project will implement biosecurity protocols to minimise the threat of future diseases.

- *interfere substantially with the recovery of the species*

There is no adopted or made recovery plan for this species, however the approved conservation advice for the species notes that the primary conservation outcome is a stable population over time, enabled by a fire and forest management regime. The project will implement protocols to prevent the risk of bushfires including managing vegetation within the transmission corridor to prevent the risk of fires. It is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

Based on the assessment above, the loss of 217.72 hectares of assumed habitat for the Pilotbird would result in a significant residual impact on the species.

B4.2.6 Woodland birds

The following three bird species have been grouped together as they have similar habitat requirements and listing status:

- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)
- Diamond Firetail (*Stagonopleura guttata*)
- Painted Honeyeater (*Grantiella picta*).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

Relevant Commonwealth guidelines and policy statements that have been considered in this assessment include:

- Approved conservation advice:
  - Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for *Climacteris picumnus victoriae* (brown treecreeper (south-eastern)). Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/67062-conservation-advice-31032023.pdf. In effect under the EPBC Act from 31 March 2023.
  - 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. In effect under the EPBC Act from 31 March 2023.
  - 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. In effect under the EPBC Act from 08 July 2015.

- Adopted/made recovery plan: 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. In effect under the EPBC Act from 16 Jun 2022.
- Adopted/made Threat Abatement Plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

Is an important population likely to be present?

Under the Act, important populations are:

- likely to be key source populations either for breeding or dispersal.
- likely to be necessary for maintaining genetic diversity, and/or
- at or near the limit of the species range.

Based on the approved conservation advice for each of the woodland species and DCCEEWs Species Profile and Threats Database, none of these woodland species would be considered at the or near the limit of the species range or have been identified as a key sources population for breeding or for maintaining genetic diversity.

No important populations of the Brown Treecreeper, Diamond Firetail, and Painted Honeyeater are known to occur within the subject land.

Significant impact criteria

Under the EPBC Act, 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*

No important populations of the woodland birds' species have been identified in the subject land. In addition, no important populations were identified in the approved conservation advice for each of the woodland bird species. Therefore, it is unlikely the project would lead to a long-term decrease in the size of an important population of Brown Treecreeper, Diamond Firetail, and Painted Honeyeater.

- *reduce the area of occupancy of an important population*

No important populations of Brown Treecreeper, Diamond Firetail, and Painted Honeyeater have been identified in the subject land; therefore, it is unlikely the project would reduce the area of occupancy of an important population of these woodland bird species.

- *fragment an existing important population into two or more populations*

It is unlikely the project would fragment an existing important population into two or more populations, as no important populations of Brown Treecreeper, Diamond Firetail, and Painted Honeyeater are known to occur within the subject land.

- *adversely affect habitat critical to the survival of a species*

Habitat critical to the survival of a species also 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.

Habitat critical to the survival of these species includes:

- **Brown treecreeper (south-eastern).** Areas that have a relatively undisturbed grassy woodland with native understorey. The habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators. Living and dead trees are essential for roosting and nesting sites and fallen timber which provides essential foraging habitat. Habitat with hollows in standing dead or live trees and tree stumps is also essential for nesting.
- **Diamond firetail.** Identified 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. The approved conservation advice also states that any known or likely habitat identified in map 1 of the approved conservation advice should be considered habitat critical to the survival of the species. The subject land falls within the area mapped as known habitat, therefore could be considered habitat critical to the species.
- **Painted Honeyeater.** Known or likely breeding habitat in Boree/Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) woodlands, box-gum woodlands, and box-ironbark forests on the inland slopes of the Great Dividing Range in New South Wales, Victoria, and southern Queensland. All preferred foraging species within known and likely foraging habitat particularly mistletoes of the genus *Amyema* growing on forest and woodland eucalypts and acacias. It is unlikely the subject land would provide habitat critical to the survival of the species.

The project will result in the loss of:

- 751.21 hectares of assumed habitat for the Brown Treecreeper
- 453.97 hectares for the assumed habitat Diamond Firetail
- 248.82 hectares for the assumed habitat Painted Honeyeater.

The habitat within the subject land is likely to contain habitat critical to the survival of the species. While the project will implement mitigation measures to reduce the impact on these species, such as micro-siting of towers, given the extent of the impacts it is likely the project would adversely affect habitat critical to the survival of the woodland bird species.

- *disrupt the breeding cycle of an important population*

No important populations of the three woodland bird species have been identified in the subject land, therefore it is unlikely the proposed development would disrupt the breeding cycle of an important populations.

- *modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Habitat for the woodland bird species was impacted by the 2019–2020 bushfires within the subject land:

- 139.85 hectares of habitat for the Brown Treecreeper
- 75.37 hectares for the Diamond Firetail
- 85.18 hectares for the Painted Honeyeater.

Given the extent of habitat to be removed and impacts from the bushfires, it is considered likely the project would modify, remove or decrease the availability of habitat for the three woodland bird species to the extent that the Brown Treecreeper, Diamond Firetail or Painted Honeyeater may decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Habitat for the species in the subject land is varied in condition with much of the woodland and agricultural landscape in modified or poor condition, and many patches dominated by exotic ground species. Weed and pest species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species.

- *introduce disease that may cause the species to decline*

The project involves construction works that have potential to introduce disease or pathogens into the subject land and surrounding areas. This would be controlled through the implementation of appropriate mitigation measures, making the risk unlikely.

- *interfere substantially with the recovery of the species*

There is currently no adopted or made recovery plan for the Brown Treecreeper and Diamond Firetail. The approved conservation advice for the species identifies a number of regional and local priority actions for each species to assist in recovery including protecting woodland, open forest and, grassland habitat from clearing, fragmentation and disturbance.

The recovery plan for the Painted Honeyeater lists a number of strategies for the recovery of the species including:

- identify, protect, manage, and restore foraging and movement habitats, at the local, regional and landscape scales
- define, monitor, reduce and manage threats
- improve understanding of species movement and habitat use at a landscape scale in order to better target protection and restoration measures
- engage local communities and stakeholders in conservation
- coordinate, review and report on recovery progress.

The project is likely to result in the loss of assumed habitat for the species and therefore may interfere with the recovery of the Brown Treecreeper, Diamond Firetail or Painted Honeyeater.

Conclusion

While the subject land does not represent an important population of the Brown Treecreeper, Diamond Firetail or Painted Honeyeater, it is likely to have a significant residual impact on the woodland bird species due to loss of habitat critical to the survival of the species and interference with recovery of the species.

B4.2.7 White-throated Needletail (Hirundapus Caudacutus)

White-throated Needletail (*Hirundapus caudacutus*) is listed as vulnerable under the EPBC Act. The White-throated Needletail breeds in Asia and migrates to Australia during the non-breeding season (September to April). The White-throated Needletail is known to favour wooded areas including open forest and rainforest. The species is almost exclusively aerial, though it does roost in tree hollows or in the crowns of tall trees in forest habitats, and forages within the foliage canopy. In coastal areas they have been recorded flying over sandy beaches mudflats and coast cliffs.

The White-throated Needletail is widespread in eastern and southeastern Australia. In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

Relevant Commonwealth guidelines and policy statements that have been considered in this assessment include:

- Threatened Species Scientific Committee (2019). Conservation Advice *Hirundapus caudacutus* White-throated Needletail. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/682-conservation-advice-04072019.pdf. In effect under the EPBC Act from 04 July 2019.
- Other: Draft referral guideline for 14 birds listed as migratory species under the EPBC Act (Department of the Environment, 2015.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The White-throated Needletail was recorded during the ecological surveys. The population is estimated to be at least 10,000 individuals but probably fewer than 100,000. The Draft Referral guidelines for 14 birds listed as migratory species under the EPBC Act notes that a nationally ecological significant portion of a population would be 10 individual birds. While only one White-throated Needletail was recorded during the ecological surveys, a previous sighting has recorded up to 12 near Lake Liddel in the Upper Hunter. Therefore, for the purpose of this assessment the White-throated Needletail is an important population.

Significant impact criteria

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*

The White-throated Needletail is a non-breeding visitor to Australia, therefore habitat within the subject land only represents forging and roost habitat. The project will remove 761.98 hectares of foraging habitat for the White-throated Needletail. Approximately 135,809.10 hectares of available foraging habitat for the species occurs within a 10 kilometre buffer of the subject land. The loss of foraging habitat associated with the project represents less than 0.6% of the available habitat within the locality. Given the mobility of the species it is unlikely the species would be dependent on the resources within the subject land.

In addition, the species is susceptible to collision with transmission lines. To minimise the impacts diverters will be installed on transmission lines to reduce impacts from collision with transmission lines and infrastructure. The exact position and diverter model will be finalised during detailed design. The mitigation measures are known to be effective in minimizing aerial species collision with transmission lines and infrastructure therefore if implemented it is unlikely this would have a significant impact on the species population.

Based on the above, it is considered unlikely the project would lead to a long-term decline in the size of an important population.

- *reduce the area of occupancy of an important population*

The approved conservation advice for the White-throated Needletail states that the extent of occurrence is estimated at >20,000 square kilometres and the area of occupancy estimated at >18,000 square kilometres. Given the species mobility, it is unlikely the loss of 761.98 hectares of foraging habitat, which represents 0.042% of the area of occupancy for this species, would significantly reduce the area of occupancy of an important population.

- *fragment an existing population into two or more important populations*

The White-throated Needletail is an international migratory species flying thousands of kilometres a year between the northern and southern hemispheres. The project may result in fragmentation of the species habitat due to the potential collision with the transmission lines. However, mitigation measures are known to be effective in minimizing aerial species collision with transmission lines and infrastructure therefore if implemented, therefore it is unlikely the project would fragment an existing population into two or more. The species regularly flies across areas that might represent barriers to other species.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. Habitat critical is defined as habitat that is 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.

The White-throated Needletail only occurs in Australia during the non-breeding season. Habitat for the White-throated Needletail within the project is limited to foraging habitat. Based on the mapping the project will result in the loss of 761.98 hectares of foraging habitat for the species.

Approximately 135,809.10 hectares of available foraging habitat for the species occurs within a 10 kilometre buffer of the subject land. The loss of foraging habitat associated with the project represents less than 0.6% of the available foraging resources within the locality. Given the extent of foraging habitat, it is unlikely the project would be critical to the survival of the species, therefore the project would not result in an adverse impact to habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests in eastern Siberia, northeastern China, the Korean Peninsula and Japan. The project will remove foraging habitat that may be considered necessary to the species' ability to migrate to the breeding ground. Therefore, there is a real chance or possibility that the project would 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*

Based on the mapping the project will result in the loss of 761.98 hectares of foraging habitat for the species, although this is likely to be reduced due to micro-siting of the towers and infrastructure. In addition, approximately 135,809.10 hectares of available foraging habitat for the species occurs with a 10 kilometre buffer of the subject land. The loss of foraging habitat associated with the project represents less than 0.6% of the available forging resources within the locality. Consequentially it is unlikely the project would modify or decrease the availability of habitat to the extent the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The subject land has been previously disturbed and is subjected to ongoing disturbance such as invasive species. Invasive weeds and vertebrate pests such as cats and foxes are already known to occur within the subject land. It is unlikely the loss of foraging habitat would result in additional species that are harmful to the White-throated Needletail and/or its habitats becoming established.

- *introduce disease that may cause the species to decline*

There are no known diseases impacting this species that would be introduced by the project.

- *interfere substantially with the recovery of the species*

There is no made or adopted recovery plan for the White-throated Needletail. The approved conservation advice for the species sets out priority actions include:

- seek the support of governments in East Asia to protect remaining old growth forests within the breeding range of the species
- identify requirements of important habitat in Australia
- support initiatives to improve habitat management at key sites in Australia
- enhance existing White-throated Needletail monitoring programs, such as BirdLife Australia's Swift Monitoring Sites, particularly to improve coverage in under surveyed parts of Australia
- improve knowledge of the species including the life history, population size, distribution and ecological requirements in Australia and threatening process.

The project will not hinder the priority actions above, therefore unlikely to substantially interfere with the recovery of the species.

Conclusion

Based on the above assessment, it is unlikely the project would result in the modification and loss of habitat for the species, that may lead to a decline in an important population. Therefore, the project is unlikely to have a significant residual impact on the species.

B4.2.8 Parma Wallaby (Notamacropus Parma)

The Parma Wallaby is listed as vulnerable under the EPBC Act. This species current distribution is limited to the coastal and mountainous areas of central and northern NSW, ranging from around Olney State Forest southwest of Newcastle, to south of Tenterfield and Casino. The Parma Wallaby occurs in wet sclerophyll forest, with a matrix of thick scrubby understorey for shelter paired with grassy patches for foraging considered optimum habitat (Department of Climate Change, Energy, the Environment and Water, 2022).

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements used in this assessment this species is as follows:

- Approved conservation advice: Department of Climate Change, Energy, the Environment and Water (2022). *Conservation Advice for Notamacropus parma (*Parma wallaby*)*. Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/89289-conservation-advice-05102022.pdf. In effect under the EPBC Act from 05 October 2022.

- Adopted/made threat abatement plans:
  - Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
  - Department of the Environment, Water, Heritage and the Arts (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. In effect under the EPBC Act from 01 October 2008.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The approved conservation advice for the species notes that populations important to the survival of the Parma Wallaby include populations at the limits of the species' range, outlying populations, stronghold populations, research populations and other populations where recovery actions, such as predator control and reintroductions, are being implemented. Five Parma Wallaby were recorded within the Corrabare State Forest, within the Wyong IBRA subregion Given the records and the location of the project; it is likely this population represent an important population of the species.

Significant impact criteria

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*

The species is known to experience low subpopulation densities with relatively sparse, disjunct distribution (there is no known home range for the NSW population of Parma Wallaby). The approved conservation advice for the species notes that there has been a continuing decline in the number of mature individuals within the species distribution. The species was impacted by the 2019–2020 bushfires, with the overall population expected to decline by 16% across the next three generations due to the impacts associated with the 2019–2020 bushfire sand ongoing threats.

Approximately 27.07 hectares of habitat for the species was impacted within the subject land during the 2019–2020 bushfires. The project will result in the removal or modification of 304.98 hectares of confirmed habitat for the Parma Wallaby. Therefore, it is likely the loss of habitat resources for the species could lead to a long-term decrease in the size of an important population due to habitat restriction.

- *reduce the area of occupancy of an important population*

The area of occupancy of the Parma Wallaby is estimated at 590 square kilometres. The area occupied by this species is likely to be reduced by the project, with the removal or modification of 304.98 hectares of habitat. Given the low area of occupancy for this species, the impacts from the project are likely to reduce the area of occupancy for the Parma Wallaby.

- *fragment an existing population into two or more important populations*

The distance the species travels is largely unknown, the approved conservation advice notes that studies in New Zealand have shown the species moves approximately 5 hectares, however in Australia this is expected to be larger given the larger area of habitat for the species. The towers will be micro-sited to ensure minimal impact on the species habitat. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. powerlines will be above the habitat) it is unlikely the project would result in a barrier to movement, or the fragmentation of an existing population into two or more important populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. The approved conservation advice for the species notes that habitat critical to the survival of the species includes:

- occupied forested habitat
- unoccupied forested areas adjacent or near known occurrences, which can provide future habitat for natural range expansion, dispersal or translocation
- areas of habitat that supported the species in the past, but from which they are now absent.

The project will remove 304.98 hectares of habitat that represents habitat critical to the survival of the species. Given the distribution of the species and known records within the subject land, it is considered that the project will adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The Parma Wallaby is normally solitary, with year-round birth after a gestational period of 33-36 days. Pouch life is estimated at 30 weeks. Due to the permeability of the project design and the flexible breeding cycle of the species, it is unlikely the proposed development 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 that the species is likely to decline*

The project will result in the loss of 304.98 hectares of habitat for the Parma Wallaby. Given the limited distribution of the species, it is likely the loss of this habitat may result in a decrease in the availability of the habitat for the species.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Invasive species are currently present throughout the landscape, and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. Mitigation measures to minimise invasive species (e.g. weed controls) outlined in Section 8 of the BDAR would be implemented for the project to address potential invasive species introduction. As such the project is considered unlikely to result in invasive species becoming established in the habitat.

- *introduce disease that may cause the species o decline*

There are no known disease issues affecting this species in relation to the project. The project would be unlikely to increase the potential for significant disease vectors to affect the species. It is the intention to use current best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. Consequently, there is no real chance or possibility that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There is currently no recovery plan for the Parma Wallaby. However, the conservation and management priorities within the species' approved conservation advice outline the following impacts as interfering with its recovery:

- fire
- climate change and sever weather impacts
- habitat loss, degradation and modification
- invasive species.

As habitat loss and modification are identified as impacts interfering with the species' recovery, and 146.84 hectares of habitat is will be impacted by the project, there is the potential for the project to interfere with the recovery of the species.

Conclusion

The project will remove habitat for the Parma Wallaby, which is likely to lead to a decline in a long-term population and reduce the availability of habitat and the area of occupancy of the species. Therefore, it is likely the project will have a significant residual impact on the Parma Wallaby.

B4.2.9 Yellow-Bellied Glider (Petaurus australis)

The Yellow-bellied Glider is listed under as vulnerable under the EPBC Act. The species is the second largest glider in Australia and found at altitudes ranging from sea level to 1400 metres above sea level and has a widespread but patchy distribution from southeastern Queensland to far southeastern South Australia, near the Victorian boarder. In NSW the species predominantly occurs in forests along the eastern coast but is known to extend inland to the western slopes of the Great Dividing Range in parts of NSW.

The Yellow-bellied Glider occurs in eucalypt-dominated woodlands and forests, with a preference for habitats that contain a high proportion of winter-flowering and smoot-barked eucalyptus. The subspecies is social and lives in family groups of two to six individuals (though usually three to four) of varying age and sex composition, throughout an exclusive home range of approximately 25–85 hectares. The large home range is required to maintain the populations' viability. The Yellow-bellied Glider has very low dispersal capabilities over spaces larger than its gliding distance. The maximum gliding distance may be up to 120-140 metres. Hollow-bearing trees are used for dens and therefore are a critical habitat feature for the Yellow-bellied Glider.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

Relevant Commonwealth guidelines and policy statements that have been considered in this assessment include:

- Approved conservation advice: Department of Agriculture, Water and the Environment (2022). Conservation Advice for *Petaurus australis australis* (yellow-bellied glider (south-eastern)). Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/87600-conservation-advice-02032022.pdf. In effect under the EPBC Act from 02 March 2022.
- Adopted/made threat abatement plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 Dec 2024.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The subject land is not included in the areas identified as having an important population in the approved conservation advice. However, the advice notes that the list is not exhaustive and in the absence of information all populations should be considered important. The Yellow-bellied Glider was recorded during the ecological surveys, therefore represents part of an important population of the species.

Significant impact criteria

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*

The approved conservation advice for the species notes that there is no reliable estimate of the population size of the Yellow-bellied Glider. There are estimates of over 100,000 mature individuals, however, due to ongoing decline and the 2019–2020 bushfires, the current population size is likely to be below 100,000 mature individuals but still substantially above 10,000 mature individuals. The project would remove 480.38 hectares of assumed habitat which may reduce resources for the species and lead to a long-term decline in the species population.

- *reduce the area of occupancy of an important population*

The area of occupancy is estimated at 12,724 square kilometres, based on the mapping of point records from a 20-year period (2000–2020) obtained from state governments, museums and CSIRO. The approved conservation advice notes that the area of occupancy is likely significantly under-estimated due to limited sampling across the occupied range. The project does occur near the western limit of the species distribution. Given the decline in the species area of occupancy post the 2019-2020 bushfires, it is considered that the loss of 480.38 hectares of assumed habitat may reduce the area of occupancy for the Yellow-bellied Glider.

- *fragment an existing population into two or more important populations*

The project has the potential to limit connectivity due to clearance requirements under the transmission lines. Where the construction area will impact habitat connectivity the areas are to be investigated and where appropriate glider poles will be installed. The exact location and design of under-transmission line glider poles and/or rope bridges will be nominated as part of a guided Connectivity Strategy. Where poles are proposed to be installed on land adjacent to the easement, they will be subject to landowner agreement and captured in the property management plan. These measures have been used in previous linear projects and are considered effective in maintaining connectivity for the species. Providing these measures are implemented it is unlikely the project would fragment an existing population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. The approved conservation advice notes that habitat critical to the survival of the Yellow-bellied Glider may be broadly defined as areas containing the following attributes (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis):

- large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees
- areas identified as refuges under future climate change scenarios
- short or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas
- habitat corridors required to facilitate dispersal of the species between fragmented habitat patches and/or that enable recolonization or movement away from threats
- areas in which some trees have evidence of use for sap extraction by Yellow-bellied Glider.

Habitat within the subject land is likely to contain features that would represent habitat critical to the survival of the species including winter-flowering plants, smooth barked eucalyptus and hollows suitable for denning. Therefore, the loss of 480.38 hectares of assumed habitat is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

This species utilises hollow bearing trees, primarily living, smooth-barked eucalypts of multiple species. The project will result in the loss 480.38 hectares of assumed habitat that may contain suitable hollow bearing trees. The loss of these trees combined with the potential fragmentation may disrupt the breeding cycle of the species.

The loss of 480.38 hectares of assumed habitat including the potential loss of tree hollows, associated with the project, is considered likely to modify, destroy, remove or isolate or decrease the availability or quality of 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*

Many assumed habitat patches in the project study area are dominated by exotic ground species. Weed and pest faunal species are both currently present throughout the landscape and it is considered unlikely that the project would substantially change the composition of the species' habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species. There is potential for the project to introduce additional weeds and pathogens within the subject land and surrounding locality. Mitigation measures outlined in Section 8 of the BDAR would be implemented for the project to address potential invasive species introduction. As such the project is considered unlikely to result in invasive species becoming established in the habitat.

- *introduce disease that may cause the species to decline*

There are no known disease issues affecting this species in relation to the project. The project would be unlikely to increase the potential for significant disease vectors to affect the species. It is the intention to use current best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. Consequently, there is no real chance or possibility that the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

There is currently no recovery plan for the Yellow-bellied Glider. The species approved conservation advice states that the primary conservation outcome is to stabilise populations by protecting areas of habitat from extensive severe fire, fragmentation and timber harvesting, known threats are mitigated and key habitat features (e.g., sap trees, hollow-bearing trees) and habitat connectivity are retained. As the project will affect 480.38 hectares of assumed habitat, it is possible that it will interfere with the recovery of the species.

Conclusion

Based on the above assessment it is likely the project would have a significant residual impact on the Yellow-bellied Glider.

B4.2.10 Brush-Tailed Rock Wallaby (Petrogale Penicillata)

Brush-tailed Rock-wallaby is listed as vulnerable under the EPBC Act. Brush-tailed Rock-wallaby occupy a disjoined range in southeastern Australia, mostly associated with the Great Dividing Range, from the Grampians, in western Victoria, to Yarraman, in south-eastern Queensland. This species historically inhabited a large range, but since 2004 many sub-populations have been extirpated. Brush-tailed Rock-wallaby are a social animal and live in colonies of approximately 30 individuals or less.

The Brush-tailed Rock-wallaby tend to rest and bask in rugged north facing rocky areas, including rock faces and outcrops during the day. At night, this species will forage for grasses, fungi, fruit, flowers and bark in grassy forest, pastures and woodland habitats close to their daytime resting areas. As a group the Brush-tailed Rock-wallaby territory is approximately 15 hectares, however individual foraging areas are smaller at 2–3 hectares.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Conservation Advice: The Conservation Advice for *Petrogale penicillata* (Brush-tailed Rock-wallaby) (Department of Agriculture Water and the Environment, 2022).
- Listing Advice: Listing assessment information may be available in the approved Conservation Advice.
- Recovery Plan: National Recovery Plan for the Brush-tailed Rock-wallaby *Petrogale penicillata.* (Department of Agriculture, 2022).
- Threat Abatement Plan/s:
  - Threat abatement plan for predation by feral cats (Department of the Environment, 2015b).
  - Threat abatement plan for competition and land degradation by rabbits (Department of Environment and Energy, 2016).
  - Threat abatement plan for competition and land degradation by unmanaged goats (Department of the Environment Water Heritage and the Arts, 2008d).
  - Threat abatement plan for predation by the European red fox (Department of the Environment Water Heritage and the Arts, 2008e).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery (Department of the Environment, 2013). Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The approved conservation advice for the Brush-tailed rock-wallaby identifies important populations of the species (in this case sub-populations). Populations important to the survival of the Brush-tailed rock-wallaby include stronghold populations, populations at the limits of the species range, outlying populations, research populations, captive populations, and other populations where recovery actions, such as predator control or reintroductions, are being implemented. Important populations identified in NSW include (not exhaustive):

- Warrumbungle Range/Mount Kaputar populations (NSW)
- Shoalhaven population (NSW)
- Nattai National Park population (NSW)
- Wollemi National Park and Jenolan Caves populations (NSW)
- Wolgan population (NSW)
- Watagans population (NSW)
- Big Yango population (NSW)
- Barnard River population (NSW)
- Macleay Gorges population (NSW)
- Shanno Creek population (NSW)
- Guy Fawkes River population (NSW)
- Green Gully population (NSW).

The subject land includes habitat within the known population range for both the Watagans and Big Yango important populations of Brush-tailed rock-wallaby.

Significant impact criteria

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*

The subject land includes habitat within the known population range for both the Watagans and Big Yango important populations of Brush-tailed rock-wallaby. It is estimated that approximately 50% of the Brush-tailed Rock-wallaby distribution occurs within the area impacted by the 2019–2020 bushfires. The impacts of bushfires on the species are not only limited to habitat loss but can also incur an increase in predators such as cats or other species that compete food resources.

Twenty-six Brush-tailed Rock-wallabies were recorded across the Pokolbin, Corrabare and Watagan. Approximately 14.17 hectares of habitat for the species within the subject land was burnt during the 2019–2020 bushfires. The loss of 145.64 hectares of confirmed habitat within the subject land (breeding and foraging) and 10.38 hectares of assumed habitat (total of 156.02 hectares) could lead to a long decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

The subject land includes habitat within the known population range for both the Watagans and Big Yango important populations of Brush-tailed rock-wallaby. The loss of 156.02 hectares of habitat (145.64 hectares of confirmed habitat and 10.38 hectares of assumed habitat) could amount to a reduction in area of occupancy for the species.

- *fragment an existing population into two or more important populations*

The subject land includes habitat within the known population range for both the Watagans and Big Yango important populations of Brush-tailed rock-wallaby. As the nature of the project is highly permeable, it is unlikely that fragmentation of a population would occur for terrestrial species.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

The approved conservation advice notes that habitat critical to the survival of a species refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species

The approved conservation advice for the species states that it is not practicable to describe habitat critical to the survival of this species. The species eligibility for listing, and key threats being the loss, degradation and fragmentation of habitat suggests that all habitat for the species either now or at some point in the near future is likely to be critical to the survival of the species. Therefore, the loss of 156.02 hectares of habitat (145.64 hectares of confirmed habitat and 10.38 hectares of assumed habitat) is likely to adversely affect habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The subject land includes habitat within the known population range for both the Watagans and Big Yango important populations of Brush-tailed Rock-wallaby. As the nature of the project is highly permeable, it is unlikely that fragmentation of a population would occur that could lead to breeding cycle disruption i.e. dispersal.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The impact to Brush-tailed Rock-wallaby is estimated at approximately 145.64 hectares of confirmed foraging or movement habitat and 10.38 hectares of assumed habitat. Given the inclusion of habitat of known populations within the subject land, it is likely the loss of habitat could cause change to the extent that the species may decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The project is unlikely to result in an invasive species harmful to the Brush-tailed Rock-wallaby becoming established in the habitat. Introduced predators are well established. The potential for weed invasion was considered possible with a project of this nature and appropriate controls are required during construction and operation to reduce this threat. Invasive species would be managed under the construction environmental management plan using best practice methods. Consequently, there is no real chance or possibility that the project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- *introduce disease that may cause the species to decline*

There are no known disease issues affecting this species in relation to the project. The project would be unlikely to increase the potential for significant disease vectors to affect the species. It is the intention to use current best practice hygiene protocols as part of the construction environmental management plan to prevent the introduction or spread of pathogens. It is unlikely the project will introduce disease that may cause the species to decline.

- *interfere substantially with the recovery of the species*

The national recovery plan for the Brush-tailed Rock-wallaby outlines the following objectives for recovery of the species:

- determine and manage threats to the Brush-tailed Rock-wallaby and its habitat
- determine distribution, abundance, population trends and viability for the Brush-tailed Rock-wallaby
- establish and maintain separate, viable captive populations derived from the Southern and Central Evolutionarily Significant Units (ESUs)
- undertake translocations to improve the genetic and demographic robustness of populations and to establish new colonies of Brush-tailed Rock-wallabies
- investigate key aspects of Brush-tailed Rock-wallaby biology and ecology for conservation management
- increase community awareness and support for Brush-tailed Rock-wallaby conservation.

The project will not interfere with any of the identified recovery objectives, therefore unlikely to substantially interfere with the recovery of the species.

Conclusion

Based on the above assessment it is likely the project would result in a significant residual impact on the Brush-tailed Rock-wallaby.

B4.2.11 Long-Nosed Potoroo (Potorous Tridactylus)

The Long-nosed Potoroo is listed as vulnerable under the EPBC Act. The Long-nosed Potoroo is a compact, medium-sized marsupial that occurs in a range of vegetation types from coastal scrub and heathy woodland to wet sclerophyll forest and rainforest. The species' preferred habitat has a dense understorey layer to provide cover, but with sufficient open space beneath the sub-canopy to allow foraging. The species has often been recorded in gullies and near creeks, which provide refuge during fire and drought.

The species has a fragmented distribution and generally occurs between sea level and up to 800 metres above sea level in habitat that receives an annual rainfall greater than 760 millimetres. The species is split into two subspecies: northern and southern. The Long-nosed Potoroo has a broad, though highly fragmented distribution across two major bioregions (Southeast Queensland and New South Wales north coast) and occurs between Many Peaks Range (near Gladstone) in the north to the northern boundaries of the Sydney Basin.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements used in this assessment include:

- Approved conservation advice: Department of Agriculture, Water and the Environment (2022). Conservation Advice for *Potorous tridactylus tridactylus* (Northern Long-nosed Potoroo). Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/66645-conservation-advice-15022022.pdf. In effect under the EPBC Act from 15 February 2022.
- Adopted/made threat abatement plan:
  - Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

- Department of the Environment, Water, Heritage and the Arts (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. In effect under the EPBC Act from 01 October 2008.

- Other: *Survey guidelines for Australia's threatened mammals. EPBC Act survey guidelines 6.5* (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC, 2011).

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The approved conservation advice for the species notes that populations important to the survival of the northern long-nosed potoroo include populations at the limits of the species' range, outlying populations, stronghold populations, island populations, research populations and other populations where recovery actions, predator control and reintroductions are being implemented. The Long-nose Potoroo was recorded within the subject land. The approved conservation advice does not identify this area as one of the important populations. Therefore, without further information a precautionary approach has been taken, as it may represent an outlying or island population.

Significant impact criteria

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*

The species conservation advice (including the listing advice) notes that the species population is estimated between 7750 to 70,144 mature individuals. The home range of the species ranges between 2 to 5 hectares. The project would remove approximately 135.10 hectares of confirmed habitat for the species. Given the small home range, and the extent of the impacts it is considered that the project may lead to a long-term decline in the size of this important population.

- *reduce the area of occupancy of an important population*

The extent of occurrence in this assessment is estimated at 92,897 square kilometres with an area of occupancy of 512 square kilometres. Approximately 1.91 hectares of habitat for the species was impacted by the 2019–2020 bushfire, representing less than 0.003% of the species area of occupancy. The project would result in the loss of 135.10 hectares of confirmed habitat for the species, which represents 0.26% of the area of occupancy for the Long-nosed Potoroo. Given the project is not at the limit of the species distribution it is unlikely the project would reduce the area of occupancy for the species.

- *fragment an existing population into two or more important populations*

The species approved conservation advice notes that many of the extant subpopulations are isolated by distance or separated by uninhabitable fragmented landscapes. The Long-nosed Potoroo has low dispersal capability (less than 8 kilometres) and small home ranges (0.19 square kilometres for females and 1 square kilometres for males) making it susceptible to fragmentation

The project will result in the loss of 135.10 hectares of confirmed habitat for the species. However, towers will be micro-sited to avoid area of sensitive habitats, and transmission lines will span over the habitat therefore reducing impacts of fragmentation. Therefore, it is unlikely the project would result in an existing population being split into two populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. The species approved conservation advice identifies habitat critical to the survival as:

- occupied forested habitats larger than 0.1 square kilometres
- unoccupied forested areas larger than 0.1 square kilometres, which are either adjacent or proximal to extant subpopulations
- areas of habitat that supported the northern long-nosed potoroo in the past, but from which they are now absent.

The Long-nosed Potoroo was recorded within the subject land, therefore the area to be removed may form part of the occupied habitat. The loss of 135.10 hectares of confirmed habitat is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The Long-nosed Potoroo breed throughout the year but more frequently in late winter to early spring and late summer. The species approved conservation advice notes fragmentation may impact the genetic diversity of the species and ability to successfully breed. However, the loss of 135.10 hectares of confirmed habitat for a species with limited dispersal capabilities may disrupt the breeding cycle of an important population due to lack of foraging resources.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Given the small home range of the species, it is likely the loss of 135.10 hectares of confirmed habitat of habitat will modify or decrease the availability of habitat to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Invasive species likely to be harmful to the Long-nosed Potoroo (e.g. cats and foxes) are already well established within the landscape. The potential for weed invasion was considered possible with a project of this nature and appropriate controls are required during construction and operation to reduce this threat. Invasive species would be managed under the construction environmental management plan using best practice methods. It is unlikely the project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- *introduce disease that may cause the species to decline*

The approved conservation advice notes there are two disease which are known to impact the Long-nosed Potoroo. Infestation of native vegetation by *Phytophthora cinnamomi* can result in the degradation of habitat and reduce food availability for the species. This is of particular concern during the breeding or survival cycle.

Toixoplasma gondii is a virulent pathogen that can cause the disease toxoplasmosis. The pathogen is spread by cats and can result in death or may affect the species' behaviour making it more suspectable to predation.

Both *Phytophthora cinnamomi* and *Toixoplasma gondii* are found throughout the s Long-nosed Potoroo range. Therefore, it is unlikely the project would introduce a disease that may cause the decline of the species. In addition, biosecurity protocols will be implemented to minimise *Phytophthora cinnamomi* and *Toixoplasma gondii* spread where possible.

- *interfere substantially with the recovery of the species*

There is no made or adopted recovery plan for the species, however the approved conservation advice for the Long-nosed Potoroo includes the following conservation priorities:

- where *Phytophthora cinnamomi* occurs within or proximal to the Northern Long-nosed Potoroo subpopulations, develop hygiene controls
- develop and implement strategies to control predation by the European red fox and feral cats and where relevant, competition from feral pigs, as detailed in the relevant threat abatement plans or management strategies
- avoid further loss and fragmentation of habitat, including loss of vegetation connecting areas of habitat for the species or the creation or increase of barriers to movement between subpopulations
- where feasible, promote the restoration and enhancement of habitat connectivity between fragmented habitat patches to allow safe movement of individuals.

The project will result in the loss of 135.10 hectares of confirmed habitat; therefore, it is likely to be in conflict with the conservation priorities. However, with the implementation of mitigation measures to reduce clearing it is unlikely to substantially interfere with the recovery of the species.

Conclusion

The project is likely to have a significant residual impact on the Long-nosed Potoroo due to the loss of 131.94 hectares of habitat.

B4.2.12 New-Holland Mouse (Pseudomys Novaehollandiae)

The New Holland Mouse is a small, terrestrial, burrowing rodent native to Australia. The New Holland Mouse has a disjunct, fragmented distribution extending across southern Qld, NSW, the Australian Capital Territory (ACT), Victoria, and Tasmania. The species primarily occurs in coastal areas; however, its range extends inland to around 100 kilometres in northern NSW and southern Queensland.

The species habitat includes open heathland, woodland and dry sclerophyll forest with a heath understorey, grasslands and vegetated sand dune. It nests communally in underground burrows during the day and feeds on the surface at night on seeds, leave, flowers, fungi and invertebrates.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements used in this assessment include:

- Approved conservation advice: Department of Climate Change, Energy, the Environment and Water (2024). Conservation Advice for *Pseudomys novaehollandiae* (New Holland mouse, Pookila). Canberra: Department of Climate Change, Energy, the Environment and Water. In effect under the EPBC Act from 05 July 2024.
- Adopted/made threat abatement plans:
  - 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. In effect under the EPBC Act from 22 February 2019.
  - Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

If present, this would likely be an important population.

The approved conservation advice for the species notes that all populations of the New Holland Mouse are important for the long-term recovery and survival of this species due to the patchiness and isolated nature of the species' populations along with evidence of declines. While the species was not recorded during the ecological surveys several records are known to occur within the subject land, therefore it is considered an important population.

Significant impact criteria

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*

The population of the New Holland Mouse is estimated to range between 13,100 to 26,300 mature individuals. The project is likely to remove 31.98 hectares of the assumed habitat for the species. Approximately 1.79 hectares of assumed habitat for the species within the subject land was impacted by the 2019–2020 bushfires. Noting the home range of the species is between 0.14 hectares to 2.14 hectares, if present in the subject land the loss of this habitat may result in a long-term decrease in the size of the population.

- *reduce the area of occupancy of an important population*

The approved conservation advice notes the average area of occupancy for the species is estimated at 694 square kilometres. The project would result in the loss of 0.05% of the area of occupancy for the species. Given the project is not at the limit of the species distribution it is unlikely it would reduce the area of occupancy for the species.

- *fragment an existing population into two or more important populations*

The New Holland Mouse has been recorded moving distances of 37 metres in one hour and up to 206 meters in one night. The home range of the species have been recorded ranging between 0.14 hectares to 2.14 hectares. The towers will be micro-sited to ensure minimal impact on the species habitat. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. powerlines will be above the habitat) it is unlikely the project would result in a barrier to movement or fragment an existing population into two or more important populations.

- *adversely affect habitat critical to the survival of a species*

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. The approved conservation advice notes that habitat critical to the survival of the New Holland Mouse can be broadly defined as: the current area of occupancy of the species; areas in which the species previously occurred but has since become locally extinct; patches of assumed habitat that may not be currently occupied by the species; and assumed habitat into which the New Holland Mouse could disperse or be translocated.

The species was not recorded within the subject land and there are no records of the species previously occurring, however habitat within the subject land may represent suitable habitat that may not be currently occupied. The project would result in the loss of 31.98 hectares of assumed habitat for the new Holland Mouse. Therefore, the project is likely to adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

The New Holland Mouse nests in burrows during the day and forages at night. Breeding typically occurs from late winter to early spring or autumn in the north, and from late spring to early summer in the south of its range. The timing of breeding is related to abundance and quality of foraging habitat.

The construction of the access roads and towers may require some excavation works which may impact on burrows, in addition to the loss of 31.98 hectares of suitable foraging habitat. Therefore, there is a real chance or possibility that the project could disrupt the breed 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 project will require clearing of 31.98 hectares of assumed habitat for the species and excavation works that may impact on burrows. Mitigation measures will be implemented to reduce these impacts including micro-siting of the towers to avoid sensitive habitats. However, given the small home range of the species, the project may modify, destroy or decrease the availability of habitat for the New Holland Mouse to the extent that the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The project is unlikely to result in an invasive species harmful to the New Holland Mouse becoming established in the habitat. Introduced predators are well established. The potential for weed invasion was considered possible with a project of this nature and appropriate controls are required during construction and operation to reduce this threat. Invasive species would be managed under the construction environmental management plan using best practice methods. Consequently, it is unlikely the project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- *introduce disease that may cause the species to decline*

The approved conservation advice notes there are two diseases which are known to impact the new Holland Mouse. Infestation of native vegetation by *Phytophthora cinnamomi* can result in the degradation of habitat and reduce food availability for the species. This is of particularly concern during the breeding or survival cycle.

Toixoplasma gondii is a virulent pathogen that can cause the disease toxoplasmosis. The pathogen is spread by cats and can result in death or may affect the species' behaviour making it more suspectable to predation.

Both *Phytophthora cinnamomi* and *Toixoplasma gondii* are found throughout the species range. Therefore, it is unlikely the project would introduce a disease that may cause the decline of the species. In addition, biosecurity protocols will be implemented to minimise *Phytophthora cinnamomi* and *Toixoplasma gondii* spread where possible.

- *interfere substantially with the recovery of the species*

There is no made or adopted recovery plan for this species. Conservation and recovery actions outlined in the species approved conservation advice include:

- ensure that habitat occupied by the New Holland Mouse, and habitat that is currently unoccupied but is important to support the recovery of the species, is protected from disturbance by development or other land use change
- control access routes to suitably constrain public access to known sites on public land
- restrict adverse impacts from land use at sites where the species is known to occur
- protect subpopulations from impacts of habitat change caused by *Phytophthora cinnamomi*
- manage fire regimes to improve habitat suitability for the New Holland Mouse
- manage impacts of introduced predators on New Holland Mouse subpopulations.

The project will implement mitigation measures including micro-siting towers, avoiding sensitive habitat where possible, biosecurity and invasive species controls which are consistent with the species recovery action. However, the project results in the loss of 31.98 hectares assumed habitat, therefore the project is likely to interfere with the first recovery action.

Conclusion

Based on the assessment above it is likely the loss of 31.98 hectares of assumed habitat would result in a significant residual impact on the New Holland Mouse.

B4.2.13 Grey-Headed Flying-Fox (Pteropus Poliocephalus)

The Grey-headed Flying-fox is listed as vulnerable under the EPBC Act and is one of the largest bats in the world. The species is regularly found from the coast, inland to the tablelands and western slopes of northern New South Wales and the tablelands of southern Queensland. Breeding camps have been recorded as far north as Ingham in far north Queensland and more recently, the species has become established in South Australia, the Australian Capital Territory and Victoria and inland areas of New South Wales.

The species forages over extensive areas and has been known to fly as far as 40 kilometres to feed, before returning to their roost the same night. They have no biological adaptations to withstand food shortages (e.g. torpor) and migrate in response to changes in the quantity and location of food. Grey-headed Flying-foxes roost in large aggregations, known as camps, in the exposed branches of trees.

Camps that have contained ≥ 10,000 Grey-headed Flying-fox in more than one year in the last 10 years, or have been occupied by more than 2500 Grey-headed Flying-fox permanently or seasonally every year for the last 10 years, are identified as nationally important Grey-headed Flying-foxes camps. The species can move long distances between camps.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Listing advice: threatened Species Scientific Committee (2001). Commonwealth Listing Advice on *Pteropus poliocephalus* (Grey-headed Flying-fox). Available from: http://www.environment.gov.au/biodiversity/threatened/species/p-poliocephalus.html. In effect under the EPBC Act from 06 December 2001.
- Adopted/made recovery plan: Department of Agriculture, Water and the Environment (2021). National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus*. Canberra: Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/recovery/grey-headed-flying-fox. In effect under the EPBC Act from 19 March 2021.
- Adopted/made threat abatement plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
- Other:
  - *Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1* (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010.
  - *Referral guideline for management actions in Grey-headed and Spectacled flying-fox camps* (Department of the Environment, 2015.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery. Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

If present, this would likely be an important population.

There are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' entire geographic range.

Significant impact criteria

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*

Based on the CSIRO National Flying-fox Monitoring Program (https://data.csiro.au/collection/csiro:64370) the population of Grey-headed Flying-fox is estimated to be between 330,000 and 990,000, with strong seasonal variation depending on the reproductive cycle and availability of foraging resources within the species range.

There are nationally important Grey-headed Flying-foxes camps within 50 kilometres of the subject land. The species was recorded in PCTs 3263, 3315 and 3438, and is also associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3314, 3431, 3439, 3444, 3581, 3599, 3605, 3617, 3621, 4039.

While the project is unlikely to impact a Grey-headed Flying-fox camp, it will clear approximately 727.57 hectares of foraging habitat for the species, which may contain essential winter foraging resources. In addition, the Grey-headed Flying-fox is prone to accidental injury and death from various artificial obstacles. Animals can be electrocuted on powerlines, therefore there is a real risk that the project could cause injury or death to the species. Therefore, there is a real chance or possibility that the loss of this habitat could lead to a long-term decline in an important population.

- *reduce the area of occupancy of an important population*

The listing advice for the species notes that distribution of the Grey-headed Flying-foxes is not precarious for the survival of the species nor limited, the range of the species extending from Bundaberg in Queensland to Melbourne in Victoria and from the coast inland to the western slopes of New South Wales. Therefore, it is unlikely the project would significantly reduce the area of occupancy of an important population of the species.

- *fragment an existing population into two or more important populations*

There are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' entire geographic range. The species is known to occur from Queensland to Adelaide.

The project has the potential to limit connectivity due to the transmission lines. However, given the mobility of the species and extent of the population distribution it is unlikely the project would fragment an existing population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

Habitat critical to the survival of a species also 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.

The recovery plan for the Grey-headed Flying-fox identifies habitat critical to the survival as that vegetation containing winter and spring foraging species as *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or Syncarpia glomulifera*.

The habitat within the subject land includes the some of the forging species identified above. Therefore, given the extent of foraging habitat to be cleared it is likely the project would adversely impact habitat critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

There is no breeding habitat known to occur within the subject land, and the land to be developed will not impact on any known roosting or maternity camp. However, the loss of foraging resources may reduce the species ability to breed. However, given the species mobility and additional resources within 50 kilometres of the nationally important camps it is unlikely the Grey-headed Flying-fox would be dependent on the resource in the subject land. As such the project is unlikely to 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*

Habitat for the Grey-headed Flying-fox was impacted by the 2019–2020 bushfires. One study identified that the bushfires had a substantial impact on Grey-headed Flying-fox roosting habitat, with 134 roosts having some or all roosting habitat directly affected by the bushfires (Mo, et al., 2024). This equates to 15% of all known grey-headed flying-fox roost locations. The impact of the fires not only impacts roosting habitat but also foraging habitat, with the study showing that the majority of the unburnt roosts were within 27 km of burnt areas that may be used or foraging.

Approximately 21 hectares of habitat for the Grey-headed Flying-fox was impacted during the 2019–2021 bushfires. The project will result in the loss of approximately 727.57 hectares of foraging habitat for the Grey-headed Flying-fox which may contain essential winter foraging species. Therefore, it is likely the project would decrease the availability of foraging habitat to the extent the species is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Habitat for the species in the subject land is varied in condition and weed and pest species are both currently present throughout the landscape. Therefore, with the implementation of biosecurity measures and pest controls it is considered unlikely that the project would substantially change the composition of the species habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species.

- *introduce disease that may cause the species to decline*

As there are no known diseases likely to impact this species, given the impacts are well known it is considered unlikely that the project would introduce disease that would cause the decline of the species.

- *interfere substantially with the recovery of the species*

The overall objective of the national recovery plan for the Grey-headed Flying-fox is to improve the population trend by reducing the threats to the species and assist the Grey-headed Flying-fox and communities to coexist. While the project will result in the loss 727.57 hectares of foraging habitat for the species, given the available resources in the locality and species mobility it is unlikely to substantially interfere with the recovery of the species.

Conclusion

Based on the assessment above the project is likely to result in the loss of habitat critical to the survival of the species. It is therefore likely the project would have a significant residual impact on the Grey-headed Flying-fox.

B4.2.14 Corben's Long-eared Bat (Nyctophilus corbeni)

The Corben's Long-eared Bat is listed as vulnerable under the EPBC Act, the species is found in southern central Queensland, central western New South Wales, north-western Victoria and eastern South Australia. In NSW the species inhabits a variety of vegetation types, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales.

The species forages around concentrated patches of trees in the landscape, with many individuals from different species of bat sharing the same foraging area. Corben's Long-eared Bat roost mainly in dead trees and the sprouts of lining trees. These roost sites may only be used for a day with the species recorded traveling up to 4 kilometres over might to other sites.

Relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plan

A summary of the relevant Commonwealth guidelines and policy statements available for this species is as follows:

- Listing advice: Threatened Species Scientific Committee (2001). Commonwealth Listing Advice on ten species of Bats. Available from: http://www.environment.gov.au/biodiversity/threatened/species/bats.html. In effect under the EPBC Act from 04 April 2001.
- Approved conservation advice: Threatened Species Scientific Committee (2015). Conservation Advice *Nyctophilus corbeni* south-eastern long-eared bat. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/83395-conservation_advice-01102015.pdf. In effect under the EPBC Act from 01 October 2015.
- Adopted/made threat abatement plan: Department of Climate Change, Energy, the Environment and Water (2024). Threat abatement plan for predation by feral cats 2024. Canberra: Commonwealth of Australia. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 24 December 2024.
- Other: Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1 (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010.

Is this an important population?

In accordance with the Significant Impact Guidelines, the presence of an important population must be identified prior to addressing the significance impact criteria. An important population is defined in the guidelines as a population that is necessary for a species' long-term survival and recovery (Department of the Environment, 2013). Under the EPBC Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

The species was not recorded during the ecological surveys and no important populations have been identified. Based on the approved conservation advice for the species a large portion of the subject land is located outside of the species distribution, however the remaining areas are within the eastern limit of the species range. For the purpose of this assessment the species is considered an important population.

Significant impact criteria

An action is likely to have a significant impact on a Critically Endangered 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*

There is limited information on the Corben's Long-eared Bat. The species is associated with PCT 3315, 3438, 3489 and 4039. The area of impact (39.40 hectares) has been calculated based on the PCTs' distribution across the subject land. The species is mobile and approximately 17,666.34 hectares of associated PCTs occurs within a 10 kilometres buffer of the subject land. Given the extent of the species distribution and mobility of the species, it is unlikely the project would lead to a long-term decrease in the size of an important population.

- *reduce the area of occupancy of an important population*

The approved conservation advice for the species notes that the species occurs throughout much of inland New South Wales. A portion of the project occurs at the eastern limit of the species distribution. Habitat for the species within the subject land was impacted by the 2019–2020 bushfires with 11.56 hectares of habitat burnt. Approximately 17,666.34 hectares of associated PCTs occurs within a 10 kilometres buffer of the subject land. Therefore, given the species mobility it is unlikely the loss of 39.40 hectares would significantly reduce the area of occupancy for the species.

- *fragment an existing population into two or more important populations*

The project may impact the movement of the Corben's Long-eared Bat due to the placement of powerlines and towers. The project will implement measures to minimise the impacts including micro-siting towers to avoid sensitive habitat and installing diverters to reduce impacts from collision with transmission lines and infrastructure. The exact position and diverter model will be finalised during detailed design. The mitigation measures are known to be effective in minimizing aerial species collision with transmission lines and infrastructure therefore if implemented it is unlikely the project would fragment an existing population in two or more populations.

- *adversely affect habitat critical to the survival of a species*

Habitat critical to the survival of a species also 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.

Habitat critical to the survival of the species is not identified in the species approved conservation advice. However, the conservation advice notes that the species requires large areas of land, therefore some areas within the subject land may represent habitat critical to the survival of the species. The project would result in the loss of 39.40 hectares of assumed habitat for the species. As the impacts are based on the PCTs across the entire project this impact likely to be significantly smaller. Therefore, given the extent of habitat for the species west of the project it is unlikely the project would adversely affect impact habitat critical to the survival of the species. In addition, approximately 17,666.34 hectares of associated PCTs occurs within a 10 kilometre buffer of the subject land.

- *disrupt the breeding cycle of an important population*

The project will result in the loss of breeding and foraging habitat for the Corben's Long-eared Bat. However, habitat for this species occurs west of the project, therefore given the species mobility it is unlikely to 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*

A portion of the project occurs at the eastern limit of the species distribution, however habitat for the species is well represented within the immediate vicinity of the subject land (approximately 17,666.34 hectares of associated PCTs occurs within a 10 kilometres buffer of the subject land). Therefore, it is unlikely the project would destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. In addition, mitigation measures will be implemented to minimise the impacts including micro-siting the towers to avoid sensitive habitat.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Habitat for the species in the subject land is varied in condition and weed and pest species are both currently present throughout the landscape. Therefore, with the implementation of biosecurity measures and pest controls it is considered unlikely that the project would substantially change the composition of the species habitat within the landscape or increase the spread and establishment of invasive species (i.e. predators) that could threaten the survival of the species.

- *introduce disease that may cause the species to decline*

As there are no known diseases likely to impact this species, given the impacts are well known it is considered unlikely that the project would introduce diseases that would cause the decline of the species.

- *interfere substantially with the recovery of the species*

The approved conservation advice for the species set out a number of conservation actions for the recovery of the species including:

- protect known and assumed habitat of key populations, including within conservation reserves, from habitat loss and fragmentation
- provide relevant state government land management agencies, regional bodies and local shires with the location of key populations under their jurisdiction to incorporate these into planning mechanisms to assist in habitat protection
- incorporate findings of research into the impact of forestry practices into forest management to protect key populations
- retain hollow-bearing trees and provide for hollow tree recruitment where possible
- implement control programs of feral species identified as having a known or potential impact on key populations.

While the project will result in the loss 39.40 hectares habitat for the species, protocols and mitigation measures will be implemented to minimise the loss of hollow trees and reduce invasive species. Therefore, it is unlikely the project would substantially interfere with the recovery of the species.

Conclusion

A portion of the project occurs at the eastern limit of the species distribution, however habitat for the species is well represented within the immediate vicinity of the subject land (approximately 17,666.34 hectares of associated PCTs occurs within a 10 kilometre buffer of the subject land). Therefore it is unlikely the project would result in a significant residual impact on the species.

B5. Commonwealth land (plants and animals)

The project will transect the Singleton Military Area (SMA), which is considered Commonwealth land under the EPBC Act. The assessment of Commonwealth land must consider the 'environment' on Commonwealth land. The EPBC Act defines environment to include: (a) ecosystems and their constituent parts, including people and communities; (b) natural and physical resources; (c) the qualities and characteristics of locations, places and areas; (d) heritage values of places; and (e) the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b), or (c).

In accordance with the *Significant Impact Guidelines 1.2: Actions on, or impacting upon, Commonwealth Land, and actions by Commonwealth agencies (Significant Impact Guidelines 1.2)* the component of the environment considered in relation to biodiversity includes the plants and animals). This includes common species, threatened species and ecological communities listed under the BC Act and the EPBC Act, and migratory species listed under the EPBC Act likely or known to occur within the subject land on Commonwealth land (SMA).

B5.1 Impacts on plants

The *Significant Impact Guidelines 1.2* provides guidance to identify the environmental context for an action. In relation to plants the guidelines considers this in relation to vegetation types and vegetation species. Therefore, the assessment below considers the impacts associated with the project on native vegetation on Commonwealth land (SMA).

The project is expected to impact on 128.84 hectares of land in the subject land on the SMA. This includes 105.15 hectares of native vegetation and 48.69 hectares of EPBC listed threatened ecological communities. The break-down of impact across vegetation types, TECs and threatened flora is shown in Table B.2.

Table B.2 Impact of the project on native vegetation and listed EPBC Act and BC Act threatened species and ecological communities within Singleton Military Area

Disturbance area	Impacted entity	Impact area (ha)
Disturbance A	PCT3314 - Central Hunter Slopes Grey Box Forest (Thinned condition)	0.11
	PCT3315 - Central Hunter Ironbark-Spotted Gum Forest (Derived condition)	17.03
	PCT3315 - Central Hunter Ironbark-Spotted Gum Forest (Thinned condition)	4.67
	PCT3431 - Central Hunter Ironbark Grassy Woodland (Disturbed Grassland)	3.11
	PCT3431 - Central Hunter Ironbark Grassy Woodland (Plantation)	1.44
	PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)	12.24
	PCT3438 - Hunter Escarpment Footslopes Ironbark Forest (Mod-good condition)	4.83
	PCT3439 - Hunter Escarpment Grey Gum Sheltered Forest (Mod-good condition)	0.29
	PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)	14.88
	PCT3446 - Lower North Foothills Ironbark-Box-Gum Grassy Forest (Mod-good condition)	0.46
	PCT4015 - Central Hunter Swamp Oak Riparian Forest (Derived condition)	0.03
	PCT4015 - Central Hunter Swamp Oak Riparian Forest (Thinned condition)	0.38
	PCT4039 - Hunter Range Creekflat Apple-Red Gum Forest (Mod-good condition)	0.31
	PCT4072 - Hunter River Oak Mesic Forest (Mod-good condition)	0.21
	Total	***60.00***
Disturbance B	PCT3315 - Central Hunter Ironbark-Spotted Gum Forest (Derived condition)	2.14
	PCT3315 - Central Hunter Ironbark-Spotted Gum Forest (Thinned condition)	3.99
	PCT3431 - Central Hunter Ironbark Grassy Woodland (Disturbed Grassland)	1.55
	PCT3431 - Central Hunter Ironbark Grassy Woodland (Plantation)	1.21
	PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)	13.18
	PCT3438 - Hunter Escarpment Footslopes Ironbark Forest (Mod-good condition)	5.02

Disturbance area	Impacted entity	Impact area (ha)
	PCT3439 - Hunter Escarpment Grey Gum Sheltered Forest (Mod-good condition)	0.72
	PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)	16.62
	PCT3446 - Lower North Foothills Ironbark-Box-Gum Grassy Forest (Mod-good condition)	0.91
	PCT4015 - Central Hunter Swamp Oak Riparian Forest (Thinned condition)	0.29
	PCT4039 - Hunter Range Creekflat Apple-Red Gum Forest (Mod-good condition)	0.31
	Total	***45.94***
Disturbance HZ	PCT3438 - Hunter Escarpment Footslopes Ironbark Forest (Mod-good condition)	0.02
	PCT3439 - Hunter Escarpment Grey Gum Sheltered Forest (Mod-good condition)	0.20
	PCT3444 - PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)	0.002
	Total	***0.22***
Grand Total (native vegetation)		**106.15**
TEC - EPBC		
Disturbance A	Central Hunter Valley eucalypt forest and woodland	23.75
	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	0.31
	Total	***24.06***
Disturbance B	Central Hunter Valley eucalypt forest and woodland	24.30
	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	0.31
	Total	***24.61***
Disturbance HZ	Central Hunter Valley eucalypt forest and woodland	0.02
Grand Totals	**Central Hunter Valley eucalypt forest and woodland**	**48.07**
	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	**0.62**

Disturbance area	Impacted entity	Impact area (ha)
TEC – BC		
Disturbance A	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	13.79
	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	4.67
	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	0.46
	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	14.88
	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.31
Disturbance B	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	14.38
	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	3.99
	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	0.91
	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	16.62
	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.31
Disturbance HZ	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	0.002
Total		**70.33**

Disturbance area	Impacted entity		Impact area (ha)
Threatened Species			
Species	**Disturbance A**	**Disturbance B**	**Total**
Acacia bynoeana	9.55	0.00	9.55
Acacia pendula – endangered population	3.84	3.03	6.87
Angophora inopina	0.84	0.00	0.84
Callistemon linearifolius	1.98	0.43	2.41
Cymbidium canaliculatum	4.06	3.07	7.13
Diuris tricolor	16.70	0.00	16.70
Eucalyptus glaucina	3.55	2.97	6.52
Eucalyptus pumila	2.07	0.43	2.5
Grevillea parviflora subsp. parviflora	1.14	0.00	1.14
Ozothamnus tesselatus	3.74	0.00	3.74
Pomaderris queenslandica	2.90	0.00	2.90
Prasophyllum petilum	18.75	0.00	18.75
Prasophyllum wybong	18.75	0.00	18.75
Prostanthera cineolifera	6.48	0.00	6.48
Pterostylis chaetophora	18.75	0.00	18.75
Pterostylis gibbosa	1.88	0.00	1.88
Rutidosis heterogama	10.69	0.00	10.69

Under the EPBC Act a significant impact may occur where there a real chance or possibility that the action will:

- *involve medium or large-scale native vegetation clearance*

The proposed transmission line aims to avoid and/or minimise impacts on native vegetation within the SMA by co-locating the project with the existing transmission infrastructure and locating a large portion of the transmission line through the highly disturbed agricultural land of the valley floor and lower slopes that has been cleared of native vegetation. This design resulted in the lowest overall potential impact to PCTs (avoidance of about 15 hectares of native vegetation) and TECs (avoidance of about 10 hectares of EPBC Act and BC Act). However, the project will clear 106.15 hectares of PCTs within the subject land on the SMA including 48.67 hectares of EPBC listed threatened ecological communities and 69.74 hectares of BC threatened ecological communities.

The loss of native vegetation represents:

- 0.12% loss of the PCTs across NSW with the highest level of loss being within PCT 3444 (0.62% of the NSW extent)
- 1.44% of the PCTs within the SMA.

Although PCT 3314 was recorded in the subject land on the SMA, this PCT was not identified in the State Vegetation Type Map (SVTM) for the area. Therefore, the loss of the PCT across the SMA cannot be estimated. However, this PCT is well represented within NSW (see Table B.3).

The project will implement mitigation measures including micro-siting the transmission towers to further minimise vegetation clearance. Given the nature and scale of the impacts, extent of the PCTs within the locality and across NSW, it is likely the loss of 106.15 hectares would represent a moderate scale native clearance.

Table B.3 Vegetation clearance across PCTs within Commonwealth Land

PCT	Clearance area (hectares)	Extent within Singleton Military Area (SVTM)	% loss in Singleton Military Area	NSW Extent	% loss NSW
3314	0.11	Not mapped by SVTM	NA	15287	0.001
3315	27.82	2613.06	1.06	12473	0.22
3431	32.72	2096.17	1.57	14853	0.22
3438	9.87	959.42	1.03	6316	0.156
3439	1.21	45.52	2.66	2979	0.041
3444	31.51	969.45	3.25	5021	0.628
3446	1.37	125.79	1.09	23841	0.006
4015	0.71	424.64	0.17	2647	0.027
4039	0.62	70.22	0.88	7639	0.008
4072	0.21	86.62	0.24	488	0.043
Total	**106.15**	**7390.89**	**1.44**	**91544**	**0.116**

- *involve any clearance of any vegetation containing a listed threatened species which is likely to result in a long-term decline in a population or which threatens the viability of the species*

Two threatened flora species, *Pterostylis gibbosa* and *Prostanthera cineolifera* were recorded within the subject land in the SMA (see Table B.4). *Pterostylis gibbosa* is known to occur in a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra) of New South Wales. The approved conservation advice for the species notes that the population in the Hunter Valley was estimated at 400 plants. The project would remove 2.81 hectares of habitat for the species within the SMA. The area to be impacted is small and it is unlikely the loss of this habitat would result in a long-term decrease in the size of a population.

Prostanthera cineolifera is restricted to only a few localities near Scone, Cessnock and St Albans. *Prostanthera cineolifera* was recorded extensively within Pokolbin State Forest and neighbouring private properties (Yengo IBRA subregion) during the ecological surveys. The project would result in the loss of 12.8 hectares of habitat for the species within the SMA. Mitigation measures will be implemented to minimise the impacts of the project on habitat for threatened species, including micro-siting the transmission line infrastructure, biosecurity procedures to reduce weeds and sedimentation control measures to manage run-off and erosion. Given the extensive records within the biodiversity study area, and providing the mitigation measures are implemented, it is unlikely that the loss of habitat would result a long-term decrease in the size of a population of *Prostanthera cineolifera*.

In addition, one *Cymbidium canaliculatum* was recorded within the subject land. The species is part of an endangered population. The loss of one plant is unlikely to lead to a long term decline in the population.

It is unlikely the project would result in the clearance of vegetation containing which is likely to result in a long-term decline in a threatened species population.

- *introduce potentially invasive species*

Invasive species are already known to occur within the SMA, and it is considered unlikely that invasive species would become further established as a result of the project. In addition, the project will implement mitigation measures to minimise potential weed dispersal associated with earthworks during construction including wash down procedures of equipment and vehicles.

- *involve the use of chemicals which substantially stunt the growth of native vegetation, or involve large-scale controlled burning or any controlled burning in sensitive areas, including areas which contain listed threatened species?*

The project will not result in any controlled burning. Earthworks associated with the project may result in the mobilisation of fertilisers, herbicides or other chemicals. It is considered that, with the implementation of the mitigation measures such as sediment and erosion stabilisation and biosecurity measures (wash down procedures), any impacts will be contained and unlikely to substantially stunt the growth of native vegetation.

Conclusion

The project will clear approximately 106.15 hectares of native vegetation within the SMA. Based on the assessment above it is unlikely the project would result in the clearance of vegetation containing which is likely to result in a long-term decline in a threatened species population.

B5.2 Impacts on animals

The Significant Impact Guidelines 1.2 provides guidance to identify the environmental context for an action. In relation to animals the guidelines consider this in relation to terrestrial and marine species. Therefore, the assessment below considers the impacts associated with the project on fauna within the SMA.

Fauna habitat features within the SMA included foraging, breeding and shelter habitat for both common animal species and threatened fauna. The condition of the habitat varies across the site with most of the habitat having been previously disturbed by existing transmission infrastructure and agricultural practices.

Is there a real chance or possibility that the action will:

- *cause a long-term decrease in, or threaten the viability of, a native animal population or populations, through death, injury or other harm to individuals*

Impacts likely to result in harm to native fauna associated with the project include:

- Fauna mortality resulting from vegetation clearing activities and interactions with vehicles: as with any land clearing activities involving the removal of native vegetation, there is always an inherent risk of native fauna mortality, especially those fauna species actively sheltering or breeding in microhabitats (i.e. hollows) during vegetation clearing.
- Vehicle strike: Increased traffic as a result of the project has the potential to result in vehicle strike to native animals. Vehicle collision is a direct impact that reduces local population numbers and is a common occurrence in Australia (Coffin 2007; Rowden et al. 2008). Areas in the Hunter Valley are near existing infrastructure and highly disturbed areas. During operation in the State forests, vehicle speeds would be very low due to the topography and nature of the roads, combined with speed limits. Overall, vehicle strike would therefore not appear to be a significant concern for the project.
- Increased risk of collision with the transmission line: the general fauna group most likely to have potential for powerline strike are those groups of birds which are likely to fly at heights where powerlines are located and are not familiar with local habitat attribute. Such birds can include, birds of prey, quail, and other birds, many of which move in response to changing distributions of resources usually associated with water. A fauna risk assessment is provided in Appendix I of the BDAR and identifies the following threatened species as a high risk of collision with powerline infrastructure:
  - Gang-gang Cockatoo
  - South-eastern Glossy Black-Cockatoo
  - Powerful Ow (*Ninox strenua*).

  All of these species are wide-ranging in the vicinity of the project's greenfield locations.
- Electrical and magnetic fields (EMF) impacts from new infrastructure: fauna likely to be impacted by EMF include birds moving through the alignment. Although it is considered unlikely that birds would be at high risk of electrocution, as electrocution would require contact with different phases or conductor potentials, and the horizontal separation between individual conductors, or bundled conductors, exceeds the wingspans (WS) of all birds, including the largest migratory birds, such as Brolgas (WS~2.4 m) Pelicans (WS~2.4–2.6 m) Black Swans (WS~2.0 m) and Australian Shelduck (WS~1.2 m) (Pizzey and Knight 2012).

  Birds of prey, which are resident in habitats associated with the alignment, are part of the group of birds which are most likely at risk to longer periods of exposure to EMFs because they often use the infrastructure for perching, but most particularly if they use the infrastructure for nesting. Most of the project's alignment occurs within areas within areas where woodlands and forests are within the landscape, and which offer an abundance of suitably elevated nesting opportunities for birds of prey and so birds of prey using tower infrastructure for nesting purposes for this project are considered to be rare.

Table 8.28 of the BDAR outlines mitigation measures that will be implemented to reduce the above impacts on animals' species, including (but not limited to):

- bird diverters will be installed on transmission lines at appropriate locations to reduce impacts on aerial fauna species from collision with transmission lines and infrastructure. Installation of the bird diverters will occur within 2 weeks of transmission line installation or as soon as practical, and will remain in place and/or replaced as required
- the location and extent of areas to be protected (e.g. hollow-bearing trees, nests, burrows and other habitat features) located inside the construction area or in close proximity to the clearing areas will be identified prior to commencing clearing works
- two-phase clearing process to allow fauna to move into adjoining habitat
- measures to be implemented on site to clearly demarcate areas to be retained as 'no go areas'
- pre-clearing surveys are to be carried out within 48 hours prior to the commencement of clearing works in each construction area, The surveys will:
  - identify any fauna that will require relocation prior to clearing, including inspection of any built structures and wooden fence posts to be demolished
  - confirm that biodiversity exclusion zones are demarcated
  - confirm that hollow-bearing trees within and adjacent to the clearing extents are prominently marked/tagged
  - confirm that nest boxes are in place (where required) in suitable locations adjacent to areas to be cleared, or suitable locations for installation have been identified.

Given the nature and scale of the impact above on native animals on the SMA within the subject land, it is unlikely the project would result in a long-term decrease in, or threaten the viability of, a native animal population or populations. In addition, mitigation measures would be implemented to further minimise the impacts that would result in death, injury or other harm to individuals so that a native animal population would declines.

Further information on the indirect impacts associated with project and mitigation measures is provided in section 8.2 and 8.4 of the BDAR respectively.

- *displace or substantially limit the movement or dispersal of native animal populations or substantially reduce or fragment available habitat for native species*

The project will largely be co-located with existing transmission infrastructure and within the previously disturbed agricultural areas. It is expected that existing roads will be used and/or upgraded to access the site. Vegetation up to 2 metres in height will be retained within the transmission line, providing habitat for small birds, mammals, and reptiles.

The transmission lines are unlikely to substantially affect terrestrial movement, given the project would be highly permeable. The nature of the potential impacts to connectivity primarily relate to aerial species such as birds and bats, through the interaction with the proposed transmission line towers and associated powerlines. Research of powerlines on smaller bats is scarce, but a decrease in bat activity close to powerlines has been shown (Kahnonitch, Lubin *et al*. 2018). Powerline-associated collision and electrocution has been proven to lead to high mortality rates of birds across the world, including in Italy and the United States (Rubolini, Gustin *et al.* 2005; Loss, Will et al. 2014). As discussed above, mitigation measure will be implemented to minimise the impacts associated with Powerline-associated collision and electrocution.

Two creeks occur within the SMA, Monkey Place Creek and Peach Tree Creek, wish provide habitat for fish and aquatic macroinvertebrates. works would be mostly limited to above-ground construction, with appropriate ground disturbance and water management measures to be implemented. Temporary impacts associated with vehicle water crossings during the construction phase will be limited where possible to existing forestry and farm tracks and crossing points.

Mitigation measures in section 8.4 of the BDAR outline that any riparian areas subject to disturbance would be stabilised and rehabilitated, and that only vegetation of the tree-stratum can be cleared (with tree trunks to be retained to a safe operational height), protecting the understory in such areas. Each riparian area would continue to function as it currently performs. It is considered unlikely that temporary impacts would result in any long-term degradation of fish habitat. Therefore, it is unlikely the project would impact a native fish population.

The project is planned to occur in some likely movement corridors, where it may affect aerial and arboreal species. Arboreal mammals (e.g. Sugar Glider, Common Brushtail Possum) may be impacted where gaps in habitat are greater than 40 meters. Specific mitigation measures will be implemented to minimise these impacts including maintaining vegetation height within the transmission lines to 2 metres in height, and glider poles which are known to be effective. Overall, the nature of the project means that it would be highly permeable and is highly unlikely to result in any substantial impacts to local or regional connectivity for aerial or terrestrial species.

- *reduce or fragment available habitat for listed threatened species, which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species*

Nineteen threatened fauna species were recorded within the subject land on the SMA during the ecological surveys including 9 mammal species, 8 bird species, 1 reptile species and 1 fish (Table B.4).

The project has been designed to minimise impacts on threatened species. This includes co-locating infrastructure within the existing transmission line and previously disturbed agricultural land. However, the project will reduce available habitat for listed threatened species, which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species within the SMA.

Birds

Six threatened birds were recorded on SMA, with assumed habitat identified for a further 7 threatened birds (Table B.4). Threatened birds likely to be at greater risk from the project would be those where: the extent of habitat loss is high, important habitat will be significantly impacted; and/or, at increased risk of bird strike with transmission lines and EMF impacts from new infrastructure. There is a real chance or possibility that the project would result in a long-term decline in a population of a threatened species known occur or with assumed habitat within the SMA.

The SMA is mapped as an important habitat area for the Swift Parrot and Regent Honeyeater and identified as a Key Biodiversity Area (KBA) for both species. The approved conservation advice for the Swift Parrot notes that the SMA has been identified as a KBA because it regularly supports significant numbers of the critically endangered Regent Honeyeater and Swift Parrot. The project would result in the loss of 41.49 hectares of habitat for the Regent Honeyeater and 40.96 hectares of habitat for the Swift Parrot within the SMA. Given the extent of habitat loss of breeding and foraging resources to be reduced it is likely the project would lead to long-term decrease in the populations.

As noted above the Gang-gang Cockatoo, South-eastern Glossy Black-Cockatoo and Powerful Owl are at a high risk of collision with powerline infrastructure. All of these species are wide-ranging in the vicinity of the project's greenfield locations and therefore this impact is unlikely to lead to a lead to long-term decrease in the population. In addition, mitigation measures will be implemented (section 8.4 of the BDAR), to minimise impacts associated with collision risk.

A number of woodland birds were recorded or have assumed habitat on the SMA. Habitat for these species within the subject land would be reduced by the project. The project will largely be located on previously disturbed agricultural land and within existing the transmission infrastructure corridor. The transmission lines will span large areas of woodland habitat therefore reducing impacts associated with fragmentation for these species.

Mammals

Nine threatened mammals were recorded on the SMA with assumed habitat for a further 9 threatened mammals likely to occur within the subject land (Table B.4). The project is likely to clear approximately 106.15 hectares of native vegetation within the subject land on the SMA. These habitats are widely represented across the SMA (8831.79 hectares).

Many of the threatened mammals recorded or with assumed habitat within the subject area are known to traverse large areas of habitat, and are considered highly mobile (e.g. Spotted tail quoll), therefore given the extensive available habitat within the immediate vicinity of the project it is unlikely the loss of habitat would lead to long-term decrease in the populations.

The project is likely to result in fragmentation for sedentary threatened mammal species. Sedentary species are considered to be species with small territories that they rarely leave, due to the necessity of familiar cover to protect them from predatory animals. Such species are highly dependent upon the integrity of corridor habitats to maintain contact between populations at either end of the corridor. The Common Planigale, Squirrel Glider and Southern Greater Glider are considered sedentary species that are known to occur on the SMA

The proposed operational corridor will effectively result in stepping stones of maintained vegetation within the outer areas of the transmission lines, and vegetation up to two metres high within the transmission lines, which will specifically facilitate the movement of most terrestrial fauna species as per minimum gap requirements, including sedentary species except for canopy dependent arboreal mammals (e.g. Squirrel Glider). Specific mitigation measures will be implemented to minimise the impacts of fragmentation for the threatened glider species including the use of glider poles (section 8.4 of the BDAR). These methods are known to be effective, therefore it is unlikely the project would lead to a lead to long-term decrease in the population of Squirrel Glider and Southern Greater Glider.

Frogs

Two threatened frog species, Giant Burrowing Frog and Green and Golden Bell Frog, were identified as having assumed habitat present within the subject land on the SMA. The towers will be micro-sited to ensure minimal impact on the species habitat, and riparian habitats will be largely avoided. Although the species may use the terrestrial habitats for dispersal, given the nature of the projects (i.e. powerlines will be above the habitat) it is unlikely the project would lead to a lead to long-term decrease in the population.

Fish

Monkey Place Creek which is mapped at habitat for the Southern Purple Spotted Gudgeon which is listed as endangered under the NSW *Fisheries Management Act 1994.* As noted above the works would be mostly limited to above-ground construction, with appropriate ground disturbance and water management measures to be implemented. Transmission line towers would be located around 50 to 100 metres from the watercourses to minimise impact to riparian areas.

All waterway crossing will be designed in accordance with Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge 2003) and Policy & Guidelines for Fish Habitat Conservation & Management (2013 update) (Department of Primary Industruies, 2013). Where the project involves works within 40 metres of the high bank of any river, lake or wetlands (collectively waterfront land), such as waterway crossings, the work will be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land.

At most, any impact to water quality would be temporary and negligible. Each riparian area would continue to function as it currently performs. It is considered unlikely that temporary impacts would result in any long-term degradation of mapped key fish habitat areas. Further information on the impacts to aquatic biodiversity is provided in section 8.3.5 and Appendix L of the BDAR. Mitigation measures are provided in section 8.4.

Reptiles

One threatened reptile, Hunter Valley Delma, was recorded outside of the subject land within the SMA. Habitat for the species was identified within the subject land. The species is known almost entirely from a 25 kilometre wide corridor in the Hunter Valley NSW, between Maitland and Muswellbrook (Mahony et al. 2022). A further specimen has been identified from just north of Parraweena on the Liverpool plains, approximately 80 kilometres north-west of Muswellbrook. Given the extent of habitat to be reduced (56.96 hectares) it is likely that the project would lead to a long-term decline the species population.

Table B.4 Threatened fauna species recorded or with assumed habitat (non-surveyed, suitable or potential habitat) within the subject land on the Singleton Military Area

Scientific name	Common name	EPBC Act	BC Act / FM Act	Associated PCTs within the subject land on the SMA
Amphibians				
Heleioporus australiacus	Giant Burrowing Frog	V	V	Assumed habitat present. Species associated PCTs 4039 and 4072
Litoria aurea	Green and Golden Bell Frog	V	E	Assumed habitat present. Species associated with PCT 3315, 3431, 3438, 3444, 4015, 4039.
Birds				
Anthochaera phrygia	Regent Honeyeater	CE	CE	Assumed habitat present. Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444, 4039, 4072.
Apus pacificus	Fork-tailed Swift	M	-	Aerial species. Associated PCTs not listed for this species however records from ALA and BioNet are present within the locality and the species exhibits a diverse range of habitat preferences.
Botaurus poiciloptilus	Australasian Bittern	E	E	Assumed habitat present. Species associated with PCT 4039, 4072, 4015.
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	Assumed habitat present. Species associated with PCTs 3087, 3438, 3439, 3444, 3446, 4039, 4072, 3314, 3315, 3431, 4015.
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	Assumed habitat present. Species associated with PCTs 3087, 3444, 3446, 4039, 4072, 3314, 3315, 3431, 4015.
Chthonicola sagittata	Speckled Warbler	-	V	Recorded. Species associated with PCTs 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4015, 4039, 4072
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies	V	V	Recorded. Species associated with PCT 3087, 3438, 3439, 3444, 3446, 4039, 4072, 3314, 3315, 3431, and 4015
Daphoenositta chrysoptera	Varied Sittella	-	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4015, 4039, 4072
Erythrotriorchis radiatus	Red Goshawk	E	E	Assumed habitat present. Species associated with PCT 3315, 4039, 3446,
Grantiella picta	Painted Honeyeater	V	V	Assumed habitat present. Species associated with PCTs 4015.

Scientific name	Common name	EPBC Act	BC Act / FM Act	Associated PCTs within the subject land on the SMA
Glossopsitta pusilla	Little Lorikeet	-	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3438, 3439, 3444, 3446, 4015, 4039, 4072
Hirundapus caudacutus	White-throated Needletail	V, M	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4039, 4072
Lathamus discolor	Swift Parrot	CE	E	Assumed habitat present. Species associated with PCTs 3087, 3314, 3315, 3431, 3438, 3439, 3444, 4015.
Ninox strenua	Powerful Owl	-	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 4015, 4039, 4072
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	E	Assumed habitat present. Species associated with PCT 4015.
Petroica boodang	Scarlet Robin	-	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3444, 3446, 4072
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern)	-	V	Recorded. Species associated with PCT 3315, 3431, 3438, 3444, 3446, 4015, 4039, 4072
Rostratula australis	Australian Painted Snipe	E	E	Assumed habitat present. Species associated with PCTs 4015, 4039, 4072.
Stagonopleura guttata	Diamond Firetail	V	V	Assumed habitat present. Species associated with PCTs 3446, 3314, 3315, 3431.
Tyto Novaehollandiae	Masked Owl	-	V	Assumed habitat present. Species associated with PCTs 3314, 3315, 3431, 3438, 3439, 3444
Fish				
Mogurnda adspersa	Southern Purple Spotted Gudgeon	-	E	Monkey Place Creek is mapped at habitat for the Southern Purple Spotted Gudgeon
Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	E	E	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, 3439, 3444.
Dasyurus maculatus	Spotted-tail Quoll	E	V	Assumed habitat present. Species associated with PCTs 3087, 3438, 3439, 3444, 3446, 4072, 3314, 3315, 3431, 4015.
Micronomus norfolcensis	Eastern Coastal Free-tailed Bat	-	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3444, 3446, 4015, 4039
Miniopterus australis	Little Bent-winged Bat	-	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 4039
Miniopterus orianae oceanensis	Large Bent-winged Bat	-	V	Recorded. Species associated with PCT 3087, 3314, 3315, 3431, 3438, 3439, 3444, 3446, 4015, 4039
Myotis Macropus	Southern Myotis	-	V	Assumed habitat present. Species associated with PCT 3087, 3150, 3314, 3315, 3431, 3438, 3439, 3444, 4015, 4039, 4072

Scientific name	Common name	EPBC Act	BC Act / FM Act	Associated PCTs within the subject land on the SMA
Notamacropus parma	Parma Wallaby	V	V	Assumed habitat present. Species associated with PCT 3087.
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Assumed habitat present. Species associated with PCTs 3315, 3438, 4039.
Petauroides volans	Southern Greater Glider	E	E	Assumed habitat present. Species associated with PCTs 3314, 3315, 4039, 4072.
Petaurus australis australis	Yellow-bellied Glider	V	V	Recorded. Species associated with PCT 3438, 3444, 3446, 3087.
Petaurus norfolcensis	Squirrel Glider	-	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3444, 3446, 4015, 4039.
Petrogale penicillata	Brush-tailed Rock Wallaby	V	E	Assumed habitat present. Species associated with PCTs 3087, 3314, 3315, 3444, 3446, 4015, 4039.
Phascolarctos cinereus	Koala	E	E	Assumed habitat present. Species associated with PCTs 3314, 3315, 3431, 3438, 3439, 3446.
Planigale maculata	Common Planigale	-	V	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, 3439
Pseudomys novaehollandiae	New Holland Mouse	V	V	Assumed habitat present. Species associated with PCTs 3446 and 3315.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Recorded. Species recorded in PCT 3315 and 3438.
Scoteanax rueppellii	Greater Broad-nosed Bat	-	V	Recorded. Species associated with PCT 3315, 3431, 3446
Vespadelus troughtoni	Eastern Cave Bat	-	V	Assumed habitat present. Species associated with PCTs 3314, 3315, 3431, 3438, 3439, 3444, 4015, 4039
Reptiles				
Delma Vescolineata	Hunter Valley Delma	E	E	Recorded. Species associated with PCT 3314, 3315, 3431, 3438, and 3439.

*E = Endangered, V = Vulnerable, CE = Critically Endangered, M= migratory

- *introduce exotic species which will substantially reduce habitat or resources for native species, or undertake large-scale controlled burning or any controlled burning in areas containing listed threatened species*

The project does not include any controlled burning. Habitat for the species in the subject land is varied in condition and weed and pest species are both currently present throughout the landscape. Therefore, with the implementation of biosecurity measures and pest control it is considered unlikely that the project would introduce exotic species that would reduce habitat or resources for native species.

Conclusion

The project will clear approximately 106.15 hectares of habitat for native animal species on Commonwealth land. This loss of habitat would reduce available habitat for listed threatened species which is likely to result in a long-term decline in populations of these species.

B6. References

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Appendix D

Vegetation survey data

D1 Flora data

D1.1 3029 – Lower North Wet Gully Palm Rainforest (Mod-good)

HTP-MS-43

Date	19/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-43		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3029	Mod-good	37	37	9	7	0	2	7	12	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	240.3	240.3	137.6	21.7	0	0.8	37	43.2	0	0	
Acmena smithii	25	20	TG		25								
Adiantum hispidulum	1	30	EG						1				
Arthropteris beckleri	0.1	1	EG						0.1				
Blechnum cartilagineum	15	100	EG						15				
Callicoma serratifolia	10	8	SG			10							
Calochlaena dubia	0.4	5	OG							0.4			
Ceratopetalum apetalum	55	50	TG		55								
Cordyline stricta	1	5	OG							1			
Cryptocarya glaucescens	20	40	TG		20								
Diploglottis australis	0.2	3	TG		0.2								
Doryphora sassafras	35	30	TG		35								
Geitonoplesium cymosum	0.1	1	OG							0.1			
Gymnostachys anceps	0.4	10	FG					0.4					
Gynochthodes jasminoides	5	40	OG							5			
Lastreopsis decomposita	20	100	EG						20				
Marsdenia flavescens	0.1	1	OG							0.1			
Marsdenia suaveolens	0.1	1	OG							0.1			
Microsorum pustulatum subsp. pustulatum	0.4	10	EG						0.4				
Neolitsea dealbata	0.4	3	TG		0.4								
Palmeria scandens	5	30	OG							5			
Pandorea pandorana	0.4	5	OG							0.4			
Parsonsia straminea	1	10	OG							1			
Pittosporum multiflorum	5	40	SG			5							
Pseuderanthemum variabile	0.4	30	FG					0.4					
Psychotria loniceroides	0.4	5	SG			0.4							
Pteris tremula	0.4	5	EG						0.4				
Pyrrosia confluens var. confluens	0.1	2	EG						0.1				
Ripogonum fawcettianum	10	50	OG							10			
Sarcopetalum harveyanum	0.1	1	OG							0.1			
Schizomeria ovata	0.4	5	TG		0.4								
Smilax australis	20		OG							20			
Solanum stelligerum	0.2	5	SG			0.2							
Synoum glandulosum subsp. glandulosum	5	10	SG			5							
Syzygium australe	0.1	3	SG			0.1							
Tasmannia insipida	1	5	SG			1							
Tristaniopsis collina	1	5	TG		1								
Trochocarpa laurina	0.6	1	TG		0.6								

Easting	343338
Northing	6343067
Orientation	267
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	13
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	126
BAM Attributes 1x1 plot (%)	79
Litter (%)	85
	95
	65
	60
	90

HTP-MS-52

Date	24/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-52		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3029	Mod-good	30	30	10	6	0	1	3	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	223.3	223.3	102.8	39.3	0	0.4	0.3	80.5	0	0	
Acmena smithii	15	12	TG		15								
Ceratopetalum apetalum	30	20	TG		30								
Cissus hypoglauca	25	5	OG							25			
Cordyline stricta	0.4	5	OG							0.4			
Cryptocarya glaucescens	15	10	TG		15								
Cryptocarya microneura	0.4	2	TG		0.4								
Cryptocarya rigida	8	10	SG			8							
Cyathea leichhardtiana	1	2	OG							1			
Diploglottis australis	0.4	1	TG		0.4								
Doodia australis	0.1	1	EG						0.1				
Doryphora sassafras	15	20	TG		15								
Elaeocarpus reticulatus	1	3	SG			1							
Eucalyptus saligna	15	4	TG		15								
Gynochthodes jasminoides	5	40	OG							5			
Neolitsea dealbata	2	3	TG		2								
Palmeria scandens	25	50	OG							25			
Pandorea pandorana subsp. pandorana	1	5	OG							1			
Parsonsia straminea	3	5	OG							3			
Platycerium bifurcatum	0.1	1	EG						0.1				
Pseuderanthemum variabile	0.4	50	FG					0.4					
Pyrrosia confluens var. confluens	0.1	1	EG						0.1				
Ripogonum fawcettianum	15	50	OG							15			
Sarcopetalum harveyanum	0.1	1	OG							0.1			
Smilax australis	5	40	OG							5			
Syncarpia glomulifera subsp. glomulifera	5	2	TG		5								
Synoum glandulosum subsp. glandulosum	10	15	SG			10							
Tasmannia insipida	20	50	SG			20							
Trochocarpa laurina	5	10	TG		5								
Wilkiea huegeliana	0.1	1	SG			0.1							
Zieria arborescens	0.2	3	SG			0.2							

Easting	343847
Northing	6341817
Orientation	30
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	3
30-49	11
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	82
BAM Attributes 1x1 plot (%)	85
Litter (%)	95
	90
	85
	65
	90

HTP-MS-59

Date	26/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-59		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3029	Mod-good	50	50	10	12	1	2	11	14	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	233.5	233.5	89.6	32.6	0.1	4	25	82.2	0	0	
Abrophyllum ornans	0.1	2	SG			0.1							
Acmena smithii	15	10	TG		15								
Adiantum formosum	2	80	EG						2				
Adiantum silvaticum	0.4	20	EG						0.4				
Archontophoenix cunninghamiana	45	1000	OG							45			
Arthropteris tenella	2	30	EG						2				
Asplenium australasicum	2	10	EG						2				
Backhousia myrtifolia	15	10	SG			15							
Blechnum cartilagineum	3	40	EG						3				
Calanthe triplicata	3	50	FG					3					
Callicoma serratifolia	10	4	SG			10							
Ceratopetalum apetalum	35	30	TG		35								
Cissus hypoglauca	15	10	OG							15			
Cordyline stricta	1	30	OG							1			
Cryptocarya glaucescens	10	20	TG		10								
Cryptocarya rigida	0.1	1	SG			0.1							
Cyathea leichhardtiana	0.4	1	OG							0.4			
Cymbidium suave	0.1	1	OG							0.1			
Dioscorea transversa	0.4	10	OG							0.4			
Doodia australis	1	30	EG						1				
Doryphora sassafras	5	10	TG		5								
Embelia australiana	0.8	10	OG							0.8			
Endiandra discolor	1	5	TG		1								
Eupomatia laurina	0.4	5	SG			0.4							
Ficus coronata	1	5	SG			1							
Guioa semiglauca	1	5	TG		1								
Gymnostachys anceps	1	40	FG					1					
Gynochthodes jasminoides	5	50	OG							5			
Hymenophyllum cupressiforme	0.4	50	EG						0.4				
Lastreopsis decomposita	3	50	EG						3				
Marsdenia flavescens	0.4	5	OG							0.4			
Marsdenia suaveolens	0.1	1	OG							0.1			
Microsorum scandens	10	100	EG						10				
Oplismenus imbecillis	0.1	5	GG				0.1						
Palmeria scandens	5	20	OG							5			
Pittosporum multiflorum	1	10	SG			1							
Pittosporum revolutum	0.1	1	SG			0.1							
Polyosma cunninghamii	2	10	TG		2								
Psychotria loniceroides	0.1	1	SG			0.1							
Pteris tremula	0.4	5	EG						0.4				
Pyrrosia confluens var. confluens	0.8	20	EG						0.8				
Ripogonum fawcettianum	2	20	OG							2			
Sloanea australis	5	10	TG		5								
Smilax australis	4	50	OG							4			
Stenocarpus salignus	0.4	2	SG			0.4							
Syncarpia glomulifera subsp. glomulifera	15	2	TG		15								
Syzygium australe	0.4	3	SG			0.4							
Tasmannia insipida	4	20	SG			4							
Trochocarpa laurina	0.6	3	TG		0.6								
Trophis scandens	3	50	OG							3			

Easting	346881
Northing	6335977
Orientation	172
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	3
50-79	4
30-49	8
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	3
Length logs (m)	38
BAM Attributes 1x1 plot (%)	86
Litter (%)	95
	80
	85
	90
	80

HTP-MS-63

Date	27/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-63		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3029	Mod-good	33	33	7	6	3	2	5	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	154.5	154.5	109	27.6	0.6	0.4	2.3	14.6	0	0	
Acmena smithii	10	20	TG		10								
Adiantum formosum	0.1	5	EG						0.1				
Allocasuarina torulosa	12	7	TG		12								
Archontophoenix cunninghamiana	0.1	5	OG							0.1			
Blechnum cartilagineum	0.4	10	EG						0.4				
Blechnum nudum	1	10	EG						1				
Blechnum wattsii	0.4	10	EG						0.4				
Callicoma serratifolia	15	8	SG			15							
Ceratopetalum apetalum	45	80	TG		45								
Cissus hypoglauca	5	20	OG							5			
Cordyline stricta	3	50	OG							3			
Cryptocarya glaucescens	1	5	TG		1								
Cryptocarya rigida	0.1	1	SG			0.1							
Cyathea leichhardtiana	0.2	1	OG							0.2			
Doryphora sassafras	15	40	TG		15								
Eucalyptus scias subsp. scias	18	2	TG		18								
Gahnia sieberiana	0.4	5	GG				0.4						
Gymnostachys anceps	0.3	4	FG					0.3					
Gynochthodes jasminoides	0.1	3	OG							0.1			
Lastreopsis decomposita	0.4	5	EG						0.4				
Lomandra confertifolia	0.1	1	GG				0.1						
Oplismenus imbecillis	0.1	5	GG				0.1						
Palmeria scandens	0.1	1	OG							0.1			
Pittosporum revolutum	0.4	3	SG			0.4							
Pseuderanthemum variabile	0.1	2	FG					0.1					
Psychotria loniceroides	0.1	5	SG			0.1							
Ripogonum fawcettianum	2	20	OG							2			
Sarcopetalum harveyanum	0.1	1	OG							0.1			
Smilax australis	3	50	OG							3			
Synoum glandulosum subsp. glandulosur	10	30	SG			10							
Tasmannia insipida	2	10	SG			2							
Todea barbara	1	4	OG							1			
Trochocarpa laurina	8	40	TG		8								

Easting	346612
Northing	6336991
Orientation	197
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	5
30-49	8
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	89
BAM Attributes 1x1 plot (%)	86
Litter (%)	80
	95
	90
	75
	90

D1.2 3086 – Lower North Hinterland Riparian Dry Rainforest (Mod-good)

HTP-MS-74

Date	3/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-74		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3086	Mod-good	57	56	11	15	3	5	9	13	0	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	163.2	162.2	47.2	47.8	6.1	16	31.2	13.9	0	1	
Abrophyllum ornans	0.1	2	SG			0.1							
Adiantum formosum	5	100	EG						5				
Adiantum hispidulum var. hispidulum	2	50	EG						2				
Alectryon subcinereus	1	5	SG			1							
Aneilema acuminatum	0.4	20	FG					0.4					
Arthropteris tenella	5	100	EG						5				
Backhousia myrtifolia	5	10	SG			5							
Baloghia inophylla	5	20	TG		5								
Breynia oblongifolia	0.4	5	SG			0.4							
Calochlaena dubia	5	100	OG							5			
Capparis arborea	0.2	2	SG			0.2							
Carex longebrachiata	1	20	GG				1						
Ceratopetalum apetalum	25	30	TG		25								
Cissus antarctica	3	30	OG							3			
Cissus hypoglauca	1	5	OG							1			
Claoxylon australe	25	10	SG			25							
Clerodendrum tomentosum	0.1	1	TG		0.1								
Cryptocarya glaucescens	1	5	TG		1								
Cyperus tetraphyllus	0.1	5	GG				0.1						
Dendrocnide excelsa	2	10	TG		2								
Diospyros australis	0.4	3	SG			0.4							
Diploglottis australis	0.1	1	TG		0.1								
Doodia australis	4	100	EG						4				
Doryphora sassafras	5	20	TG		5								
Elaeodendron australe	0.1	1	SG			0.1							
Embelia australiana	0.1	3	OG							0.1			
Ficus coronata	10	10	SG			10							
Guioa semiglauca	1	5	TG		1								
Gymnostachys anceps	0.1	1	FG					0.1					
Gynochthodes jasminoides	1	20	OG							1			
Hibiscus heterophyllus subsp. heterophyllus	0.4	5	SG			0.4							
Lantana camara	1	5	HT									1	
Lastreopsis decomposita	5	100	EG						5				
Legnephora moorei	0.4	3	OG							0.4			
Marsdenia rostrata	0.4	5	OG							0.4			
Mischocarpus australis	5	20	TG		5								
Oplismenus imbecillis	5	100	GG				5						
Palmeria scandens	1	10	OG							1			
Pandorea pandorana	0.1	1	OG							0.1			
Pellaea falcata	2	50	EG						2				
Pellaea paradoxa	0.2	10	EG						0.2				
Pittosporum multiflorum	1	20	SG			1							
Planchonella australis	2	10	TG		2								
Pollia crispata	15	200	FG					15					
Pseuderanthemum variabile	0.4	30	FG					0.4					
Psychotria loniceroides	0.8	10	SG			0.8							
Pteris tremula	5	100	EG						5				
Pyrrosia rupestris	3	100	EG						3				
Ripogonum album	0.4	5	OG							0.4			
Rubus rosifolius	0.4	5	SG			0.4							
Sarcomelicope simplicifolia subsp. simplicifolia	1	10	SG			1							
Stellaria flaccida	0.1	5	FG					0.1					
Stephania japonica	0.1	1	OG							0.1			
Streblus brunonianus	1	10	TG		1								
Trophis scandens	1	5	OG							1			
Tylophora paniculata	0.4	20	OG							0.4			
Wilkiea huegeliana	2	20	SG			2							

Easting	333339
Northing	6361760
Orientation	207
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	4
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	51
BAM Attributes 1x1 plot (%)	80

D1.3 3087 – Lower North Ranges Riparian Turpentine Forest (Mod-good)

HTP-MS-10

Date	23/08/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS10		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3087	Mod-good	60	59	8	20	5	6	7	13	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	197.9	196.9	52.8	74.3	9.4	1.2	21.4	37.8	1	0	
Acmena smithii	15	12	TG		15								
Adiantum aethiopicum	0.8	30	EG						0.8				
Alectryon subcinereus	3	5	SG			3							
Allocasuarina torulosa	1	1	TG		1								
Aneilema acuminatum	0.4	20	FG					0.4					
Astrotricha latifolia	0.1	1	SG			0.1							
Backhousia leptopetala	2	5	SG			2							
Backhousia myrtifolia	0.8	4	SG			0.8							
Carex brunnea	1	30	GG				1						
Carex longebrachiata	8	50	GG				8						
Cissus antarctica	10	20	OG							10			
Cissus hypoglauca	10	30	OG							10			
Claoxylon australe	1	10	SG			1							
Clematis aristata	0.1	1	OG							0.1			
Cordyline australis	1	10	EX								1		
Cryptocarya rigida	3	10	SG			3							
Cyperus tetraphyllus	0.1	1	GG				0.1						
Diospyros australis	20	15	SG			20							
Diospyros pentamera	0.4	2	TG		0.4								
Eupomatia laurina	8	10	SG			8							
Ficus coronata	10	8	SG			10							
Gahnia melanocarpa	0.2	4	GG				0.2						
Geitonoplesium cymosum	0.1	1	OG							0.1			
Guioa semiglauca	5	8	TG		5								
Gymnostachys anceps	0.1	2	FG					0.1					
Gynochthodes jasminoides	4	20	OG							4			
Hydrocotyle sibthorpioides	0.4	30	FG					0.4					
Lastreopsis acuminata	1	20	EG						1				
Lastreopsis microsora subsp. microsora	15	60	EG						15				
Marsdenia rostrata	0.1	1	OG							0.1			
Melaleuca linariifolia	1	1	SG			1							
Melicope micrococca	0.1	2	SG			0.1							
Neolitsea australiensis	0.4	2	TG		0.4								
Notelaea longifolia	1	5	TG		1								
Oplismenus imbecillis	0.1	5	GG				0.1						
Pandorea pandorana	0.2	5	OG							0.2			
Parsonsia straminea	1	10	OG							1			
Pellaea falcata	3	80	EG						3				
Pellaea paradoxa	0.4	20	EG						0.4				
Phyllanthus similis	0.1	5	FG					0.1					
Pittosporum multiflorum	10	80	SG			10							
Polystichum australiense	0.2	5	EG						0.2				
Pseuderanthemum variabile	0.1	5	FG					0.1					
Psychotria loniceroides	0.4	3	SG			0.4							
Pyrrosia rupestris	1	80	EG						1				
Rhodamnia rubescens	0.2	2	SG			0.2							
Ripogonum fawcettianum	10	50	OG							10			
Rubus moorei	0.1	2	OG							0.1			
Rubus rosifolius	0.8	5	SG			0.8							
Sarcochilus australis	0.1	15	OG							0.1			
Sarcopetalum harveyanum	0.1	2	OG							0.1			
Smilax australis	2	20	OG							2			
Solanum prinophyllum	0.1	2	FG					0.1					
Solanum stelligerum	0.1	2	SG			0.1							
Stenocarpus sinuatus	10	10	TG		10								
Syncarpia glomulifera subsp. glomulifera	20	5	TG		20								
Syzygium spp. 08	8	5	SG			8							
Unknown 04	0.6	10	SG			0.6							
Unknown 09	0.2	5	SG			0.2							
Wilkiea huegeliana	5	12	SG			5							

Easting	340795
Northing	6342956
Orientation	279
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	2
50-79	6
30-49	4
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	4
Length logs (m)	62
BAM Attributes 1x1 plot (%)	82

TC-19

Date	31/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-19		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3087	Mod-good	32	32	5	10	1	4	4	8	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	106.7	106.7	47.1	31.2	10	6.2	4.2	8	0	0	
Acacia schinoides	4	3	SG			4							
Alectryon subcinereus	1	2	SG			1							
Alphitonia excelsa	0.1	3	TG		0.1								
Astrotricha latifolia	5	30	SG			5							
Backhousia myrtifolia	12	28	SG			12							
Cissus hypoglauca	2	4	OG							2			
Clematis glycinoides	0.1	5	OG							0.1			
Commersonia fraseri	2	20	SG			2							
Doodia aspera	0.1	2	EG						0.1				
Eucalyptus punctata	5	1	TG		5								
Goodenia ovata	3	4	SG			3							
Gynochthodes jasminoides	1	5	OG							1			
Hibbertia dentata	0.5	8	OG							0.5			
Hydrocotyle laxiflora	5	50	FG					5					
Lastreopsis decomposita	3	3	EG						3				
Notelaea longifolia	1	1	TG		1								
Oplismenus aemulus	10	20	GG				10						
Pandorea pandorana	1	4	OG							1			
Passiflora herbertiana	0.3	20	OG							0.3			
Pellaea falcata	0.1	3	EG						0.1				
Plectranthus parviflorus	0.1	4	FG					0.1					
Pseuderanthemum variabile	1	7	FG					1					
Pyrrosia rupestris	1	1	EG						1				
Scolopia braunii	1	4	TG		1								
Smilax australis	3	13	OG							3			
Solanum prinophyllum	0.1	3	FG					0.1					
Solanum stelligerum	3	8	SG			3							
Stenocarpus salignus	0.1	1	SG			0.1							
Stephania japonica	0.1	2	OG							0.1			
Syncarpia glomulifera	40	6	TG		40								
Synoum glandulosum subsp. glandulosum	1	1	SG			1							
Zieria smithii	0.1	1	SG			0.1							

Easting	334058
Northing	6356771
Orientation	42
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	3
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	77
BAM Attributes 1x1 plot (%)	46

D1.4 3150 – Hunter Coast Ranges Turpentine Wet Forest (Mod-good)

HTP-MS-42

Date	19/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-42		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3150	Mod-good	43	43	14	11	5	3	0	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	146.4	146.4	65.2	37.4	30.8	1.5	0	11.5	0	0	
Acacia irrorata subsp. irrorata	5	10	SG			5							
Acacia prominens	1	5	TG		1								
Acacia schinoides	6	10	SG			6							
Acmena smithii	15	40	TG		15								
Allocasuarina torulosa	2	5	TG		2								
Cissus hypoglauca	4	10	OG							4			
Cordyline stricta	0.2	5	OG							0.2			
Cryptocarya glaucescens	0.2	2	TG		0.2								
Cryptocarya microneura	0.4	5	TG		0.4								
Cryptocarya rigida	5	10	SG			5							
Dianella caerulea	0.1	3	FG					0.1					
Elaeocarpus reticulatus	2	10	SG			2							
Eucalyptus deanei	10	3	TG		10								
Eucalyptus saligna	3	1	TG		3								
Gahnia melanocarpa	0.1	2	GG				0.1						
Gahnia sieberiana	30	80	GG				30						
Guioa semiglauca	0.8	5	TG		0.8								
Gymnostachys anceps	0.6	10	FG					0.6					
Gynochthodes jasminoides	0.4	10	OG							0.4			
Lepidosperma laterale	0.2	5	GG				0.2						
Lomandra longifolia	0.1	1	GG				0.1						
Marsdenia flavescens	0.1	3	OG							0.1			
Notelaea longifolia	0.6	3	TG		0.6								
Ottochloa gracillima	0.4	10	GG				0.4						
Palmeria scandens	1	10	OG							1			
Parsonsia straminea	0.1	1	OG							0.1			
Pittosporum multiflorum	0.4	5	SG			0.4							
Pittosporum revolutum	0.4	5	SG			0.4							
Polyosma cunninghamii	0.1	1	TG		0.1								
Prostanthera incisa	8	50	SG			8							
Pseuderanthemum variabile	0.8	50	FG					0.8					
Psychotria loniceroides	0.4	5	SG			0.4							
Ripogonum fawcettianum	0.4	5	OG							0.4			
Rubus nebulosus	0.2	3	OG							0.2			
Sarcopetalum harveyanum	0.1	1	OG							0.1			
Schizomeria ovata	0.1	1	TG		0.1								
Smilax australis	5	40	OG							5			
Stenocarpus salignus	0.1	1	SG			0.1							
Syncarpia glomulifera subsp. glomulifera	30	15	TG		30								
Synoum glandulosum subsp. glandulosum	10	20	SG			10							
Tasmannia insipida	0.1	1	SG			0.1							
Tristaniopsis collina	1	10	TG		1								
Trochocarpa laurina	1	10	TG		1								

Easting	343969
Northing	6341205
Orientation	336
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	2
30-49	7
20-29	Yes
10-19	Yes
5-9	Yes
<5	Yes
Hollows	0
Length logs (m)	63
BAM Attributes 1x1 plot (%)	80
Litter (%)	80
	95
	65
	70
	90

HTP-MS-44

Date	19/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-44		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3150	Mod-good	40	40	5	13	5	4	0	13	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	130	130	65	47.3	1.5	2.7	0	13.5	0	0	
Acacia schinoides	5	10	SG			5							
Acmena smithii	5	10	TG		5								
Astrotricha latifolia	3	20	SG			3							
Calochlaena dubia	1	10	OG							1			
Cissus hypoglauca	2	20	OG							2			
Commersonia fraseri	1	5	SG			1							
Cordyline stricta	0.6	5	OG							0.6			
Cryptocarya glaucescens	5	10	TG		5								
Cryptocarya rigida	3	5	SG			3							
Cymbidium suave	0.1	1	OG							0.1			
Dianella caerulea	0.8	10	FG					0.8					
Elaeocarpus reticulatus	6	40	SG			6							
Entolasia marginata	0.4	5	GG				0.4						
Entolasia stricta	0.2	10	GG				0.2						
Eucalyptus deanei	15	10	TG		15								
Eucalyptus pilularis	30	20	TG		30								
Gahnia melanocarpa	0.1	1	GG				0.1						
Gahnia sieberiana	0.4	3	GG				0.4						
Gymnostachys anceps	0.1	1	FG					0.1					
Gynochthodes jasminoides	2	20	OG							2			
Hibbertia dentata	0.4	5	OG							0.4			
Lasiopetalum ferrugineum var. cordatum	5	40	SG			5							
Leucopogon juniperinus	0.6	5	SG			0.6							
Lobelia purpurascens	0.8	40	FG					0.8					
Lomandra longifolia	0.4	5	GG				0.4						
Myrsine variabilis	0.1	1	SG			0.1							
Pandorea pandorana subsp. pandorana	0.1	1	OG							0.1			
Parsonsia straminea	0.4	5	OG							0.4			
Passiflora herbertiana	0.1	1	OG							0.1			
Prostanthera incisa	15	100	SG			15							
Pseuderanthemum variabile	1	50	FG					1					
Psychotria loniceroides	2	5	SG			2							
Ripogonum fawcettianum	1	10	OG							1			
Sarcopetalum harveyanum	0.8	10	OG							0.8			
Smilax australis	3	50	OG							3			
Smilax glyciphylla	2	20	OG							2			
Stenocarpus salignus	0.6	2	SG			0.6							
Syncarpia glomulifera subsp. glomulifera	10	5	TG		10								
Synoum glandulosum subsp. glandulosum	2	10	SG			2							
Zieria smithii	4	40	SG			4							

Easting	343369
Northing	6343010
Orientation	99
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	4
30-49	21
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	28
BAM Attributes 1x1 plot (%)	85
Litter (%)	90
	95
	85
	75
	80

HTP-MS-56

Date	25/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-56		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3150	Mod-good	36	36	11	10	1	2	2	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	247.2	247.2	143.6	27.2	0.1	0.7	0.8	74.8	0	0	
Acmena smithii	20	15	TG		20								
Blechnum cartilagineum	0.4	10	EG						0.4				
Ceratopetalum apetalum	15	10	TG		15								
Cissus hypoglauca	20	10	OG							20			
Clerodendrum tomentosum	2	3	TG		2								
Cordyline stricta	3	40	OG							3			
Cryptocarya glaucescens	20	15	TG		20								
Cryptocarya microneura	3	5	TG		3								
Cryptocarya rigida	5	10	SG			5							
Dianella caerulea	0.1	4	FG					0.1					
Doryphora sassafras	35	40	TG		35								
Elaeocarpus reticulatus	10	20	SG			10							
Eucalyptus agglomerata	14	2	TG		14								
Eucalyptus saligna	26	8	TG		26								
Eupomatia laurina	0.8	3	SG			0.8							
Gahnia melanocarpa	0.1	1	GG				0.1						
Geitonoplesium cymosum	1	10	OG							1			
Geitonoplesium cymosum	0.8	3	OG							0.8			
Gymnostachys anceps	0.6	5	FG					0.6					
Lastreopsis decomposita	0.4	10	EG						0.4				
Marsdenia flavescens	1	5	OG							1			
Notelaea longifolia	0.6	2	TG		0.6								
Palmeria scandens	2	10	OG							2			
Parsonsia straminea	5	10	OG							5			
Pittosporum multiflorum	2	20	SG			2							
Pittosporum revolutum	0.4	1	SG			0.4							
Psychotria loniceroides	3	8	SG			3							
Ripogonum fawcettianum	30	50	OG							30			
Rubus nebulosus	2	10	OG							2			
Smilax australis	10	50	OG							10			
Stenocarpus salignus	2	5	SG			2							
Syncarpia glomulifera subsp. glomulifera	5	3	TG		5								
Synoum glandulosum subsp. glandulosum	1	5	SG			1							
Tasmannia insipida	1	10	SG			1							
Trochocarpa laurina	3	8	TG		3								
Wilkiea huegeliana	2	5	SG			2							

Easting	343730
Northing	6342221
Orientation	10
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	14
30-49	10
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	44
BAM Attributes 1x1 plot (%)	79
Litter (%)	90
	65
	70
	90
	80

HTP-MS-58

Date	25/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-58		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3150	Mod-good	40	40	13	6	1	4	3	13	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	201.6	201.6	86.6	40.5	0.8	2	3.1	68.6	0	0
Acmena smithii	15	10	TG		15							
Acrotriche divaricata	0.1	1	SG			0.1						
Allocasuarina torulosa	4	5	TG		4							
Archontophoenix cunninghamiana	0.1	10	OG							0.1		
Blechnum cartilagineum	2	20	EG						2			
Cissus hypoglauca	10	5	OG							10		
Cordyline stricta	0.4	5	OG							0.4		
Cryptocarya glaucescens	2	5	TG		2							
Cryptocarya microneura	2	10	TG		2							
Cryptocarya rigida	35	80	SG			35						
Cyclophyllum longipetalum	0.4	2	TG		0.4							
Dianella caerulea	0.4	10	FG					0.4				
Elaeocarpus reticulatus	1	5	SG			1						
Eucalyptus acmenoides	15	4	TG		15							
Eucalyptus piperita	2	1	TG		2							
Eucalyptus saligna	12	3	TG		12							
Gahnia sieberiana	0.8	20	GG				0.8					
Geitonoplesium cymosum	0.2	5	OG							0.2		
Gymnostachys anceps	1	10	FG					1				
Gynochthodes jasminoides	1	30	OG							1		
Lastreopsis decomposita	1	20	EG						1			
Notelaea longifolia	10	40	TG		10							
Palmeria scandens	8	20	OG							8		
Pandorea pandorana subsp. pandorana	2	5	OG							2		
Parsonsia straminea	0.8	10	OG							0.8		
Pittosporum revolutum	0.4	2	SG			0.4						
Platycerium bifurcatum	0.1	1	EG						0.1			
Polyosma cunninghamii	0.4	1	TG		0.4							
Pseuderanthemum variabile	0.4	40	FG					0.4				
Ripogonum album	0.1	1	OG							0.1		
Ripogonum fawcettianum	35	50	OG							35		
Rubus nebulosus	0.2	1	OG							0.2		
Schelhammera undulata	0.2	10	FG					0.2				
Schizomeria ovata	0.8	2	TG		0.8							
Smilax australis	10	50	OG							10		
Stephania japonica	0.8	10	OG							0.8		
Syncarpia glomulifera subsp. glomulifera	18	5	TG		18							
Synoum glandulosum subsp. glandulosum	1	3	SG			1						
Tasmannia insipida	3	20	SG			3						
Trochocarpa laurina	5	10	TG		5							

Easting	345959
Northing	6338310
Orientation	42
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	5
30-49	9
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	3
Length logs (m)	93
BAM Attributes 1x1 plot (%)	86
Litter (%)	95
	90
	80
	90
	75

LCSM-19

Date	25/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-19		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3150	Mod-good	35	35	7	13	1	4	2	8	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	109.33	109.33	101.21	4.72	1	0.9	0.2	1.3	0	0	
Eucalyptus pilularis	30	3	TG		30								
Eucalyptus punctata	30	8	TG		30								
Syncarpia glomulifera	30	20	TG		30								
Eucalyptus agglomerata	10	1	TG		10								
Eucalyptus saligna	1	1	TG		1								
Acacia parvipinnula	0.2	1	SG			0.2							
Breynia oblongifolia	0.2	1	SG			0.2							
Zieria smithii	2	20	SG			2							
Psychotria loniceroides	0.5	5	SG			0.5							
Commersonia dasyphylla	1	10	SG			1							
Cryptocarya rigida	0.1	1	SG			0.1							
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Acronychia spp.	0.1	2	SG			0.1							
Allocasuarina torulosa	0.11		TG		0.11								
Diospyros australis	0.1	1	SG			0.1							
Acmena smithii	0.1	1	TG		0.1								
Prostanthera incisa	0.12		SG			0.12							
Ozothamnus diosmifolius	0.1	1	SG			0.1							
Leucopogon juniperinus	0.1	1	SG			0.1							
Dianella caerulea	0.2	10	FG					0.2					
Gymnostachys anceps	0.5	5	FG					0.5					
Rubus rosifolius	0.1	1	SG			0.1							
Hibbertia dentata	0.2	5	OG							0.2			
Smilax australis	0.5	10	OG							0.5			
Gahnia microstachya	1	10	GG				1						
Passiflora herbertiana	0.1	1	OG							0.1			
Parsonsia straminea	0.1	1	OG							0.1			
Clematis aristata	0.1	1	OG							0.1			
Cissus antarctica	0.1	1	OG							0.1			
Hibbertia scandens	0.1	1	OG							0.1			
Pseuderanthemum variabile	0.1	1	FG					0.1					
Hydrocotyle sibthorpioides	0.1	1	FG					0.1					
Doodia aspera	0.1	10	EG						0.1				
Geitonoplesium cymosum	0.1	1	OG							0.1			
Pteridium esculentum	0.1	2	EG						0.1				

Easting	341995
Northing	6343912
Orientation	4
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	1
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	37
BAM Attributes 1x1 plot (%)	91
Litter (%)	

D1.5 3150 – Hunter Coast Ranges Turpentine Wet Forest (Plantation)

HTP-MS-50

Date	21/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-50		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3150	Plantation	41	41	7	12	2	2	4	14	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	132.9	132.9	48.5	53.7	0.5	0.2	11.5	18.5	0	0	
Acacia maidenii	0.4	2	TG		0.4								
Acacia schinoides	10	40	SG			10							
Acmena smithii	5	20	TG		5								
Adiantum aethiopicum	0.1	5	EG						0.1				
Calochlaena dubia	5	50	OG							5			
Cayratia clematidea	0.1	1	OG							0.1			
Clematis aristata	0.2	10	OG							0.2			
Commersonia fraseri	5	50	SG			5							
Cordyline stricta	2	30	OG							2			
Cryptocarya glaucescens	12	30	TG		12								
Cryptocarya rigida	3	3	SG			3							
Diploglottis australis	0.1	1	TG		0.1								
Embelia australiana	0.8	10	OG							0.8			
Eucalyptus agglomerata	4	3	TG		4								
Eucalyptus deanei	2	1	TG		2								
Eucalyptus saligna	25	10	TG		25								
Eupomatia laurina	3	30	SG			3							
Gahnia melanocarpa	0.1	1	GG				0.1						
Gahnia sieberiana	0.4	10	GG				0.4						
Geitonoplesium cymosum	0.1	3	OG							0.1			
Gynochthodes jasminoides	0.1	10	OG							0.1			
Hydrocotyle sibthorpioides	0.1	1	FG					0.1					
Lastreopsis decomposita	0.4	10	EG						0.4				
Melicope micrococca	8	20	SG			8							
Palmeria scandens	3	20	OG							3			
Parsonsia straminea	0.1	1	OG							0.1			
Pellaea falcata	1	50	EG						1				
Pittosporum multiflorum	1	20	SG			1							
Pteris tremula	10	30	EG						10				
Rhodamnia rubescens	0.2	2	SG			0.2							
Ripogonum fawcettianum	6	50	OG							6			
Rubus rosifolius	20	200	SG			20							
Sarcopetalum harveyanum	0.4	10	OG							0.4			
Smilax australis	0.4	20	OG							0.4			
Solanum stelligerum	0.1	1	SG			0.1							
Stenocarpus salignus	2	1	SG			2							
Stephania japonica	0.1	1	OG							0.1			
Synoum glandulosum subsp. glandulosum	1	10	SG			1							
Tylophora paniculata	0.2	5	OG							0.2			
Urtica incisa	0.1	1	FG					0.1					
Wilkiea huegeliana	0.4	5	SG			0.4							

Easting	343708
Northing	6342269
Orientation	11
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	6
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	135
BAM Attributes 1x1 plot (%)	79
Litter (%)	75
	85
	80
	70
	85

LCSM-15

Date	22/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-15		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3150	Plantation	29	28	4	12	4	1	1	6	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	109.6	107.6	41.6	62.8	2.1	0.1	0.1	0.9	2	0	
Eucalyptus saligna	40	10	TG		40								
Acacia parvipinnula	40	20	SG			40							
Syncarpia glomulifera	1	10	TG		1								
Commersonia fraseri	10	20	SG			10							
Zieria arborescens	3	3	SG			3							
Cryptocarya rigida	5	3	SG			5							
Myrtaceae indeterminateRusty r	0.2	1	SG			0.2							
Pittosporum spinescens	0.5	5	SG			0.5							
Notelaea longifolia	0.1	1	TG		0.1								
Cordyline australis	2	20	EX								2		
Melicope micrococca	3	3	SG			3							
Rhodamnia rubescens	0.3	4	SG			0.3							
Astrotricha latifolia	0.3	1	SG			0.3							
Rubus rosifolius	0.3	3	SG			0.3							
Cryptocarya meissneriana	0.1	1	SG			0.1							
Clerodendrum tomentosum	0.5	1	TG		0.5								
Vine sp. See photos	0.1	2	OG							0.1			
Polyscias sambucifolia	0.1	1	SG			0.1							
Gahnia microstachya	0.5	5	GG				0.5						
Gahnia sieberiana	1	10	GG				1						
Gahnia aspera	0.5	5	GG				0.5						
Stephania japonica	0.2	5	OG							0.2			
Sarcopetalum harveyanum	0.1	5	OG							0.1			
Smilax australis	0.1	5	OG							0.1			
Oplismenus imbecillis	0.1	1	GG				0.1						
Passiflora herbertiana	0.1	1	OG							0.1			
Adiantum aethiopicum	0.1	5	EG						0.1				
Celastrus spp.	0.3	1	OG							0.3			
Pseuderanthemum variabile	0.1	10	FG					0.1					

Easting	342727
Northing	6342643
Orientation	319
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	yes
10-19	yes
5-9	no
<5	yes
Hollows	0
Length logs (m)	74
BAM Attributes 1x1 plot (%)	83
Litter (%)	

D1.6 3151 – Northwest Sydney Sandstone Grey Myrtle Dry Rainforest (Mod-good)

HTP-MS-75

Date	3/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-75		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3151	Mod-good	46	45	3	17	4	6	5	10	0	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	93.2	91.2	4.4	66.2	2.7	1.6	8.4	7.9	0	2	
Adiantum aethiopicum	1	40	EG						1				
Adiantum hispidulum var. hispidulum	1	50	EG						1				
Alectryon subcinereus	1	5	SG			1							
Aneilema acuminatum	0.4	40	FG					0.4					
Backhousia myrtifolia	40	100	SG			40							
Breynia oblongifolia	0.1	1	SG			0.1							
Bursaria spinosa	1	10	SG			1							
Cayratia clematidea	0.4	5	OG							0.4			
Cissus hypoglauca	3	20	OG							3			
Claoxylon australe	1	5	SG			1							
Clematis aristata	0.4	10	OG							0.4			
Clerodendrum tomentosum	1	5	TG		1								
Cyperus tetraphyllus	0.1	10	GG				0.1						
Denhamia silvestris	0.1	1	SG			0.1							
Dianella caerulea	0.1	1	FG					0.1					
Dichondra sp. Inglewood	0.4	50	FG					0.4					
Dioscorea transversa	1	10	OG							1			
Diospyros australis	1	10	SG			1							
Doodia australis	5	100	EG						5				
Elaeodendron australe	2	5	SG			2							
Ficus coronata	1	5	SG			1							
Galium leiocarpum	0.1	1	FG					0.1					
Geitonoplesium cymosum	0.4	10	OG							0.4			
Grona varians	0.1	2	OG							0.1			
Gynochthodes jasminoides	2	20	OG							2			
Lantana camara	2	20	HT									2	
Lepidosperma cf. laterale	0.2	5	GG				0.2						
Marsdenia suaveolens	0.1	1	OG							0.1			
Melaleuca styphelioides	15	8	SG			15							
Melicope micrococca	1	5	SG			1							
Microlaena stipoides var. stipoides	0.4	10	GG				0.4						
Myrsine variabilis	1	5	SG			1							
Notelaea longifolia	0.4	3	TG		0.4								
Oplismenus imbecillis	2	100	GG				2						
Pandorea pandorana	0.4	5	OG							0.4			
Pellaea falcata	1	50	EG						1				
Pellaea paradoxa	0.4	20	EG						0.4				
Phyllanthus gunnii	0.1	2	SG			0.1							
Pittosporum multiflorum	0.4	5	SG			0.4							
Plectranthus parviflorus	0.2	5	FG					0.2					
Pseuderanthemum variabile	0.4	30	FG					0.4					
Rubus moluccanus	0.1	1	SG			0.1							
Solanum stelligerum	1	20	SG			1							
Stephania japonica	0.1	2	OG							0.1			
Streblus brunonianus	3	10	TG		3								
Synoum glandulosum subsp. glandulosum	0.4	2	SG			0.4							

Easting	333224
Northing	6361272
Orientation	73
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	17
BAM Attributes 1x1 plot (%)	69

D1.7 3152 – Hunter Range Turpentine-Grey Myrtle Gully Forest (Mod-good)

Benchmark

D1.8 3230 – Hunter Range Turpentine-Grey Myrtle Gully Forest (Mod-good)

HTP-MS-13

Date	31/08/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS13		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	43	43	9	11	7	5	1	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	163.1	163.1	41.1	73.5	37.1	1.4	0.4	9.6	0	0	
Acacia parvipinnula	45	500	SG			45							
Allocasuarina torulosa	1	2	TG		1								
Angophora costata	3	2	TG		3								
Angophora floribunda	5	6	TG		5								
Billardiera scandens	3	50	OG							3			
Breynia oblongifolia	0.4	3	SG			0.4							
Clematis glycinoides	0.1	1	OG							0.1			
Clerodendrum tomentosum	1	4	TG		1								
Corymbia maculata	1	1	TG		1								
Denhamia silvestris	0.2	5	SG			0.2							
Dianella caerulea var. producta	0.6	10	FG					0.6					
Dichondra repens	0.1	10	FG					0.1					
Entolasia marginata	5	50	GG				5						
Entolasia stricta	15	100	GG				15						
Eucalyptus agglomerata	3	1	TG		3								
Eucalyptus piperita	22	8	TG		22								
Eucalyptus punctata	5	1	TG		5								
Gahnia aspera	0.1	1	GG				0.1						
Geitonoplesium cymosum	1	20	OG							1			
Glycine clandestina	0.2	10	OG							0.2			
Gonocarpus teucrioides	0.2	10	FG					0.2					
Goodenia heterophylla	0.4	5	FG					0.4					
Hardenbergia violacea	0.8	10	OG							0.8			
Hibbertia dentata	2	30	OG							2			
Hibbertia scandens	0.4	5	OG							0.4			
Imperata cylindrica	1	30	GG				1						
Kennedia rubicunda	1	15	OG							1			
Leucopogon juniperinus	0.1	2	SG			0.1							
Lomandra longifolia	0.6	8	GG				0.6						
Notelaea longifolia	0.1	1	TG		0.1								
Oplismenus imbecillis	0.4	20	GG				0.4						
Ozothamnus diosmifolius	1	10	SG			1							
Panicum simile	15	100	GG				15						
Passiflora herbertiana subsp. herbertiana	0.1	1	OG							0.1			
Persoonia linearis	1	5	SG			1							
Platysace lanceolata	20	200	SG			20							
Podolobium ilicifolium	1	10	SG			1							
Polyscias sambucifolia	3	20	SG			3							
Pomaderris spp.	1	20	SG			1							
Pteridium esculentum	0.4	10	EG						0.4				
Senecio diaschides	0.1	3	FG					0.1					
Smilax australis	1	30	OG							1			
Solanum stelligerum	0.8	10	SG			0.8							

Easting	334817
Northing	6352096
Orientation	109
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	4
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	8
BAM Attributes 1x1 plot (%)	67

HTP-MS-48

Date	20/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-48		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	40	40	7	9	6	9	1	8	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	120	120	56	34.4	3.4	2.2	0.1	23.9	0	0	
Acacia schinoides	3	8	SG			3							
Acrotriche divaricata	20	100	SG			20							
Allocasuarina torulosa	3	10	TG		3								
Angophora euryphylla	1	2	TG		1								
Calochlaena dubia	20	100	OG							20			
Corybas aconitiflorus	0.1	25	FG					0.1					
Cymbidium suave	0.1	1	OG							0.1			
Dianella caerulea	0.4	20	FG					0.4					
Elaeocarpus reticulatus	0.6	3	SG			0.6							
Entolasia stricta	0.4	20	GG				0.4						
Eucalyptus acmenoides	4	2	TG		4								
Eucalyptus agglomerata	8	6	TG		8								
Eucalyptus saligna	25	8	TG		25								
Gahnia sieberiana	0.4	5	GG				0.4						
Geitonoplesium cymosum	0.1	1	OG							0.1			
Hibbertia dentata	1	30	OG							1			
Hydrocotyle sibthorpioides	0.1	5	FG					0.1					
Lagenifera stipitata	0.1	5	FG					0.1					
Lepidosperma laterale	0.4	10	GG				0.4						
Leucopogon juniperinus	4	50	SG			4							
Lindsaea microphylla	0.1	5	EG						0.1				
Lobelia purpurascens	0.8	50	FG					0.8					
Lomandra longifolia	2	30	GG				2						
Oplismenus aemulus	0.1	3	GG				0.1						
Oplismenus imbecillis	0.1	5	GG				0.1						
Oxalis exilis	0.1	3	FG					0.1					
Parsonsia straminea	0.2	20	OG							0.2			
Persoonia linearis	4	10	SG			4							
Pittosporum multiflorum	0.4	5	SG			0.4							
Pseuderanthemum variabile	0.4	60	FG					0.4					
Psychotria loniceroides	1	10	SG			1							
Pterostylis spp.	0.1	5	FG					0.1					
Schelhammera undulata	0.1	10	FG					0.1					
Smilax australis	2	50	OG							2			
Smilax glyciphylla	0.4	10	OG							0.4			
Syncarpia glomulifera subsp. glomulifera	12	5	TG		12								
Trochocarpa laurina	3	2	TG		3								
Tylophora barbata	0.1	2	OG							0.1			
Zieria arborescens	0.4	4	SG			0.4							
Zieria smithii	1	10	SG			1							

Easting	342686
Northing	6343935
Orientation	81
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	17
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	15
BAM Attributes 1x1 plot (%)	76
Litter (%)	90
	75
	70
	65
	80

HTP-MS-60

Date	26/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-60		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	37	37	6	8	4	7	2	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	84	84	55.3	15.2	3.4	2.9	4.1	3.1	0	0	
Acacia maidenii	0.1	1	TG		0.1								
Acacia ulicifolia	0.6	10	SG			0.6							
Acrotriche divaricata	5	30	SG			5							
Allocasuarina torulosa	8	20	TG		8								
Archontophoenix cunninghamiana	0.1	5	OG							0.1			
Billardiera scandens	0.1	2	OG							0.1			
Brunoniella australis	0.1	1	FG					0.1					
Calochlaena dubia	1	20	OG							1			
Cissus hypoglauca	0.1	1	OG							0.1			
Dampiera stricta	0.1	5	FG					0.1					
Dianella caerulea	0.4	10	FG					0.4					
Elaeocarpus reticulatus	0.4	5	SG			0.4							
Entolasia stricta	1	50	GG				1						
Eucalyptus pilularis	32	16	TG		32								
Glycine clandestina	0.1	2	OG							0.1			
Guioa semiglauca	0.1	1	TG		0.1								
Hibbertia dentata	1	40	OG							1			
Hibbertia scandens	0.1	1	OG							0.1			
Lepidosperma laterale	0.4	10	GG				0.4						
Leucopogon lanceolatus	0.4	5	SG			0.4							
Lindsaea microphylla	0.1	5	EG						0.1				
Lomandra longifolia	1	20	GG				1						
Microlaena stipoides var. stipoides	1	30	GG				1						
Pandorea pandorana subsp. pandorana	0.1	1	OG							0.1			
Patersonia glabrata	2	60	FG					2					
Persoonia linearis	5	50	SG			5							
Platysace lanceolata	0.4	10	SG			0.4							
Podolobium ilicifolium	3	40	SG			3							
Pomax umbellata	0.1	5	FG					0.1					
Pseuderanthemum variabile	0.1	20	FG					0.1					
Pteridium esculentum	4	50	EG						4				
Schizomeria ovata	0.1	1	TG		0.1								
Smilax australis	0.4	5	OG							0.4			
Smilax glyciphylla	0.1	2	OG							0.1			
Syncarpia glomulifera subsp. glomulifera	15	30	TG		15								
Synoum glandulosum subsp. glandulosum	0.4	5	SG			0.4							
Xanthosia tridentata	0.1	2	FG					0.1					

Easting	347041
Northing	6336027
Orientation	19
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	3
30-49	7
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	54
BAM Attributes 1x1 plot (%)	69
Litter (%)	90
	85
	75
	40
	55

HTP-MS-62

Date	26/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-62		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	50	50	9	10	10	4	4	13	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	108.2	108.2	50.3	7	31.7	0.8	3.9	14.5	0	0	
Acacia maidenii	0.1	1	TG		0.1								
Acrotriche divaricata	5	40	SG			5							
Adiantum aethiopicum	0.4	20	EG						0.4				
Allocasuarina torulosa	8	20	TG		8								
Alphitonia excelsa	0.1	1	TG		0.1								
Amyema miquelii	0.1	1	OG							0.1			
Angophora floribunda	1	1	TG		1								
Archontophoenix cunninghamiana	0.1	5	OG							0.1			
Billardiera scandens	0.2	10	OG							0.2			
Breynia oblongifolia	0.1	2	SG			0.1							
Calanthe triplicata	0.1	1	FG					0.1					
Calochlaena dubia	5	50	OG							5			
Cissus hypoglauca	1	1	OG							1			
Cordyline stricta	1	30	OG							1			
Dianella caerulea	0.4	10	FG					0.4					
Doodia australis	0.4	10	EG						0.4				
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Entolasia marginata	1	20	GG				1						
Entolasia stricta	5	80	GG				5						
Eucalyptus pilularis	24	8	TG		24								
Gahnia sieberiana	20	80	GG				20						
Glochidion ferdinandi	1	2	TG		1								
Guioa semiglauca	0.1	1	TG		0.1								
Hibbertia dentata	5	100	OG							5			
Hibbertia scandens	0.4	5	OG							0.4			
Imperata cylindrica	2	50	GG				2						
Lasiopetalum ferrugineum var. cordatum	0.4	5	SG			0.4							
Lepidosperma laterale	0.4	10	GG				0.4						
Leucopogon lanceolatus	0.1	3	SG			0.1							
Lindsaea microphylla	0.1	5	EG						0.1				
Lomandra confertifolia	0.4	5	GG				0.4						
Lomandra longifolia	2	30	GG				2						
Microlaena stipoides var. stipoides	0.1	5	GG				0.1						
Opercularia varia	0.1	5	FG					0.1					
Oplismenus imbecillis	0.6	20	GG				0.6						
Pandorea pandorana subsp. pandorana	0.4	5	OG							0.4			
Parsonsia straminea	0.1	3	OG							0.1			
Persoonia linearis	0.2	1	SG			0.2							
Polyscias sambucifolia	0.4	3	SG			0.4							
Pseuderanthemum variabile	0.2	30	FG					0.2					
Psychotria loniceroides	0.1	1	SG			0.1							
Pteridium esculentum	3	50	EG						3				
Rubus moluccanus var. trilobus	0.2	5	SG			0.2							
Rubus nebulosus	0.1	1	OG							0.1			
Schoenus melanostachys	0.2	3	GG				0.2						
Smilax australis	1	20	OG							1			
Smilax glyciphylla	0.1	3	OG							0.1			
Syncarpia glomulifera subsp. glomulifera	15	20	TG		15								
Synoum glandulosum subsp. glandulosum	0.4	5	SG			0.4							
Trochocarpa laurina	1	3	TG		1								

Easting	347055
Northing	6335771
Orientation	8
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	7
30-49	10
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	36
BAM Attributes 1x1 plot (%)	69
Litter (%)	75
	85
	65
	75
	45

LCSM-03

Date	19/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-03		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	32	32	3	9	5	5	2	8	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	132.1	132.1	82	4.8	32.2	0.8	0.6	11.7	0	0	
Eucalyptus piperita	60	50	TG		60								
Syncarpia glomulifera	20	20	TG		20								
Allocasuarina torulosa	2	20	TG		2								
Persoonia linearis	1	10	SG			1							
Gompholobium grandiflorum	1	25	SG			1							
Acacia ulicifolia	0.5	5	SG			0.5							
Acrotriche divaricata	1	10	SG			1							
Hibbertia spp.	0.1	1	SG			0.1							
Banksia marginata	0.5	1	SG			0.5							
Acacia spp.	0.5	1	SG			0.5							
Lomatia silaifolia	0.1	1	SG			0.1							
Synoum glandulosum subsp. gland	0.1	1	SG			0.1							
Entolasia stricta	30	1000	GG				30						
Hibbertia dentata	10	2000	OG							10			
Glycine clandestina	0.1	10	OG							0.1			
Smilax glyciphylla	0.1	10	OG							0.1			
Lomandra longifolia	1	50	GG				1						
Dampiera stricta	0.3	20	FG					0.3					
Gahnia spp.	1	10	GG				1						
Dampiera purpurea	0.1	10	FG					0.1					
Patersonia spp.	0.2	20	FG					0.2					
Dianella caerulea	0.1	10	FG					0.1					
Pandorea pandorana	0.2	1	OG							0.2			
Geitonoplesium cymosum	0.1	2	OG							0.1			
Smilax australis	0.1	1	OG							0.1			
Lepidosperma spp.	0.1	2	GG				0.1						
Grona varians	0.1	1	OG							0.1			
Pteridium esculentum	0.5	20	EG						0.5				
Viola hederacea	0.1	5	FG					0.1					
Parsonsia straminea	1	10	OG							1			
Cyathochaeta diandra	0.1	1	GG				0.1						
Adiantum spp.	0.1	2	EG						0.1				

Easting	344076
Northing	6335959
Orientation	303
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	64
BAM Attributes 1x1 plot (%)	78
Litter (%)	

LCSM-08

Date	20/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-08		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	27	27	3	10	4	3	1	6	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	118.1	118.1	90	15.3	10.6	0.4	0.2	1.6	0	0	
Eucalyptus piperita	40	10	TG		40								
Syncarpia glomulifera	40	10	TG		40								
Allocasuarina torulosa	10	20	TG		10								
Persoonia linearis	0.3	1	SG			0.3							
Synoum glandulosum subsp. glan	5	50	SG			5							
Cryptocarya rigida	7	10	SG			7							
Banksia marginata	0.1	1	SG			0.1							
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Acrotriche divaricata	1.5	2	SG			1.5							
Lomatia silaifolia	1	20	SG			1							
Lomandra longifolia	5	50	GG				5						
Dianella caerulea	0.2	15	FG					0.2					
Calochlaena dubia	0.1	5	OG							0.1			
Pteridium esculentum	0.2	20	EG						0.2				
Hibbertia dentata	1	50	OG							1			
Smilax australis	0.2	50	OG							0.2			
Leucopogon lanceolatus	0.1	1	SG			0.1							
Parsonsia straminea	0.1	3	OG							0.1			
Pseuderanthemum variabile	0.1	2	FG					0.1					
Psychotria spp.	0.1	1	SG			0.1							
Lobelia purpurascens	0.1	2	FG					0.1					
Entolasia stricta	5	200	GG				5						
Pandorea pandorana	0.1	1	OG							0.1			
Xylomelum pyriforme	0.1	1	SG			0.1							
Schoenus melanostachys	0.5	10	GG				0.5						
Gahnia spp.	0.1	5	GG				0.1						
Clematis spp.	0.1	1	OG							0.1			

Easting	344071
Northing	6339967
Orientation	22
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	2
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	82
BAM Attributes 1x1 plot (%)	87
Litter (%)	

LCSM-11

Date	21/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	LCSM-11		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	40	40	6	11	5	5	3	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	113.4	113.4	70.8	3.3	20.3	0.5	5.2	13.3	0	0	
Eucalyptus piperita	20	2	TG		20								
Syncarpia glomulifera	40	20	TG		40								
Schizomeria ovata	0.5	6	TG		0.5								
Allocasuarina torulosa	10	20	TG		10								
Acacia maidenii	0.2	1	TG		0.2								
Persoonia linearis	0.2	5	SG			0.2							
Leptospermum polygalifolium	0.5	10	SG			0.5							
Cyathea australis	2	6	OG							2			
Cryptocarya rigida	0.1	1	SG			0.1							
Synoum glandulosum subsp. glandul	0.5	2	SG			0.5							
Elaeocarpus reticulatus	1	5	SG			1							
Banksia marginata	0.2	5	SG			0.2							
Acrotriche divaricata	0.3	10	SG			0.3							
Trochocarpa laurina	0.1	5	TG		0.1								
Acacia ulicifolia	0.2	1	SG			0.2							
Cyathochaeta diandra	0.1	10	GG				0.1						
Gahnia spp.	15	80	GG				15						
Calochlaena dubia	10	100	OG							10			
Pteridium esculentum	5	30	EG						5				
Dianella caerulea	0.1	10	FG					0.1					
Schoenus melanostachys	0.1	1	GG				0.1						
Pseuderanthemum variabile	0.1	10	FG					0.1					
Lomandra longifolia	0.1	1	GG				0.1						
Cissus hypoglauca	0.1	20	OG							0.1			
Smilax australis	0.5	50	OG							0.5			
Hibbertia dentata	0.1	25	OG							0.1			
Rubus rosifolius	0.1	1	SG			0.1							
Hibbertia spp.	0.1	1	SG			0.1							
Parsonsia straminea	0.2	10	OG							0.2			
Lobelia purpurascens	0.1	1	FG					0.1					
Entolasia stricta	5	200	GG				5						
Clematis spp.	0.1	1	OG							0.1			
Kennedia rubicunda	0.1	1	OG							0.1			
Psychotria loniceroides	0.1	1	SG			0.1							
Gynochthodes jasminoides	0.1	1	OG							0.1			
Cryptostylis erecta	0.1	1	FG					0.1					
Unknown	0.1	1	FG					0.1					
Gleichenia dicarpa	0.1	20	EG						0.1				
Archontophoenix cunninghamiana	0.1	1	OG							0.1			
Histiopteris incisa	0.1	1	EG						0.1				

Easting	343918
Northing	6340234
Orientation	210
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	2
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	113
BAM Attributes 1x1 plot (%)	83
Litter (%)	95
	75
	85
	65
	95

LCSM-29

Date	27/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-29		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	40	40	5	10	10	4	1	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	153.81	153.8	80.5	26.7	43.5	0.4	0.2	2.5	0	0	
Eucalyptus agglomerata	40	50	TG		40								
Angophora floribunda	20	10	TG		20								
Eucalyptus saligna	20	10	TG		20								
Acacia irrorata subsp. irrorata	25	50	SG			25							
Acacia maidenii	0.3	3	TG		0.3								
Breynia oblongifolia	0.2	2	SG			0.2							
Psychotria loniceroides	0.3	3	SG			0.3							
Polyscias sambucifolia	0.5	5	SG			0.5							
Allocasuarina torulosa	0.2	1	TG		0.2								
Ozothamnus diosmifolius	0.1	1	SG			0.1							
Synoum glandulosum subsp. glar	0.2	1	SG			0.2							
Exocarpos strictus	0.1	1	SG			0.1							
Jacksonia spp.	0.1	1	SG			0.1							
Geitonoplesium cymosum	0.1	10	OG							0.1			
Persoonia linearis	0.1	1	SG			0.1							
Pteridium esculentum	0.2	5	EG						0.2				
Kennedia rubicunda	0.2	2	OG							0.2			
Hardenbergia violacea	1	200	OG							1			
Lomandra longifolia	0.2	2	GG				0.2						
Imperata cylindrica	2	50	GG				2						
Entolasia stricta	40	2000	GG				40						
Passiflora herbertiana	0.5	5	OG							0.5			
Rubus parvifolius	0.1	1	SG			0.1							
Dianella caerulea	0.1	10	FG					0.1					
Eustrephus latifolius	0.1	2	OG							0.1			
Gonocarpus spp.	0.1	1	FG					0.1					
Hibbertia scandens	0.1	1	OG							0.1			
Glycine clandestina	0.1	10	OG							0.1			
Lepidosperma laterale	0.3	1	GG				0.3						
Billardiera scandens	0.11		OG							0.1			
Clematis glycinoides	0.1	1	OG							0.1			
Gahnia microstachya	0.1	1	GG				0.1						
Gahnia sieberiana	0.3	3	GG				0.3						
Opercularia aspera	0.1	2	FG					0.1					
Panicum simile	0.3	3	GG				0.3						
Smilax australis	0.2	1	OG							0.2			
Eragrostis spp.	0.1	1	GG				0.1						
Themeda triandra	0.1	1	GG				0.1						
Lomandra cylindrica	0.1	1	GG				0.1						
Goodenia heterophylla	0.1	3	FG					0.1					

Easting	335014
Northing	6351093
Orientation	352
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	91
BAM Attributes 1x1 plot (%)	69
Litter (%)	

TC-09

Date	28/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-09		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Mod-good	42	42	7	11	8	5	2	9	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	111.4	111.4	36.2	12.2	51.9	6.2	1.1	3.8	0	0	
Angophora floribunda	18	15	TG		18								
Allocasuarina torulosa	1	4	TG		1								
Angophora costata	5	8	TG		5								
Eucalyptus piperita	2	1	TG		2								
Amyema spp.	0.2	1	OG							0.2			
Notelaea longifolia	0.1	1	TG		0.1								
Breynia oblongifolia	1	5	SG			1							
Clerodendrum tomentosum	0.1	1	TG		0.1								
Psychotria loniceroides	0.5	3	SG			0.5							
Polyscias sambucifolia	1	3	SG			1							
Rubus parvifolius	5	12	SG			5							
Acacia parramattensis	10	15	TG		10								
Ozothamnus diosmifolius	0.3	3	SG			0.3							
Pittosporum revolutum	0.3	2	SG			0.3							
Leucopogon juniperinus	2	5	SG			2							
Jacksonia scoparia	0.1	1	SG			0.1							
Synoum glandulosum subsp. glandulosum	1	2	SG			1							
Myrsine variabilis	0.8	6	SG			0.8							
Persoonia linearis	0.2	1	SG			0.2							
Imperata cylindrica	20	100	GG				20						
Dichondra repens	5	100	FG					5					
Hibbertia scandens	2	5	OG							2			
Smilax australis	1	5	OG							1			
Lomandra longifolia	0.3	2	GG				0.3						
Pteridium esculentum	1	4	EG						1				
Gahnia sieberiana	10	25	GG				10						
Oxalis perennans	0.1	3	FG					0.1					
Oplismenus imbecillis	10	50	GG				10						
Kennedia rubicunda	0.1	1	OG							0.1			
Billardiera scandens	0.1	1	OG							0.1			
Echinopogon ovatus	0.1	1	GG				0.1						
Dianella caerulea	0.5	7	FG					0.5					
Hydrocotyle laxiflora	0.5	20	FG					0.5					
Cissus hypoglauca	0.1	3	OG							0.1			
Poa labillardierei var. labillardierei	0.5	3	GG				0.5						
Lepidosperma laterale	1	10	GG				1						
Stephania japonica	0.1	3	OG							0.1			
Oplismenus aemulus	10	20	GG				10						
Cheilanthes sieberi	0.1	1	EG						0.1				
Galium spp.	0.1	1	FG					0.1					
Pandorea pandorana subsp. pandorana	0.1	1	OG							0.1			
Glycine clandestina	0.1	2	OG							0.1			

Easting	335547
Northing	6351220
Orientation	165
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	1
30-49	9
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	4
BAM Attributes 1x1 plot (%)	46

D1.9 3230 – Hunter Range Turpentine-Grey Myrtle Gully Forest (Plantation)

HTP-MS-57

Date	25/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-57		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Plantation	45	44	5	12	6	10	2	9	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	108.2	108.1	30.9	12.1	52.4	1.6	3.1	8	0.1	0	
Acacia irrorata subsp. irrorata	1	2	SG			1							
Acacia ulicifolia	0.4	5	SG			0.4							
Acrotriche divaricata	3	10	SG			3							
Allocasuarina torulosa	1	1	TG		1								
Asterolasia correifolia	5	20	SG			5							
Billardiera scandens	0.1	5	OG							0.1			
Calochlaena dubia	0.1	2	OG							0.1			
Cissus hypoglauca	0.1	1	OG							0.1			
Clematis aristata	0.1	2	OG							0.1			
Cryptostylis spp.	0.1	3	FG					0.1					
Dianella caerulea	0.1	5	FG					0.1					
Entolasia stricta	3	50	GG				3						
Eucalyptus agglomerata	22	30	TG		22								
Eucalyptus scias subsp. scias	0.8	1	TG		0.8								
Gompholobium latifolium	0.4	5	SG			0.4							
Gymnostachys anceps	0.4	5	FG					0.4					
Hibbertia aspera	0.1	2	SG			0.1							
Hibbertia dentata	5	100	OG							5			
Hibbertia scandens	0.4	5	OG							0.4			
Hydrocotyle sibthorpioides	0.1	20	FG					0.1					
Hypochaeris radicata	0.1	2	EX								0.1		
Imperata cylindrica	45	500	GG				45						
Leucopogon lanceolatus	0.1	2	SG			0.1							
Lindsaea microphylla	0.1	5	EG						0.1				
Lobelia purpurascens	0.4	50	FG					0.4					
Lomandra longifolia	1	20	GG				1						
Microlaena stipoides var. stipoides	0.4	10	GG				0.4						
Oplismenus imbecillis	1	20	GG				1						
Ozothamnus diosmifolius	0.4	10	SG			0.4							
Parsonsia straminea	0.1	2	OG							0.1			
Patersonia glabrata	0.1	5	FG					0.1					
Persoonia linearis	0.1	1	SG			0.1							
Platysace lanceolata	0.4	10	SG			0.4							
Polyscias sambucifolia	1	10	SG			1							
Pseuderanthemum variabile	0.1	10	FG					0.1					
Pteridium esculentum	3	50	EG						3				
Pterostylis spp.	0.1	4	FG					0.1					
Rhodamnia rubescens	0.2	1	SG			0.2							
Schelhammera undulata	0.1	5	FG					0.1					
Schizomeria ovata	0.1	1	TG		0.1								
Schoenoplectus mucronatus	2	10	GG				2						
Smilax australis	2	50	OG							2			
Stephania japonica	0.1	1	OG							0.1			
Syncarpia glomulifera subsp. glomulifera	7	15	TG		7								
Viola hederacea	0.1	5	FG					0.1					

Easting	344023
Northing	6340649
Orientation	227
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
30-49	10
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	18
BAM Attributes 1x1 plot (%)	53
Litter (%)	95
	50
	40
	35
	45

LCSM-12

Date	21/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	LCSM-12		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Plantation	35	35	5	12	4	4	1	9	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	134.1	134.1	61.7	51.5	2.7	0.4	2	15.8	0	0	
Eucalyptus saligna	0.5	4	TG		0.5								
Acacia schinoides	40	20	SG			40							
Syncarpia glomulifera	1	2	TG		1								
Eucalyptus agglomerata	60	40	TG		60								
Lasiopetalum ferrugineum	5	20	SG			5							
Lomandra longifolia	2	25	GG				2						
Hibbertia dentata	15	250	OG							15			
Cassytha glabella	0.1	5	OG							0.1			
Astrotricha latifolia	5	50	SG			5							
Pteridium esculentum	2	20	EG						2				
Comesperma spp.	0.1	1	SG			0.1							
Dianella caerulea	0.1	5	FG					0.1					
Smilax australis	0.1	30	OG							0.1			
Rubus rosifolius	0.1	5	SG			0.1							
Synoum glandulosum subsp.	0.1	10	SG			0.1							
Ozothamnus diosmifolius	0.3	5	SG			0.3							
Gahnia microstachya	0.1	1	GG				0.1						
Pimelea latifolia subsp. hirs	0.1	10	SG			0.1							
Acacia parvipinnula	0.5	2	SG			0.5							
Hibbertia aspera	0.1	1	SG			0.1							
Acrotriche divaricata	0.1	1	SG			0.1							
Platysace lanceolata	0.1	20	SG			0.1							
Stephania japonica	0.1	1	OG							0.1			
Allocasuarina torulosa	0.1	1	TG		0.1								
Hibbertia scandens	0.1	1	OG							0.1			
Entolasia stricta	0.1	20	GG				0.1						
Gonocarpus spp.	0.1	1	FG					0.1					
Lobelia purpurascens	0.1	30	FG					0.1					
Hydrocotyle sibthorpioides	0.1	1	FG					0.1					
Clerodendrum tomentosum	0.1	1	TG		0.1								
Geitonoplesium cymosum	0.1	2	OG							0.1			
Clematis glycinoides	0.1	1	OG							0.1			
Parsonsia straminea	0.1	3	OG							0.1			
Gahnia sieberiana	0.5	15	GG				0.5						
Billardiera scandens	0.1	1	OG							0.1			

Easting	343674
Northing	6340781
Orientation	0
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
Litter (%)	82
	75
	85
	90
	80
	80

LCSM-14

Date	22/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-14		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Plantation	31	30	4	10	4	3	3	6	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	124.9	114.9	20.4	88.2	4.2	0.3	0.7	1.1	10	0	
Eucalyptus agglomerata	20	5	TG		20								
Acacia spp.	40	20	SG			40							
Syncarpia glomulifera	0.2	1	TG		0.2								
Commersonia fraseri	30	50	SG			30							
Astrotricha latifolia	10	20	SG			10							
Cryptocarya rigida	5	10	SG			5							
Zieria arborescens	2	20	SG			2							
Cordyline australis	10	50	EX								10		
Malvaceae indeterminateBlue pu	0.5	5	SG			0.5							
Pimelea spp.	0.1	1	SG			0.1							
Pittosporum spinescens	0.4	4	SG			0.4							
Logania albiflora	0.1	1	SG			0.1							
Acmena smithii	0.1	1	TG		0.1								
Rhodamnia rubescens	0.1	5	SG			0.1							
Notelaea longifolia	0.1	2	TG		0.1								
Marsdenia spp.	0.1	1	OG							0.1			
Smilax australis	0.3	1	OG							0.3			
Clematis glycinoides	0.1	5	OG							0.1			
Gahnia microstachya	2	20	GG				2						
Gymnostachys anceps	0.1	1	FG					0.1					
Sarcopetalum harveyanum	0.1	1	OG							0.1			
Stephania japonica	0.4	2	OG							0.4			
Pellaea falcata	0.1	10	EG						0.1				
Fern sp.	0.5	5	EG						0.5				
Adiantum aethiopicum	0.1	10	EG						0.1				
Lepidosperma laterale	2	20	GG				2						
Pseuderanthemum variabile	0.1	10	FG					0.1					
Microlaena stipoides	0.1	1	GG				0.1						
Hydrocotyle sibthorpioides	0.1	10	FG					0.1					
Cassytha glabella	0.1	1	OG							0.1			
Gahnia aspera	0.1	1	GG				0.1						

Easting	342906
Northing	6342296
Orientation	7
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	no
Hollows	0
Length logs (m)	141
BAM Attributes 1x1 plot (%)	60
Litter (%)	

LCSM-17

Date	25/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-17		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230	Plantation	27	26	3	13	3	0	1	6	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	116.5	116	41	42.3	25.7	0	0.1	6.9	0.5	0	
Eucalyptus saligna	30	15	TG		30								
Acacia parvipinnula	30	20	SG			30							
Syncarpia glomulifera	10	5	TG		10								
Astrotricha latifolia	10	25	SG			10							
Clerodendrum tomentosum	1	2	TG		1								
Rhodomyrtus psidioides	0.1	1	SG			0.1							
Polyscias sambucifolia	0.1	1	SG			0.1							
Cryptocarya rigida	0.1	1	SG			0.1							
Pittosporum spinescens	0.2	2	SG			0.2							
Stenocarpus salignus	0.1	1	SG			0.1							
Pimelea spp.	0.1	1	SG			0.1							
Rhodamnia rubescens	1	5	SG			1							
Melicope micrococca	0.1	1	SG			0.1							
Cordyline australis	0.5	5	EX								0.5		
Denhamia silvestris	0.2	1	SG			0.2							
Acronychia spp.	0.2	1	SG			0.2							
Phebalium spp.	0.1	1	SG			0.1							
Geitonoplesium cymosum	0.5	20	OG							0.5			
Eustrephus latifolius	0.2	5	OG							0.2			
Passiflora herbertiana	1	100	OG							1			
Lepidosperma laterale	25	500	GG				25						
Smilax australis	5	50	OG							5			
Gahnia sieberiana	0.2	2	GG				0.2						
Lomandra longifolia	0.5	5	GG				0.5						
Clematis aristata	0.1	1	OG							0.1			
Stephania japonica	0.1	1	OG							0.1			
Adiantum aethiopicum	0.1	5	EG						0.1				

Easting	342494
Northing	6343128
Orientation	187
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	67
BAM Attributes 1x1 plot (%)	80.4
Litter (%)	

D1.10 3237 – Hunter Range Blue Gum Gully Forest (Mod-good)

HTP-MS-78

Date	4/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-78		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3237	Mod-good	58	58	8	18	7	7	0	18	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	97.4	97.4	46.8	26.2	7.4	5.2	0	11.8	0	0	
Acacia irrorata subsp. irrorata	5	20	SG			5							
Acacia maidenii	3	10	TG		3								
Acacia parvipinnula	0.2	2	SG			0.2							
Allocasuarina torulosa	3	8	TG		3								
Arthropodium minus	0.1	1	FG					0.1					
Astrotricha latifolia	1	10	SG			1							
Billardiera scandens	0.1	1	OG							0.1			
Brachychiton populneus	1	2	TG		1								
Breynia oblongifolia	5	50	SG			5							
Cissus antarctica	2	10	OG							2			
Cissus hypoglauca	0.8	5	OG							0.8			
Clematis glycinoides	1	30	OG							1			
Clerodendrum tomentosum	0.8	5	TG		0.8								
Croton verreauxii	2	10	SG			2							
Cymbidium suave	0.1	1	OG							0.1			
Denhamia silvestris	1	10	SG			1							
Dianella caerulea	1	40	FG					1					
Dichondra repens	0.4	50	FG					0.4					
Digitaria ramularis	1	40	GG				1						
Dodonaea triquetra	1	10	SG			1							
Echinopogon ovatus	0.4	10	GG				0.4						
Entolasia marginata	2	80	GG				2						
Eucalyptus saligna	8	4	TG		8								
Eucalyptus sparsifolia	15	10	TG		15								
Eustrephus latifolius	1	20	OG							1			
Geitonoplesium cymosum	2	20	OG							2			
Glycine clandestina	0.2	20	OG							0.2			
Grona varians	0.4	10	OG							0.4			
Gymnostachys anceps	0.1	1	FG					0.1					
Gynochthodes jasminoides	0.1	1	OG							0.1			
Hardenbergia violacea	1	20	OG							1			
Hibbertia scandens	0.1	2	OG							0.1			
Lepidosperma cf. laterale	1	40	GG				1						
Lobelia purpurascens	3	50	FG					3					
Lomandra longifolia	1	30	GG				1						
Maekawaea rhytidophylla	0.4	20	OG							0.4			
Microlaena stipoides	1	30	GG				1						
Notelaea longifolia	1	5	TG		1								
Oplismenus imbecillis	1	50	GG				1						
Pandorea pandorana	0.4	5	OG							0.4			
Parsonsia straminea	0.6	3	OG							0.6			
Passiflora herbertiana	0.4	5	OG							0.4			
Persoonia linearis	2	10	SG			2							
Phyllanthus gunnii	2	40	SG			2							
Pittosporum multiflorum	1	10	SG			1							
Pittosporum revolutum	0.4	5	SG			0.4							
Pittosporum undulatum	0.1	1	SG			0.1							
Plectranthus parviflorus	0.4	20	FG					0.4					
Podolobium ilicifolium	0.1	1	SG			0.1							
Polyscias sambucifolia	0.4	3	SG			0.4							
Pseuderanthemum variabile	0.2	30	FG					0.2					
Psychotria loniceroides	2	10	SG			2							
Rubus parvifolius	1	20	SG			1							
Smilax australis	1	20	OG							1			
Solanum stelligerum	1	20	SG			1							
Stephania japonica	0.2	5	OG							0.2			
Syncarpia glomulifera	15	5	TG		15								
Trema tomentosa var. aspera	1	5	SG			1							

Easting	331618
Northing	6368594
Orientation	20
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	1
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	2
Length logs (m)	59
BAM Attributes 1x1 plot (%)	73

HTP-MS-79

Date	4/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-79		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3237	Mod-good	54	53	6	17	5	10	3	12	0	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	99.9	99.8	34	24.8	13.4	4	0.9	22.7	0	0.1	
Acacia irrorata subsp. irrorata	5	20	SG			5							
Acacia maidenii	1	3	TG		1								
Acacia parvipinnula	1	5	SG			1							
Adiantum aethiopicum	0.1	5	EG						0.1				
Allocasuarina torulosa	5	10	TG		5								
Angophora euryphylla	8	2	TG		8								
Astrotricha latifolia	2	10	SG			2							
Breynia oblongifolia	1	10	SG			1							
Cayratia clematidea	0.4	5	OG							0.4			
Cissus antarctica	3	30	OG							3			
Cissus hypoglauca	10	50	OG							10			
Clematis glycinoides	0.4	10	OG							0.4			
Clerodendrum tomentosum	1	5	TG		1								
Croton verreauxii	2	5	SG			2							
Denhamia silvestris	0.2	5	SG			0.2							
Dianella caerulea	0.6	20	FG					0.6					
Dichondra repens	0.1	10	FG					0.1					
Digitaria ramularis	0.4	10	GG				0.4						
Doodia australis	0.4	20	EG						0.4				
Entolasia marginata	5	100	GG				5						
Eucalyptus saligna	15	3	TG		15								
Eucalyptus sparsifolia	4	2	TG		4								
Eustrephus latifolius	0.4	5	OG							0.4			
Galium leiocarpum	0.1	5	FG					0.1					
Geitonoplesium cymosum	1	20	OG							1			
Glycine clandestina	0.2	10	OG							0.2			
Grona varians	1	50	OG							1			
Hydrocotyle sibthorpioides	0.1	10	FG					0.1					
Lantana camara	0.1	1	HT									0.1	
Lomandra longifolia	1	10	GG				1						
Microlaena stipoides	2	50	GG				2						
Myrsine variabilis	1	5	SG			1							
Oplismenus imbecillis	5	100	GG				5						
Oxalis exilis	0.1	1	FG					0.1					
Ozothamnus diosmifolius	0.4	5	SG			0.4							
Pandorea pandorana	0.2	5	OG							0.2			
Parsonsia straminea	1	1	OG							1			
Passiflora herbertiana	0.1	5	OG							0.1			
Persoonia linearis	1	10	SG			1							
Phyllanthus gunnii	2	20	SG			2							
Pittosporum undulatum	1	1	SG			1							
Plectranthus parviflorus	2	80	FG					2					
Polyscias sambucifolia	0.4	10	SG			0.4							
Pseuderanthemum variabile	0.4	30	FG					0.4					
Psychotria loniceroides	2	20	SG			2							
Pteridium esculentum	0.4	10	EG						0.4				
Rubus moluccanus	1	10	SG			1							
Rubus parvifolius	1	10	SG			1							
Sigesbeckia orientalis subsp. orientalis	0.4	5	FG					0.4					
Solanum prinophyllum	0.1	2	FG					0.1					
Solanum stelligerum	0.8	10	SG			0.8							
Stephania japonica	5	50	OG							5			
Trema tomentosa var. aspera	3	10	SG			3							
Wahlenbergia gracilis	0.1	1	FG					0.1					

Easting	331691
Northing	6368428
Orientation	64
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	4
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	51
BAM Attributes 1x1 plot (%)	74

HTP-MS-80

Date	5/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-80		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3237	Mod-good	65	65	5	20	10	15	2	13	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	106.8	106.8	38	18.4	38.5	5.4	0.3	6.2	0	0	
Acacia irrorata subsp. irrorata	5	30	SG			5							
Allocasuarina torulosa	12	20	TG		12								
Arthropodium minus	0.2	20	FG					0.2					
Astrotricha latifolia	1	5	SG			1							
Austrostipa pubescens	1	50	GG				1						
Billardiera scandens	0.1	3	OG							0.1			
Brachyscome trisecta	0.1	5	FG					0.1					
Breynia oblongifolia	1	10	SG			1							
Brunoniella australis	0.2	20	FG					0.2					
Cassinia trinerva	1	2	SG			1							
Cheilanthes sieberi	0.1	5	EG						0.1				
Cissus antarctica	0.2	5	OG							0.2			
Cissus hypoglauca	0.4	5	OG							0.4			
Clematis aristata	0.8	20	OG							0.8			
Clerodendrum tomentosum	3	10	TG		3								
Coronidium elatum	0.1	3	SG			0.1							
Croton verreauxii	0.4	2	SG			0.4							
Denhamia silvestris	2	10	SG			2							
Dianella caerulea	0.4	10	FG					0.4					
Dichondra repens	1	100	FG					1					
Diospyros australis	0.4	2	SG			0.4							
Echinopogon caespitosus var. caespitosus	3	50	GG				3						
Entolasia marginata	2	50	GG				2						
Eucalyptus michaeliana	5	1	TG		5								
Eucalyptus punctata	15	4	TG		15								
Eustrephus latifolius	1	30	OG							1			
Exocarpos strictus	0.4	3	SG			0.4							
Galium leiocarpum	0.1	10	FG					0.1					
Geitonoplesium cymosum	0.2	5	OG							0.2			
Geranium homeanum	0.1	5	FG					0.1					
Glycine clandestina	1	50	OG							1			
Grona varians	0.4	40	OG							0.4			
Hibbertia scandens	0.1	2	OG							0.1			
Hydrocotyle sibthorpioides	0.6	40	FG					0.6					
Indigofera australis	0.1	1	SG			0.1							
Lepidosperma cf. laterale	0.1	1	GG				0.1						
Lobelia purpurascens	2	100	FG					2					
Lomandra longifolia	3	20	GG				3						
Markawaea rhytidophylla	0.1	1	OG							0.1			
Marsdenia flavescens	0.8	10	OG							0.8			
Mentha satureioides	0.1	10	FG					0.1					
Microlaena stipoides	1	50	GG				1						
Myrsine variabilis	0.8	2	SG			0.8							
Oplismenus aemulus	25	500	GG				25						
Oxalis perennans	0.1	5	FG					0.1					
Paspalidium distans	0.4	10	GG				0.4						
Pellaea falcata	0.2	10	EG						0.2				
Persoonia linearis	0.1	1	SG			0.1							
Phyllanthus gunnii	3	30	SG			3							
Pittosporum undulatum	1	3	SG			1							
Plectranthus parviflorus	0.1	5	FG					0.1					
Poa affinis	2	50	GG				2						
Polyscias sambucifolia	0.1	2	SG			0.1							
Pseuderanthemum variabile	0.2	20	FG					0.2					
Psychotria loniceroides	1	5	SG			1							
Rhodamnia rubescens	0.1	1	SG			0.1							
Rubus parvifolius	0.4	10	SG			0.4							
Smilax australis	0.1	1	OG							0.1			
Solanum stelligerum	0.4	10	SG			0.4							
Stephania japonica	1	20	OG							1			
Syncarpia glomulifera	3	2	TG		3								
Themeda triandra	1	30	GG				1						
Trema tomentosa var. aspera	0.1	1	SG			0.1							
Vernonia cinerea	0.1	5	FG					0.1					
Veronica plebeia	0.1	10	FG					0.1					

Easting	331183
Northing	6370690
Orientation	58
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	4
30-49	3
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	31
BAM Attributes 1x1 plot (%)	74

D1.11 3238 – Hunter Range Colluvial Apple-Gum Forest (Mod-good)

Benchmark

D1.12 3239 – Hunter Range Sheltered Grey Gum Forest (Mod-good)

HTP-MS-18

Date	26/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS18		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Mod-good	49	49	6	16	8	7	1	11	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	96.9	96.9	36.4	26.1	23.9	3	0.1	7.4	0	0	
Acacia schinoides	3	8	SG			3							
Acrotriche latifolia	3	40	SG			3							
Allocasuarina torulosa	2	6	TG		2								
Angophora costata	5	4	TG		5								
Austrostipa pubescens	0.8	5	GG				0.8						
Billardiera scandens	0.2	5	OG							0.2			
Brachyscome spp.	0.4	10	FG					0.4					
Breynia oblongifolia	0.4	1	SG			0.4							
Cassinia spp.	4	40	SG			4							
Cassytha glabella	0.1	1	OG							0.1			
Cheilanthes sieberi	0.1	5	EG						0.1				
Cissus hypoglauca	0.1	2	OG							0.1			
Claoxylon australe	1	3	SG			1							
Clematis glycinoides	0.1	1	OG							0.1			
Denhamia silvestris	0.8	4	SG			0.8							
Dianella caerulea	1	20	FG					1					
Echinopogon caespitosus	0.8	20	GG				0.8						
Entolasia marginata	3	50	GG				3						
Entolasia stricta	15	200	GG				15						
Eucalyptus agglomerata	8	6	TG		8								
Eucalyptus punctata	3	5	TG		3								
Exocarpos strictus	0.1	1	SG			0.1							
Gahnia melanocarpa	3	20	GG				3						
Galium spp.	0.1	5	FG					0.1					
Geitonoplesium cymosum	0.1	1	OG							0.1			
Goodenia heterophylla	0.8	15	FG					0.8					
Grona varians	0.1	3	OG							0.1			
Hardenbergia violacea	0.1	2	OG							0.1			
Hibbertia aspera	2	30	SG			2							
Hibbertia dentata	0.8	10	OG							0.8			
Hydrocotyle sibthorpioides	0.1	5	FG					0.1					
Lepidosperma cf. laterale	0.8	10	GG				0.8						
Leucopogon juniperinus	0.2	1	SG			0.2							
Lomandra confertifolia subsp. rubiginosa	0.4	5	GG				0.4						
Notelaea longifolia	0.4	2	TG		0.4								
Oplismenus imbecillis	0.1	5	GG				0.1						
Ozothamnus diosmifolius	0.2	3	SG			0.2							
Parsonsia straminea	0.4	5	OG							0.4			
Persoonia linearis	5	20	SG			5							
Pittosporum multiflorum	0.8	5	SG			0.8							
Pittosporum undulatum	0.6	4	SG			0.6							
Platysace lanceolata	3	40	SG			3							
Podolobium ilicifolium	1	10	SG			1							
Pseuderanthemum variabile	0.2	5	FG					0.2					
Psychotria loniceroides	1	6	SG			1							
Sarcopetalum harveyanum	0.4	5	OG							0.4			
Smilax australis	5	80	OG							5			
Solanum prinophyllum	0.4	5	FG					0.4					
Syncarpia glomulifera	18	25	TG		18								

Easting	336632
Northing	6348221
Orientation	38
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	4
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	70
BAM Attributes 1x1 plot (%)	81
Litter (%)	45
	95
	80
	100
	85

HTP-MS-19

Date	5/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-19		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Mod-good	44	44	5	15	12	7	0	5	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	88.3	109.3	51	38.2	14.2	3.3	0	2.6	0	0	
Oplismenus imbecillis	0.2	5	GG				0.2						
Prostanthera incana	1	8	SG			1							
Imperata cylindrica	0.4	10	GG				0.4						
Smilax australis	0.1	1	OG							0.1			
Polyscias sambucifolia	0.1	1	SG			0.1							
Dichelachne micrantha	0.4	5	GG				0.4						
Leucopogon juniperinus	0.1	1	SG			0.1							
Pittosporum undulatum	0.1	1	SG			0.1							
Euchiton involucratus	0.1	4	FG					0.1					
Gonocarpus teucrioides	0.2	5	FG					0.2					
Geitonoplesium cymosum	0.4	5	OG							0.4			
Dichelachne crinita	0.6	15	GG				0.6						
Poa affinis	0.8	20	GG				0.8						
Lepidosperma laterale	0.2	5	GG				0.2						
Lomandra confertifolia subsp. rubiginosa	0.4	5	GG				0.4						
Entolasia marginata	5	100	GG				5						
Cassinia cunninghamii	0.1	1	SG			0.1							
Acrotriche divaricata	0.4	5	SG			0.4							
Persoonia linearis	0.1	1	SG			0.1							
Lomandra filiformis	0.4	20	GG				0.4						
Ozothamnus diosmifolius	1	10	SG			1							
Dianella caerulea	1	20	FG					1					
Plectranthus parviflorus	0.6	15	FG					0.6					
Billardiera scandens	0.1	3	OG							0.1			
Goodenia heterophylla	0.4	10	FG					0.4					
Galium leiocarpum	0.2	10	FG					0.2					
Pittosporum revolutum	0.2	2	SG			0.2							
Lomandra longifolia	0.8	6	GG				0.8						
Exocarpos strictus	0.1	1	SG			0.1							
Entolasia stricta	4	50	GG				4						
Austrostipa pubescens	1	10	GG				1						
Astrotricha latifolia	1	8	SG			1							
Brachyscome multifida	0.8	20	FG					0.8					
Hardenbergia violacea	1	20	OG							1			
Kennedia rubicunda	1	10	OG							1			
Platysace lanceolata	8	100	SG			8							
Daviesia genistifolia	2	10	SG			2							
Podolobium ilicifolium	20	100	SG			20							
Acacia schinoides	4	15	SG			4							
Allocasuarina torulosa	3	4	TG		3								
Angophora costata	3	5	TG		3								
Syncarpia glomulifera subsp. glomulifera	6	5	TG		8								
Eucalyptus agglomerata	10	4	TG		25								
Eucalyptus punctata	8	3	TG		12								

Easting	335733
Northing	6349364
Orientation	347
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	12
BAM Attributes 1x1 plot (%)	78
Leaf Litter (%)	

HTP-MS-25

Date	10/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-25		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Mod-good	40	40	8	14	9	4	1	4	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	96.5	96.5	41	34.2	11.4	4	0.2	5.7	0	0	
Eucalyptus crebra	12	3	TG		12								
Eucalyptus punctata	8	2	TG		8								
Angophora euryphylla	5	3	TG		5								
Syncarpia glomulifera	4	1	TG		4								
Allocasuarina torulosa	4	8	TG		4								
Eucalyptus acmenoides	1	1	TG		1								
Corymbia maculata	2	3	TG		2								
Acacia parvipinnula	8	15	SG			8							
Astrotricha latifolia	5	30	SG			5							
Dodonaea triquetra	1	20	SG			1							
Podolobium ilicifolium	10	80	SG			10							
Cassinia cunninghamii	5	50	SG			5							
Plectranthus parviflorus	3	50	FG					3					
Lomandra confertifolia subsp. rubiginosa	2	40	GG				2						
Phyllanthus hirtellus	0.8	30	SG			0.8							
Entolasia stricta	5	100	GG				5						
Ozothamnus diosmifolius	1	20	SG			1							
Denhamia silvestris	0.8	10	SG			0.8							
Hibbertia empetrifolia subsp. empetrifolia	0.6	10	SG			0.6							
Schoenus melanostachys	0.2	3	GG				0.2						
Dianella caerulea	0.8	10	FG					0.8					
Lepidosperma laterale	0.8	20	GG				0.8						
Pittosporum multiflorum	1	10	SG			1							
Lomandra longifolia	1	10	GG				1						
Eucalyptus sparsifolia	5	2	TG		5								
Goodenia ovata	0.4	5	SG			0.4							
Hardenbergia violacea	5	40	OG							5			
Echinopogon caespitosus var. caespitosus	2	50	GG				2						
Xanthorrhoea resinosa	0.4	2	OG							0.4			
Austrostipa pubescens	0.2	5	GG				0.2						
Persoonia linearis	0.4	3	SG			0.4							
Correa reflexa	0.1	2	SG			0.1							
Pandorea pandorana	0.1	1	OG							0.1			
Pyrrosia rupestris	0.2	5	EG						0.2				
Panicum simile	0.2	10	GG				0.2						
Kennedia rubicunda	0.2	5	OG							0.2			
Brachyscome multifida	0.1	4	FG					0.1					
Dianella revoluta	0.1	1	FG					0.1					
Rytidosperma pilosum	0.1	1	GG				0.1						
Platysace lanceolata	0.1	1	SG			0.1							

Easting	334603
Northing	6353872
Orientation	184
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	5
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Hollows	1
Length logs (m)	13
BAM Attributes 1x1 plot (%)	79
Leaf Litter (%)	

LCSM-26

Date	27/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-26		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Mod-good	34	34	6	11	3	4	1	9	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	110.8	110.8	60.3	6.9	40.3	0.4	1	1.9	0	0	
Angophora costata	20	15	TG		20								
Eucalyptus punctata	10	10	TG		10								
Syncarpia glomulifera	10	1	TG		10								
Eucalyptus agglomerata	20	3	TG		20								
Persoonia linearis	0.5	7	SG			0.5							
Astrotricha latifolia	0.5	15	SG			0.5							
Cassinia spp.	0.5	20	SG			0.5							
Acacia schinoides	1.3	20	SG			1.3							
Podolobium ilicifolium	3	100	SG			3							
Ozothamnus diosmifolius	0.2	5	SG			0.2							
Platysace lanceolata	0.5	30	SG			0.5							
Pittosporum revolutum	0.1	1	SG			0.1							
Allocasuarina torulosa	0.2	5	TG		0.2								
Psychotria loniceroides	0.1	1	SG			0.1							
Polyscias sambucifolia	0.1	1	SG			0.1							
Clerodendrum tomentosum	0.1	1	TG		0.1								
Breynia oblongifolia	0.1	3	SG			0.1							
Billardiera scandens	0.1	20	OG							0.1			
Hardenbergia violacea	1	100	OG							1			
Entolasia stricta	40	1000	GG				40						
Pteridium esculentum	1	30	EG						1				
Lomandra longifolia	0.2	10	GG				0.2						
Eustrephus latifolius	0.2	30	OG							0.2			
Smilax australis	0.1	5	OG							0.1			
Dianella caerulea	0.1	20	FG					0.1					
Lomandra cylindrica	0.1	10	GG				0.1						
Goodenia heterophylla	0.1	1	FG					0.1					
Pandorea pandorana	0.1	1	OG							0.1			
Kennedia rubicunda	0.1	1	OG							0.1			
Hibbertia scandens	0.1	5	OG							0.1			
Pomax umbellata	0.1	5	FG					0.1					
Dianella longifolia	0.1	1	FG					0.1					
Geitonoplesium cymosum	0.1	20	OG							0.1			
Passiflora herbertiana	0.1	1	OG							0.1			

Easting	335939
Northing	6349101
Orientation	240
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	16
BAM Attributes 1x1 plot (%)	93
Litter (%)	

TS-17

Date	19/04/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TS-17		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Mod-good	27	27	6	4	6	5	1	5	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	118.5	118.5	32.5	4.7	42.4	2.1	0.1	36.7	0	0	
Eucalyptus agglomerata	10	15	TG		10								
Syncarpia glomulifera	15	20	TG		15								
Angophora costata	1	1	TG		1								
Eucalyptus punctata	5	30	TG		5								
Allocasuarina torulosa	1	5	TG		1								
Persoonia linearis	1	1	SG			1							
Pomax umbellata	0.2	10	FG					0.2					
Veronica spp.	0.5	20	FG					0.5					
Clematis glycinoides	0.1	1	OG							0.1			
Cynodon dactylon	2	20	GG				2						
Entolasia stricta	40	100	GG				40						
Calotis cuneifolia	0.2	20	FG					0.2					
Lomandra confertifolia	0.1	2	GG				0.1						
Rytidosperma pilosum	0.1	20	GG				0.1						
Gahnia aspera	0.1	1	GG				0.1						
Podolobium ilicifolium	3	20	SG			3							
Dianella caerulea	1	20	FG					1					
Leucopogon juniperinus	0.5	2	SG			0.5							
Lomandra multiflora subsp. multiflora	0.1	1	GG				0.1						
Smilax australis	1	20	OG							1			
Calochlaena dubia	35	50	OG							35			
Hardenbergia violacea	0.1	1	OG							0.1			
Doryphora sassafras	0.5	1	TG		0.5								
Glycine latifolia	0.5	20	OG							0.5			
Pseuderanthemum variabile	0.2	10	FG					0.2					
Calotis dentex	0.2	10	SG			0.2							
Adiantum aethiopicum	0.1	2	EG						0.1				

Easting	335997
Northing	6349426
Orientation	321
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	3
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	18
BAM Attributes 1x1 plot (%)	61
Litter (%)	

TS-18

Date	19/04/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TS-18		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Mod-good	21	21	4	9	3	4	0	1	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	197.1	197.1	63.7	83.4	40.6	9.2	0	0.2	0	0	
Eucalyptus agglomerata	60	30	TG		60								
Angophora costata	3	10	TG		3								
Pimelea latifolia subsp. latifolia	20	30	SG			20							
Polyscias sambucifolia	2	10	SG			2							
Daviesia ulicifolia	40	50	SG			40							
Podolobium ilicifolium	20	30	SG			20							
Allocasuarina torulosa	0.2	1	TG		0.2								
Grona varians	5	100	FG					5					
Gahnia aspera	0.1	1	GG				0.1						
Acacia parvipinnula	0.2	5	SG			0.2							
Acacia implexa	0.5	10	TG		0.5								
Gonocarpus tetragynus	4	50	FG					4					
Persoonia linearis	0.5	10	SG			0.5							
Dianella caerulea	0.5	10	GG				0.5						
Hardenbergia violacea	0.2	20	OG							0.2			
Entolasia stricta	40	100	GG				40						
Calotis dentex	0.1	1	FG					0.1					
Acacia elongata	0.1	1	SG			0.1							
Ozothamnus diosmifolius	0.1	1	SG			0.1							
Gonocarpus teucrioides	0.1	10	FG					0.1					
Pultenaea microphylla	0.5	2	SG			0.5							

Easting	335660
Northing	6350122
Orientation	188
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	9
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	23
BAM Attributes 1x1 plot (%)	44
Litter (%)	

D1.13 3239 – Hunter Range Sheltered Grey Gum Forest (Plantation)

HTP-MS-76

Date	4/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-76		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Plantation	58	53	5	15	11	18	0	4	4	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	138.2	131.4	51.8	43.6	15.5	18.2	0	2.3	6	0.8	
Acacia parvipinnula	25	50	SG			25							
Allocasuarina torulosa	0.4	3	TG		0.4								
Angophora costata	20	50	TG		20								
Arthropodium minus	0.4	20	FG					0.4					
Brachyscome multifida	2	100	FG					2					
Breynia oblongifolia	1	40	SG			1							
Bursaria spinosa	1	5	SG			1							
Cassinia decipiens	0.1	1	SG			0.1							
Clematis glycinoides	0.1	2	OG							0.1			
Conyza bonariensis	3	50	EX								3		
Coronidium elatum subsp. elatum	0.1	5	SG			0.1							
Cymbopogon refractus	2	100	GG				2						
Denhamia silvestris	0.2	5	SG			0.2							
Dianella caerulea	1	50	FG					1					
Dianella revoluta	2	80	FG					2					
Digitaria sanguinalis	0.4	10	EX								0.4		
Eragrostis leptostachya	1	30	GG				1						
Eucalyptus agglomerata	30	40	TG		30								
Eucalyptus punctata	1	10	TG		1								
Euchiton involucratus	3	100	FG					3					
Exocarpos strictus	1	10	SG			1							
Gamochaeta coarctata	0.6	50	EX								0.6		
Geitonoplesium cymosum	1	30	OG							1			
Gonocarpus teucrioides	1	80	FG					1					
Goodenia heterophylla	2	100	FG					2					
Goodenia ovata	4	80	SG			4							
Grona varians	0.4	30	OG							0.4			
Hardenbergia violacea	0.8	20	OG							0.8			
Hibbertia aspera	1	40	SG			1							
Hypericum gramineum	0.4	50	FG					0.4					
Hypochaeris radicata	2	100	EX								2		
Juncus usitatus	0.1	5	GG				0.1						
Lagenifera stipitata	0.4	50	FG					0.4					
Lepidosperma cf. laterale	1	50	GG				1						
Lobelia purpurascens	1	100	FG					1					
Lomandra longifolia	0.8	20	GG				0.8						
Microlaena stipoides	5	200	GG				5						
Oplismenus aemulus	2	100	GG				2						
Ozothamnus diosmifolius	0.2	2	SG			0.2							
Panicum simile	1	40	GG				1						
Pittosporum revolutum	3	20	SG			3							
Platysace lanceolata	1	50	SG			1							
Poa affinis	0.8	20	GG				0.8						
Poa labillardierei var. labillardierei	0.8	20	GG				0.8						
Podolobium ilicifolium	1	10	SG			1							
Polyscias sambucifolia	4	80	SG			4							
Pomax umbellata	1	50	FG					1					
Senecio madagascariensis	0.8	50	HT									0.8	
Sigesbeckia orientalis subsp. orientalis	1	100	FG					1					
Solanum prinophyllum	0.4	10	FG					0.4					
Solanum stelligerum	1	40	SG			1							
Stackhousia viminea	0.6	50	FG					0.6					
Syncarpia glomulifera	0.4	2	TG		0.4								
Themeda triandra	1	50	GG				1						
Vernonia cinerea	0.4	20	FG					0.4					
Veronica plebeia	0.8	80	FG					0.8					
Viola betonicifolia	0.4	30	FG					0.4					
Wahlenbergia gracilis	0.4	30	FG					0.4					

Easting	331490
Northing	6369984
Orientation	269
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	7
BAM Attributes 1x1 plot (%)	11.4

HTP-MS-77

Date	4/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-77		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3239	Plantation	44	38	5	9	9	12	0	3	5	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	120.7	88.5	28	33.5	11.6	10.2	0	5.2	31.8	0.4	
Acacia parvipinnula	20	100	SG			20							
Allocasuarina torulosa	1	5	TG		1								
Angophora costata	5	20	TG		5								
Brachyscome multifida	2	80	FG					2					
Bursaria spinosa	2	15	SG			2							
Centaurium tenuiflorum	5	200	EX								5		
Cirsium vulgare	1	20	EX								1		
Conyza bonariensis	5	200	EX								5		
Cynodon dactylon	1	30	GG				1						
Daviesia ulicifolia	1	10	SG			1							
Dichelachne micrantha	0.4	10	GG				0.4						
Eucalyptus agglomerata	15	20	TG		15								
Eucalyptus punctata	2	5	TG		2								
Eucalyptus racemosa	5	10	TG		5								
Euchiton involucratus	0.4	20	FG					0.4					
Exocarpos strictus	0.1	1	SG			0.1							
Gamochaeta purpurea	0.8	50	EX								0.8		
Geitonoplesium cymosum	0.1	1	OG							0.1			
Goodenia heterophylla subsp. heterophylla	1	80	FG					1					
Hardenbergia violacea	5	100	OG							5			
Hypochaeris radicata	20	1000	EX								20		
Juncus continuus	0.4	5	GG				0.4						
Lepidosperma cf. laterale	0.4	5	GG				0.4						
Lobelia purpurascens	0.8	50	FG					0.8					
Microlaena stipoides	5	100	GG				5						
Oplismenus imbecillis	1	30	GG				1						
Oxalis perennans	0.1	5	FG					0.1					
Ozothamnus diosmifolius	3	20	SG			3							
Phyllanthus hirtellus	0.4	10	SG			0.4							
Platysace lanceolata	1	30	SG			1							
Poa labillardierei var. labillardierei	0.4	10	GG				0.4						
Podolobium ilicifolium	5	40	SG			5							
Polyscias sambucifolia	1	10	SG			1							
Pomax umbellata	1	40	FG					1					
Poranthera microphylla	0.1	5	FG					0.1					
Scleria mackaviensis	1	50	GG				1						
Senecio madagascariensis	0.4	20	HT									0.4	
Sigesbeckia orientalis subsp. orientalis	4	100	FG					4					
Stackhousia viminea	0.4	40	FG					0.4					
Stephania japonica	0.1	2	OG							0.1			
Themeda triandra	2	50	GG				2						
Veronica plebeia	0.2	10	FG					0.2					
Viola betonicifolia	0.1	5	FG					0.1					
Wahlenbergia communis	0.1	10	FG					0.1					

Easting	331361
Northing	6370053
Orientation	156
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	2
BAM Attributes 1x1 plot (%)	21

D1.14 3241 – Lower North White Mahogany-Spotted Gum Moist Forest (Mod-good)

DL-67

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-67		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3241	Mod-good	45	41	8	5	10	4	4	10	2	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	152.6	149	95.4	23	17.6	3.5	3.4	6.1	0.2	3.4	
Acacia linifolia	0.1	1	SG			0.1							
Acmena smithii	50	30	TG		50								
Adiantum aethiopicum	3	100	EG						3				
Adiantum hispidulum	0.2	5	EG						0.2				
Aphanopetalum resinosum	0.6	5	OG							0.6			
Arrow vine	0.1	3	OG							0.1			
Austrostipa verticillata	2	10	GG				2						
Bidens subalternans	0.1	1	EX								0.1		
Brachychiton populneus	1	1	TG		1								
Bursaria spinosa	2	10	SG			2							
Cayratia clematidea	0.5	20	OG							0.5			
Cayratia clematidea	1	10	OG							1			
Cheilanthes austrotenuifolia	0.1	2	EG						0.1				
Cissus hypoglauca	0.1	2	OG							0.1			
Clematicissus opaca	0.1	3	OG							0.1			
Clerodendrum tomentosum	2	5	TG		2								
Conyza spp.	0.1	1	EX								0.1		
Cryptocarya glaucescens	2	5	TG		2								
Cyperus gracilis	2	20	GG				2						
Cyperus spp.	0.4	10	GG				0.4						
Dichondra repens	0.3	1000	FG					0.3					
Digitaria parviflora	1	10	GG				1						
Entolasia marginata	0.5	10	GG				0.5						
Eucalyptus acmenoides	15	8	TG		15								
Eucalyptus punctata	10	4	TG		10								
Eustrephus latifolius	0.6	20	OG							0.6			
Geitonoplesium cymosum	2	50	OG							2			
Glochidion ferdinandi	15	6	TG		15								
Imperata cylindrica	0.2	3	GG				0.2						
Lantana camara	3	5	HT									3	
Lepidosperma gunnii	0.1	3	GG				0.1						
Lobelia purpurascens	2	200	FG					2					
Lomandra longifolia	1	15	GG				1						
Notelaea longifolia	0.4	1	TG		0.4								
Oplismenus aemulus	10	500	GG				10						
Oplismenus imbecillis	0.4	40	GG				0.4						
Oxalis radicosa	0.7	200	FG					0.7					
Pellaea falcata	0.1	2	EG						0.1				
Pimelea latifolia	0.5	3	SG			0.5							
Rubus parvifolius	0.4	20	SG			0.4							
Senecio madagascariensis	0.4	10	HT									0.4	
Sigesbeckia australiensis	0.5	20	FG					0.5					
Stephania japonica	1	50	OG							1			
Trema tomentosa var. aspera	20	50	SG			20							
Tylophora barbata	0.1	3	OG							0.1			

Easting	329920
Northing	6374057
Orientation	233
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	4
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	0
Length logs (m)	62
BAM Attributes 1x1 plot (%)	58

HTP-MS-20

Date	5/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-20		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3241	Mod-good	57	57	7	17	13	12	0	8	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	110	127.4	54	40.4	18.5	9.9	0	4.6	0	0	
Eucalyptus deanei	2	1	TG		4								
Eucalyptus acmenoides	15	20	TG		20								
Solanum stelligerum	0.2	5	SG			0.2							
Alphitonia excelsa	0.4	3	TG		0.4								
Galium leiocarpum	0.1	5	FG					0.1					
Clematis glycinoides	0.1	1	OG							0.1			
Gahnia melanocarpa	0.1	1	GG				0.1						
Persoonia linearis	0.1	1	SG			0.1							
Dichelachne micrantha	0.4	5	GG				0.4						
Imperata cylindrica	0.6	10	GG				0.6						
Diospyros australis	1	5	SG			1							
Glycine microphylla	0.1	3	OG							0.1			
Myrsine variabilis	0.1	2	SG			0.1							
Acacia implexa	1	5	SG			2							
Entolasia stricta	1	30	GG				1						
Leucopogon juniperinus	0.2	2	SG			0.2							
Goodenia heterophylla	0.4	5	FG					0.4					
Geitonoplesium cymosum	0.8	5	OG							0.8			
Pomax umbellata	0.2	5	FG					0.2					
Astrotricha latifolia	20	100	SG			20							
Echinopogon caespitosus	0.4	5	GG				0.4						
Hibbertia scandens	0.4	5	OG							0.4			
Panicum simile	1	40	GG				1						
Ozothamnus diosmifolius	0.8	10	SG			0.8							
Brachyscome multifida	0.1	5	FG					0.1					
Oxytes brachypoda	0.4	10	FG					0.4					
Solanum pungetium	0.1	1	FG					0.1					
Pomaderris ferruginea	0.1	3	SG			0.1							
Microlaena stipoides var. stipoides	2	100	GG				2						
Digitaria parviflora	1	80	GG				1						
Dianella tasmanica	0.1	5	FG					0.1					
Indigofera australis	0.8	10	SG			0.8							
Lepidosperma laterale	1	30	GG				1						
Lepidosperma laterale	1	30	GG				1						
Oplismenus imbecillis	2	40	GG				2						
Entolasia marginata	5	100	GG				5						
Smilax australis	1	20	OG							1			
Arthropodium milleflorum	0.1	5	FG					0.1					
Billardiera scandens	0.4	20	OG							0.4			
Dichondra repens	0.8	50	FG					0.8					
Acacia longissima	0.4	5	SG			0.4							
Hardenbergia violacea	1	10	OG							1			
Geitonoplesium cymosum	0.8	5	OG							0.8			
Acacia irrorata subsp. irrorata	5	100	SG			5							
Austrostipa pubescens	3	70	GG				3						
Dianella caerulea	4	50	FG					4					
Lomandra longifolia	1	20	GG				1						
Dianella revoluta	0.6	10	FG					0.6					
Pittosporum revolutum	0.1	1	SG			0.1							
Acacia schinoides	0.8	5	SG			1							
Clerodendrum tomentosum	0.6	3	TG		0.6								
Breynia oblongifolia	0.4	5	SG			0.4							
Stenocarpus salignus	0.2	2	SG			0.2							
Ehretia acuminata var. acuminata	0.8	5	TG		1								
Plectranthus parviflorus	3	50	FG					3					
Pittosporum multiflorum	8	70	SG			8							
Allocasuarina torulosa	1	3	TG		3								
Angophora floribunda	18	30	TG		25								

Easting	335063
Northing	6350774
Orientation	163
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	6
20-29	Y
10-19	Y
5-9	Y
<5	Y
Hollows	0
Length logs (m)	17

BAM Attributes 1x1 plot (%)	81
Leaf Litter (%)	

HTP-MS-81

Date	5/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-81		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3241	Mod-good	34	34	4	10	8	9	0	3	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	73.8	73.8	40	13	13.5	4.2	0	3.1	0	0	
Allocasuarina torulosa	8	10	TG		8								
Angophora costata	12	5	TG		12								
Billardiera scandens	0.1	1	OG							0.1			
Brachyscome brownii	0.1	15	FG					0.1					
Corymbia maculata	10	3	TG		10								
Cymbopogon refractus	0.8	20	GG				0.8						
Denhamia silvestris	3	50	SG			3							
Dianella caerulea	0.4	5	FG					0.4					
Dianella revoluta	1	40	FG					1					
Entolasia stricta	1	30	GG				1						
Eucalyptus racemosa	10	20	TG		10								
Gompholobium latifolium	1	10	SG			1							
Goodenia hederacea	0.4	20	FG					0.4					
Goodenia heterophylla	1	30	FG					1					
Hardenbergia violacea	1	20	OG							1			
Hibbertia aspera	0.1	2	SG			0.1							
Indigofera australis	0.8	10	SG			0.8							
Lepidosperma cf. laterale	0.4	10	GG				0.4						
Leucopogon lanceolatus	2	20	SG			2							
Lomandra confertifolia	0.4	10	GG				0.4						
Lomandra filiformis subsp. filiformis	0.8	40	GG				0.8						
Lomandra longifolia	0.1	1	GG				0.1						
Lomandra obliqua	5	100	GG				5						
Lomatia silaifolia	1	5	SG			1							
Macrozamia reducta	2	10	OG							2			
Persoonia linearis	2	10	SG			2							
Platysace ericoides	2	40	SG			2							
Podolobium ilicifolium	1	10	SG			1							
Pomax umbellata	1	20	FG					1					
Rytidosperma pallidum	5	100	GG				5						
Solanum stelligerum	0.1	2	SG			0.1							
Thysanotus tuberosus	0.1	3	FG					0.1					
Vernonia cinerea	0.1	5	FG					0.1					
Xanthosia pilosa	0.1	3	FG					0.1					

Easting	334977
Northing	6371413
Orientation	58
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	4
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	16
BAM Attributes 1x1 plot (%)	64

HTP-MS-82

Date	5/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-82		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3241	Mod-good	38	38	4	11	7	13	0	3	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	93.3	93.3	32	17.8	27.4	10.6	0	5.5	0	0	
Acacia irrorata subsp. irrorata	0.1	1	SG			0.1							
Acrotriche divaricata	1	10	SG			1							
Angophora euryphylla	1	1	TG		1								
Billardiera scandens	0.1	1	OG							0.1			
Brachyscome brownii	0.1	12	FG					0.1					
Bursaria spinosa	2	30	SG			2							
Corymbia maculata	18	5	TG		18								
Daviesia ulicifolia	0.1	1	SG			0.1							
Dianella caerulea	0.4	10	FG					0.4					
Dianella revoluta	1	30	FG					1					
Dianella tasmanica	0.1	1	FG					0.1					
Dichelachne micrantha	2	50	GG				2						
Eucalyptus punctata	3	1	TG		3								
Eucalyptus sparsifolia	10	5	TG		10								
Gompholobium latifolium	0.1	3	SG			0.1							
Goodenia hederacea	2	80	FG					2					
Goodenia heterophylla	5	200	FG					5					
Hardenbergia violacea	0.4	10	OG							0.4			
Hibbertia aspera	0.4	5	SG			0.4							
Lagenifera stipitata	0.2	20	FG					0.2					
Lobelia purpurascens	0.4	20	FG					0.4					
Lomandra filiformis subsp. filiformis	1	50	GG				1						
Lomandra multiflora subsp. multiflora	0.4	10	GG				0.4						
Macrozamia reducta	5	40	OG							5			
Microlaena stipoides var. stipoides	1	40	GG				1						
Opercularia varia	0.1	10	FG					0.1					
Ozothamnus diosmifolius	1	30	SG			1							
Persoonia linearis	1	10	SG			1							
Platysace lanceolata	2	50	SG			2							
Poa affinis	5	100	GG				5						
Podolobium ilicifolium	10	200	SG			10							
Polyscias sambucifolia	0.1	1	SG			0.1							
Pomax umbellata	0.4	10	FG					0.4					
Poranthera microphylla	0.4	30	FG					0.4					
Rytidosperma pallidum	10	100	GG				10						
Stylidium graminifolium	0.1	1	FG					0.1					
Themeda triandra	8	100	GG				8						
Xanthosia pilosa	0.4	20	FG					0.4					

Easting	335526
Northing	6368329
Orientation	25
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	7
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	12
BAM Attributes 1x1 plot (%)	65

D1.15 3242 – Lower North Ranges Turpentine Moist Forest (Mod-good)

HTP-MS-11

Date	31/08/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS11		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	50	50	6	17	8	9	2	8	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	121.7	121.7	31.6	50.9	12.3	3	3	20.9	0	0	
Acacia irrorata subsp. irrorata	0.2	2	SG			0.2							
Acacia spp.	0.1	1	SG			0.1							
Acronychia oblongifolia	1	2	SG			1							
Allocasuarina torulosa	3	5	TG		3								
Astrotricha latifolia	20	100	SG			20							
Breynia oblongifolia	0.8	5	SG			0.8							
Carex spp.	0.1	2	GG				0.1						
Cissus antarctica	0.8	6	OG							0.8			
Cissus hypoglauca	3	10	OG							3			
Claoxylon australe	0.6	2	SG			0.6							
Corymbia maculata	15	8	TG		15								
Denhamia silvestris	0.4	5	SG			0.4							
Dianella caerulea	2	20	FG					2					
Dichondra repens	0.1	20	FG					0.1					
Diospyros australis	5	10	SG			5							
Doodia aspera	1	50	EG						1				
Eucalyptus acmenoides	3	2	TG		3								
Eucalyptus agglomerata	10	4	TG		10								
Eucalyptus punctata	0.4	1	TG		0.4								
Gahnia melanocarpa	0.4	2	GG				0.4						
Geitonoplesium cymosum	0.1	5	OG							0.1			
Geranium homeanum	0.1	5	FG					0.1					
Gymnostachys anceps	0.1	2	FG					0.1					
Hibbertia scandens	0.8	10	OG							0.8			
Hydrocotyle sibthorpioides	0.2	20	FG					0.2					
Imperata cylindrica	0.1	5	GG				0.1						
Indigofera australis	2	40	SG			2							
Lepidosperma laterale	0.2	10	GG				0.2						
Lomandra confertifolia subsp. pallida	0.1	1	GG				0.1						
Lomandra longifolia	1	10	GG				1						
Melicope micrococca	1	3	SG			1							
Myrsine variabilis	1	8	SG			1							
Notelaea longifolia	0.2	5	TG		0.2								
Oplismenus imbecillis	0.4	50	GG				0.4						
Pandorea pandorana	0.2	10	OG							0.2			
Passiflora herbertiana subsp. herbertiana	15	30	OG							15			
Pellaea falcata	2	50	EG						2				
Persoonia linearis	1	1	SG			1							
Pittosporum multiflorum	0.8	15	SG			0.8							
Plectranthus parviflorus	0.1	1	FG					0.1					
Poa affinis	10	80	GG				10						
Pseuderanthemum variabile	0.2	50	FG					0.2					
Psychotria loniceroides	1	8	SG			1							
Rubus moluccanus	0.2	5	SG			0.2							
Rubus parvifolius	15	40	SG			15							
Smilax australis	0.6	5	OG							0.6			
Solanum stelligerum	0.8	10	SG			0.8							
Stellaria flaccida	0.1	3	FG					0.1					
Veronica plebeia	0.1	2	FG					0.1					
Xanthorrhoea arborea	0.4	3	OG							0.4			

Easting	337515
Northing	6347133
Orientation	70
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	3
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	38
BAM Attributes 1x1 plot (%)	72

HTP-MS-17

Date	26/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS17		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	47	47	7	14	7	6	3	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	115.2	115.2	58	37.7	2.5	1.8	3.8	11.4	0	0	
Acacia irrorata subsp. irrorata	0.2	3	SG			0.2							
Acacia schinoides	0.4	3	SG			0.4							
Acronychia oblongifolia	2	5	SG			2							
Adiantum aethiopicum	0.8	15	EG						0.8				
Astrotricha latifolia	15	100	SG			15							
Billardiera scandens	0.4	10	OG							0.4			
Brachychiton spp.	2	1	TG		2								
Breynia oblongifolia	0.4	5	SG			0.4							
Carex longebrachiata	0.8	10	GG				0.8						
Cissus antarctica	5	30	OG							5			
Cissus hypoglauca	2	15	OG							2			
Clematis glycinoides	0.1	1	OG							0.1			
Corymbia maculata	6	3	TG		6								
Cymbidium suave	0.1	3	OG							0.1			
Daphnandra apatela	3	8	TG		3								
Dianella caerulea	0.1	4	FG					0.1					
Dichondra repens	0.2	20	FG					0.2					
Diospyros australis	10	15	SG			10							
Doodia australis	1	50	EG						1				
Entolasia marginata	0.2	6	GG				0.2						
Eucalyptus acmenoides	12	3	TG		12								
Eucalyptus punctata	2	1	TG		2								
Eupomatia laurina	1	5	SG			1							
Gahnia melanocarpa	0.6	5	GG				0.6						
Geitonoplesium cymosum	0.8	20	OG							0.8			
Gymnostachys anceps	0.4	5	FG					0.4					
Hibbertia dentata	1	20	OG							1			
Hydrocotyle sibthorpioides	0.4	20	FG					0.4					
Indigofera australis	0.4	5	SG			0.4							
Lepidosperma laterale	0.2	5	GG				0.2						
Lomandra longifolia	0.4	5	GG				0.4						
Melicope micrococca	0.8	5	SG			0.8							
Myrsine variabilis	1	10	SG			1							
Notelaea longifolia	1	5	TG		1								
Olearia elliptica	0.4	5	SG			0.4							
Oplismenus imbecillis	0.1	5	GG				0.1						
Parsonsia straminea	1	10	OG							1			
Pellaea falcata	2	60	EG						2				
Pittosporum multiflorum	1	10	SG			1							
Poa affinis	0.2	5	GG				0.2						
Pseuderanthemum variabile	0.6	20	FG					0.6					
Psychotria loniceroides	5	30	SG			5							
Sarcopetalum harveyanum	0.2	3	OG							0.2			
Solanum stelligerum	0.1	1	SG			0.1							
Syncarpia glomulifera	32	60	TG		32								
Veronica plebeia	0.1	2	FG					0.1					
Xanthorrhoea arborea	0.8	5	OG							0.8			

Easting	338691
Northing	6345682
Orientation	284
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	3
30-49	2
20-29	0
10-19	yes
5-9	yes
<5	yes
Hollows	3
Length logs (m)	68
BAM Attributes 1x1 plot (%)	73
Litter (%)	90
	30
	90
	60
	95

HTP-MS-46

Date	20/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-46		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	50	50	10	14	7	8	1	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	95.5	95.5	46.7	22.6	18.2	1.3	1	5.7	0	0	
Acacia irrorata subsp. irrorata	2	10	SG			2							
Acronychia oblongifolia	0.4	3	SG			0.4							
Acrotriche divaricata	3	30	SG			3							
Allocasuarina torulosa	1	3	TG		1								
Astrotricha latifolia	0.4	3	SG			0.4							
Calochlaena dubia	1	20	OG							1			
Cissus antarctica	0.1	1	OG							0.1			
Cissus hypoglauca	0.4	5	OG							0.4			
Clematis aristata	0.1	1	OG							0.1			
Clerodendrum tomentosum	0.1	1	TG		0.1								
Corybas aconitiflorus	0.1	25	FG					0.1					
Cryptocarya glaucescens	0.1	1	TG		0.1								
Denhamia silvestris	0.1	2	SG			0.1							
Dianella caerulea	0.4	20	FG					0.4					
Dichondra repens	0.1	5	FG					0.1					
Doryphora sassafras	0.1	1	TG		0.1								
Elaeocarpus reticulatus	5	15	SG			5							
Entolasia marginata	1	20	GG				1						
Entolasia stricta	0.6	10	GG				0.6						
Eucalyptus acmenoides	8	5	TG		8								
Eucalyptus agglomerata	12	15	TG		12								
Eucalyptus deanei	8	3	TG		8								
Eucalyptus punctata	15	8	TG		15								
Gahnia sieberiana	1	10	GG				1						
Gymnostachys anceps	0.1	1	FG					0.1					
Gynochthodes jasminoides	0.4	5	OG							0.4			
Hibbertia dentata	0.4	10	OG							0.4			
Hydrocotyle sibthorpioides	0.1	5	FG					0.1					
Leucopogon juniperinus	2	20	SG			2							
Lobelia purpurascens	0.2	20	FG					0.2					
Lomandra confertifolia subsp. pallida	0.1	5	GG				0.1						
Lomandra longifolia	15	100	GG				15						
Microlaena stipoides var. stipoides	0.1	3	GG				0.1						
Myrsine variabilis	1	10	SG			1							
Oplismenus imbecillis	0.4	10	GG				0.4						
Parsonsia straminea	0.1	2	OG							0.1			
Persoonia linearis	1	5	SG			1							
Pittosporum multiflorum	0.4	10	SG			0.4							
Plectranthus parviflorus	0.1	1	FG					0.1					
Podolobium ilicifolium	0.1	1	SG			0.1							
Pseuderanthemum variabile	0.2	10	FG					0.2					
Psychotria loniceroides	4	20	SG			4							
Pteridium esculentum	1	20	EG						1				
Schizomeria ovata	0.4	2	TG		0.4								
Smilax australis	2	50	OG							2			
Smilax glyciphylla	0.8	20	OG							0.8			
Synoum glandulosum subsp. glandulosum	3	10	SG			3							
Trochocarpa laurina	2	10	TG		2								
Tylophora barbata	0.4	20	OG							0.4			
Zieria smithii	0.2	5	SG			0.2							

Easting	343159
Northing	6343587
Orientation	169
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	3
30-49	21
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	58
BAM Attributes 1x1 plot (%)	79
Litter (%)	85
	65
	70
	90
	85

HTP-MS-54

Date	24/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-54		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	58	57	5	17	6	12	4	13	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	143.6	143.5	29	58.6	34	2.4	6.2	13.3	0.1	0	
Acacia implexa	2	3	SG			2							
Acacia irrorata subsp. irrorata	8	15	SG			8							
Adiantum silvaticum	1	40	EG						1				
Ajuga australis	0.1	3	FG					0.1					
Amyema pendula	0.2	2	OG							0.2			
Astrotricha latifolia	0.4	3	SG			0.4							
Breynia oblongifolia	0.1	1	SG			0.1							
Calochlaena dubia	1	20	OG							1			
Carex longebrachiata	5	40	GG				5						
Cayratia clematidea	0.4	5	OG							0.4			
Cissus antarctica	5	20	OG							5			
Cissus hypoglauca	3	10	OG							3			
Clematis aristata	0.4	20	OG							0.4			
Commersonia fraseri	15	40	SG			15							
Cryptocarya rigida	2	5	SG			2							
Cymbidium suave	0.1	1	OG							0.1			
Dianella caerulea	0.4	10	FG					0.4					
Dichondra repens	0.4	20	FG					0.4					
Diospyros australis	1	5	SG			1							
Ehretia acuminata var. acuminata	3	10	TG		3								
Eucalyptus acmenoides	8	1	TG		8								
Eucalyptus piperita	5	1	TG		5								
Eucalyptus saligna	12	3	TG		12								
Galium leiocarpum	0.1	5	FG					0.1					
Geitonoplesium cymosum	0.8	5	OG							0.8			
Grona varians	0.1	5	OG							0.1			
Gynochthodes jasminoides	0.1	5	OG							0.1			
Hibbertia scandens	1	10	OG							1			
Homalanthus populifolius	0.4	2	SG			0.4							
Hydrocotyle sibthorpioides	0.2	10	FG					0.2					
Imperata cylindrica	2	40	GG				2						
Leucopogon juniperinus	0.4	5	SG			0.4							
Lobelia purpurascens	0.2	20	FG					0.2					
Lomandra longifolia	5	50	GG				5						
Melicope micrococca	20	40	SG			20							
Myrsine variabilis	3	10	SG			3							
Oplismenus imbecillis	5	50	GG				5						
Ottochloa gracillima	12	100	GG				12						
Oxalis exilis	0.1	5	FG					0.1					
Pellaea falcata	4	50	EG						4				
Phyllanthus gunnii	0.1	5	SG			0.1							
Physalis peruviana	0.1	1	EX								0.1		
Platycerium bifurcatum	0.2	1	EG						0.2				
Plectranthus parviflorus	0.2	10	FG					0.2					
Poa affinis	5	30	GG				5						
Pseuderanthemum variabile	0.4	20	FG					0.4					
Psychotria loniceroides	1	5	SG			1							
Pyrrosia rupestris	1	10	EG						1				
Rubus moluccanus var. trilobus	2	10	SG			2							
Rubus rosifolius	3	30	SG			3							
Sarcopetalum harveyanum	0.4	5	OG							0.4			
Schelhammera undulata	0.1	5	FG					0.1					
Sigesbeckia orientalis subsp. orientalis	0.1	5	FG					0.1					
Smilax australis	0.8	10	OG							0.8			
Solanum stelligerum	0.1	1	SG			0.1							
Toona ciliata	1	2	TG		1								
Trema tomentosa var. aspera	0.1	1	SG			0.1							
Urtica incisa	0.1	5	FG					0.1					

Easting	341154
Northing	6345089
Orientation	76
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	4
30-49	5
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	1
Length logs (m)	87
BAM Attributes 1x1 plot (%)	56
Litter (%)	40
	75
	45
	65
	55

HTP-MS-55

Date	25/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-55		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	62	62	11	14	7	9	6	15	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	157.4	157.4	57	44.9	14	3	4.3	34.2	0	0	
Acacia irrorata subsp. irrorata	1	5	SG			1							
Acacia maidenii	0.8	3	TG		0.8								
Adiantum formosum	0.1	1	EG						0.1				
Alectryon subcinereus	0.1	3	SG			0.1							
Allocasuarina torulosa	1	3	TG		1								
Angophora floribunda	5	1	TG		5								
Cayratia clematidea	0.4	10	OG							0.4			
Cissus antarctica	10	20	OG							10			
Cissus hypoglauca	15	30	OG							15			
Clematis aristata	0.6	20	OG							0.6			
Clerodendrum tomentosum	0.1	1	TG		0.1								
Cryptocarya rigida	0.8	5	SG			0.8							
Cymbidium suave	0.1	1	OG							0.1			
Cyperus laevis	0.1	5	GG				0.1						
Dianella caerulea	0.8	20	FG					0.8					
Dichondra repens	0.4	30	FG					0.4					
Diospyros australis	20	40	SG			20							
Diploglottis australis	2	2	TG		2								
Doodia australis	2	50	EG						2				
Ehretia acuminata var. acuminata	8	5	TG		8								
Entolasia marginata	0.1	5	GG				0.1						
Entolasia stricta	1	10	GG				1						
Eucalyptus acmenoides	22	5	TG		22								
Ficus rubiginosa	5	5	TG		5								
Gahnia sieberiana	1	5	GG				1						
Geitonoplesium cymosum	0.8	10	OG							0.8			
Grona varians	0.4	30	OG							0.4			
Gymnostachys anceps	0.4	5	FG					0.4					
Hibbertia scandens	2	40	OG							2			
Hydrocotyle sibthorpioides	0.2	20	FG					0.2					
Imperata cylindrica	1	20	GG				1						
Leucopogon juniperinus	1	5	SG			1							
Lobelia purpurascens	0.4	30	FG					0.4					
Lomandra confertifolia	0.8	10	GG				0.8						
Lomandra longifolia	10	80	GG				10						
Marsdenia flavescens	0.1	1	OG							0.1			
Melicope micrococca	8	20	SG			8							
Myrsine variabilis	0.4	4	SG			0.4							
Neolitsea dealbata	1	3	TG		1								
Pandorea pandorana subsp. pandorana	0.4	2	OG							0.4			
Parsonsia straminea	1	5	OG							1			
Pellaea falcata	0.6	50	EG						0.6				
Pellaea paradoxa	0.2	20	EG						0.2				
Persoonia linearis	0.4	1	SG			0.4							
Phyllanthus gunnii	0.1	10	SG			0.1							
Pittosporum multiflorum	2	20	SG			2							
Pittosporum undulatum	5	2	SG			5							
Platycerium bifurcatum	0.4	2	EG						0.4				
Plectranthus parviflorus	0.1	5	FG					0.1					
Pseuderanthemum variabile	0.4	50	FG					0.4					
Psychotria loniceroides	5	30	SG			5							
Pyrrosia rupestris	1	20	EG						1				
Rubus parvifolius	0.1	2	SG			0.1							
Sarcopetalum harveyanum	0.4	5	OG							0.4			
Schelhammera undulata	0.1	5	FG					0.1					
Smilax australis	2	20	OG							2			
Solanum prinophyllum	0.2	5	FG					0.2					
Solanum stelligerum	1	20	SG			1							
Syncarpia glomulifera subsp. glomulifera	12	3	TG		12								
Trochocarpa laurina	0.1	1	TG		0.1								
Tylophora barbata	0.2	5	OG							0.2			
Xanthorrhoea arborea	0.8	2	OG							0.8			

Easting	341847
Northing	6344611
Orientation	88
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	8
30-49	7
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	4
Length logs (m)	55
BAM Attributes 1x1 plot (%)	68
Litter (%)	50
	80
	70
	60
	80

HTP-MS-83

Date	6/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-83		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	45	43	6	13	5	9	2	8	2	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	106.1	105	31	56.8	11	3	0.2	3	1.1	0	
Acacia prominens	3	10	TG		3								
Acacia schinoides	5	20	SG			5							
Asplenium flabellifolium	0.1	5	EG						0.1				
Astrotricha latifolia	20	100	SG			20							
Backhousia myrtifolia	20	80	SG			20							
Clerodendrum tomentosum	1	10	TG		1								
Conyza bonariensis	0.1	1	EX								0.1		
Croton verreauxii	1	5	SG			1							
Dendrobium speciosum	0.1	3	FG					0.1					
Dendrobium striolatum	0.2	20	OG							0.2			
Dianella caerulea	0.1	5	FG					0.1					
Entolasia marginata	3	100	GG				3						
Eucalyptus deanei	3	1	TG		3								
Eucalyptus punctata	18	10	TG		18								
Galium leiocarpum	0.2	20	FG					0.2					
Goodenia ovata	2	50	SG			2							
Hydrocotyle sibthorpioides	0.4	20	FG					0.4					
Kennedia procurrens	0.4	2	OG							0.4			
Liparis reflexa	0.1	1	OG							0.1			
Microlaena stipoides var. stipoides	2	50	GG				2						
Notelaea longifolia	1	10	TG		1								
Oplismenus imbecillis	2	80	GG				2						
Pandorea pandorana	0.4	5	OG							0.4			
Panicum simile	3	100	GG				3						
Parsonsia straminea	0.1	1	OG							0.1			
Passiflora edulis	1	1	EX								1		
Passiflora herbertiana	0.4	10	OG							0.4			
Pittosporum revolutum	1	5	SG			1							
Plectranthus parviflorus	1	40	FG					1					
Poa affinis	1	40	GG				1						
Polyscias sambucifolia	0.1	1	SG			0.1							
Pomaderris elliptica subsp. elliptica	0.4	5	SG			0.4							
Pomaderris ligustrina	0.4	5	SG			0.4							
Prostanthera incisa	5	100	SG			5							
Pseuderanthemum variabile	0.2	20	FG					0.2					
Pyrrosia rupestris	0.1	1	EG						0.1				
Sigesbeckia orientalis subsp. orientalis	0.4	10	FG					0.4					
Smilax australis	1	10	OG							1			
Solanum prinophyllum	0.4	10	FG					0.4					
Solanum stelligerum	0.8	20	SG			0.8							
Stenocarpus salignus	0.1	1	SG			0.1							
Stephania japonica	0.4	10	OG							0.4			
Syncarpia glomulifera subsp. glomulifera	5	6	TG		5								
Synoum glandulosum subsp. glandulosum	1	5	SG			1							
Veronica plebeia	0.2	20	FG					0.2					

Easting	333800
Northing	6357116
Orientation	324
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	14
BAM Attributes 1x1 plot (%)	57

LCSM-28

Date	27/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-28		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	51	51	9	16	5	5	2	14	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	161.6	161.6	77.6	51.2	21.9	0.8	0.2	9.9	0	0	
Angophora floribunda	20	10	TG		20								
Syncarpia glomulifera	40	2000	TG		40								
Eucalyptus saligna	10	10	TG		10								
Eucalyptus eugenioides	5	10	TG		5								
Acacia irrorata subsp. irrorata	40	1000	SG			40							
Acacia maidenii	0.2	2	TG		0.2								
Clerodendrum tomentosum	2	15	TG		2								
Xanthorrhoea spp.	5	5	OG							5			
Zieria smithii	5	25	SG			5							
Breynia oblongifolia	0.3	3	SG			0.3							
Leucopogon juniperinus	0.3	5	SG			0.3							
Indigofera australis	2	25	SG			2							
Psychotria loniceroides	2	20	SG			2							
Ozothamnus diosmifolius	0.1	1	SG			0.1							
Allocasuarina torulosa	0.2	2	TG		0.2								
Pittosporum spinescens	0.1	5	SG			0.1							
Synoum glandulosum subsp. glandulosum	0.2	1	SG			0.2							
Notelaea longifolia	0.1	1	TG		0.1								
Diospyros australis	0.2	1	SG			0.2							
Phyllanthus gunnii	0.1	1	SG			0.1							
Rhodamnia rubescens	0.1	3	SG			0.1							
Myrsine variabilis	0.1	4	SG			0.1							
Acacia prominens	0.1	1	TG		0.1								
Xerochrysum bracteatum	0.2	10	FG					0.2					
Entolasia stricta	20	500	GG				20						
Oplismenus imbecillis	0.5	20	GG				0.5						
Dianella caerulea	0.2	5	FG					0.2					
Solenogyne spp.	0.1	10	FG					0.1					
Panicum simile	1	100	GG				1						
Smilax australis	0.2	2	OG							0.2			
Stephania japonica	0.2	2	OG							0.2			
Hibbertia scandens	0.5	5	OG							0.5			
Clematis aristata	0.1	1	OG							0.1			
Passiflora herbertiana	3	100	OG							3			
Rubus moluccanus	0.1	1	SG			0.1							
Rubus rosifolius	0.5	1	SG			0.5							
Geitonoplesium cymosum	0.2	10	OG							0.2			
Rubus parvifolius	0.1	10	SG			0.1							
Cissus hypoglauca	0.1	1	OG							0.1			
Gahnia spp.	0.2	2	GG				0.2						
Grona varians	0.1	10	OG							0.1			
Glycine tabacina	0.1	10	OG							0.1			
Doodia aspera	0.1	1	EG						0.1				
Hydrocotyle sibthorpioides	0.2	10	FG					0.2					
Pteridium esculentum	0.1	1	EG						0.1				
Kennedia rubicunda	0.1	1	OG							0.1			
Lepidosperma laterale	0.2	2	GG				0.2						
Cissus antarctica	0.1	1	OG							0.1			
Senecio spp.	0.1	2	FG					0.1					
Billardiera scandens	0.1	1	OG							0.1			
Hardenbergia violacea	0.1	1	OG							0.1			

Easting	335129
Northing	6350385
Orientation	356
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	8
BAM Attributes 1x1 plot (%)	38
Litter (%)	

TC-11

Date	29/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-11		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3242	Mod-good	36	36	3	9	3	11	3	7	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	90.7	90.7	24.1	41.5	10	2.1	4.2	8.8	0	0	
Acacia irrorata	5	5	SG			5							
Acacia maidenii	0.1	1	TG		0.1								
Brachyscome trisecta	0.1	5	FG					0.1					
Breynia oblongifolia	0.1	1	SG			0.1							
Cayratia clematidea	0.1	2	OG							0.1			
Cissus antarctica	0.5	5	OG							0.5			
Cissus hypoglauca	2	5	OG							2			
Claoxylon australe	1	2	SG			1							
Dianella caerulea	0.1	2	FG					0.1					
Dichondra repens	0.1	10	FG					0.1					
Erigeron spp.	0.1	3	FG					0.1					
Eucalyptus agglomerata	8	1	TG		8								
Eupomatia laurina	4	6	SG			4							
Eustrephus latifolius	0.1	1	OG							0.1			
Galium spp.	0.1	10	FG					0.1					
Gymnostachys anceps	0.2	3	FG					0.2					
Lastreopsis decomposita	2	20	EG						2				
Lomandra longifolia	2	10	GG				2						
Oplismenus imbecillis	5	30	GG				5						
Oxalis perennans	0.1	10	FG					0.1					
Ozothamnus diosmifolius	0.2	1	SG			0.2							
Passiflora herbertiana subsp. herbertiana	0.1	1	OG							0.1			
Pellaea falcata	2	20	EG						2				
Plectranthus parviflorus	0.2	10	FG					0.2					
Poa labillardierei var. labillardierei	3	15	GG				3						
Pseuderanthemum variabile	0.1	15	FG					0.1					
Psychotria loniceroides	0.2	5	SG			0.2							
Pteridium esculentum	0.2	5	EG						0.2				
Rubus moluccanus	15	5	SG			15							
Rubus rosifolius	15	5	SG			15							
Senecio linearifolius	0.5	15	FG					0.5					
Sigesbeckia orientalis subsp. orientalis	0.5	20	FG					0.5					
Smilax australis	5	15	OG							5			
Stephania japonica	1	10	OG							1			
Syncarpia glomulifera	16	10	TG		16								
Synoum glandulosum subsp. glandulosum	1	15	SG			1							

Easting	335159
Northing	6351012
Orientation	285
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	4
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	93
BAM Attributes 1x1 plot (%)	52

D1.16 3244 – Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest (Mod-good)

DL-18

Date	22/01/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	331923
Plot Name	DL_18		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6369752
PCT	3244	Mod-good	52	51	5	15	7	13	1	10	1	0		Orientation	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	154	153.9	55.1	35.7	47.6	7.2	0.5	7.8	0.1	0		BAM Attributes 20x50m plot	
Acacia implexa	0.3	5	SG			0.3								Stem classes	
Acacia irrorata	0.2	3	SG			0.2								80+	1
Acacia linearifolia	0.1	5	TG		0.1									50-79	0
Allocasuarina torulosa	20	60	TG		20									30-49	0
Arthropodium milleflorum	0.1	5	FG					0.1						20-29	Y
Billardiera scandens	0.1	5	OG							0.1				10-19	N
Brachyscome spp.	2	50	FG					2						5-9	Y
Breynia oblongifolia	5	30	SG			5								<5	Y
Cheilanthes sieberi	0.5	100	EG						0.5					Regen	Y
Conyza bonariensis	0.1	5	EX								0.1			Hollows	1
Corymbia maculata	20	10	TG		20									Length logs (m)	32
Desmodium spp.	0.2	100	OG							0.2					
Dianella caerulea	4	100	FG					4						BAM Attributes 1x1 plot (%)	90
Entolasia stricta	15	200	GG				15								
Eucalyptus punctata	10	9	TG		10										
Eucalyptus racemosa	5	2	TG		5										
Eustrephus latifolius	0.5	20	OG							0.5					
Galium propinquum	0.1	3	FG					0.1							
Geitonoplesium cymosum	0.1	3	OG							0.1					
Glycine clandestina	0.1	10	OG							0.1					
Goodenia heterophylla	0.1	5	FG					0.1							
Goodenia spp.	0.1	50	FG					0.1							
Hardenbergia violacea	0.5	10	OG							0.5					
Hypericum gramineum	0.2	100	FG					0.2							
Imperata cylindrica	2	20	GG				2								
Kennedia rubicunda	0.1	5	OG							0.1					
Lagenifera stipitata	0.1	10	FG					0.1							
Leucopogon juniperinus	1	5	SG			1									
Leucopogon lanceolatus	0.2	3	SG			0.2									
Lobelia purpurascens	0.1	100	FG					0.1							
Lomandra longifolia	10	30	GG				10								
Microlaena stipoides	0.1	5	GG				0.1								
Opposite vine	0.2	20	OG							0.2					
Ozothamnus diosmifolius	0.4	5	SG			0.4									
Persoonia linearis	0.1	2	SG			0.1									
Pimelea linifolia	1	5	SG			1									
Poa labillardierei var. labillardiere	15	30	GG				15								
Podolobium ilicifolium	3	100	SG			3									
Polyscias sambucifolia	20	100	SG			20									
Pomaderris spp.	0.5	15	SG			0.5									
Prostanthera parviflora	3	100	SG			3									
Prostanthera spp.	0.1	3	SG			0.1									
Psychotria loniceroides	0.5	5	SG			0.5									
Rydidosperma spp	0.5	5	GG				0.5								
Smilax australis	1	29	OG							1					
Smilax australis	5	100	OG							5					
Solanum spp.	0.1	3	FG					0.1							
Themeda triandra	5	20	GG				5								
Veronica spp.	0.1	20	FG					0.1							
Viola sieberiana	0.1	100	FG					0.1							
Wahlenbergia stricta	0.1	20	FG					0.1							
White flowered shrub	0.4	5	SG			0.4									

D1.17 3250 – Northern Foothills Blackbutt Grassy Forest (Mod-good)

TC-14

Date	30/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC-14		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3250	Mod-good	34	34	8	6	6	7	0	7	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	124.2	124.2	33.6	2.6	86.3	0.9	0	0.8	0	0
Eucalyptus pilularis	20	12	TG		20							
Eucalyptus punctata	1	1	TG		1							
Angophora costata	3	4	TG		3							
Eucalyptus siderophloia	4	5	TG		4							
Eucalyptus microcorys	2	2	TG		2							
Allocasuarina torulosa	3	6	TG		3							
Angophora floribunda	0.5	1	TG		0.5							
Acacia ulicifolia	1	7	SG			1						
Acacia floribunda	1	5	SG			1						
Clerodendrum tomentosum	0.1	3	TG		0.1							
Pimelea linifolia	0.2	2	SG			0.2						
Podolobium ilicifolium	0.1	1	SG			0.1						
Lagenophora gracilis	0.1	6	FG					0.1				
Polyscias sambucifolia	0.1	2	SG			0.1						
Imperata cylindrica	80	500	GG				80					
Themeda triandra	5	40	GG				5					
Poa labillardierei var. labillardierei	1	5	GG				1					
Billardiera scandens	0.1	6	OG							0.1		
Pseuderanthemum variabile	0.1	10	FG					0.1				
Glycine clandestina	0.1	5	OG							0.1		
Grona varians	0.1	3	OG							0.1		
Hardenbergia violacea	0.1	2	OG							0.1		
Rubus parvifolius	0.2	5	SG			0.2						
Oplismenus aemulus	0.1	5	GG				0.1					
Lobelia purpurascens	0.1	10	FG					0.1				
Clematis glycinoides	0.1	1	OG							0.1		
Goodenia heterophylla	0.1	2	FG					0.1				
Smilax australis	0.1	5	OG							0.1		
Panicum simile	0.1	1	GG				0.1					
Dipodium spp.	0.1	2	FG					0.1				
Dianella caerulea	0.3	5	FG					0.3				
Eragrostis brownii	0.1	3	GG				0.1					
Parsonsia straminea	0.2	2	OG							0.2		
Viola betonicifolia	0.1	6	FG					0.1				

Easting	349047
Northing	6340076
Orientation	200
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	5
30-49	17
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	12
BAM Attributes 1x1 plot (%)	62

TC-15

Date	30/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC-15		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3250	Mod-good	47	46	7	9	6	6	2	16	0	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	97.6	94.6	44.4	8.2	36.1	0.7	0.4	4.8	0	3
Eucalyptus pilularis	20	8	TG		20							
Corymbia gummifera	15	8	TG		15							
Allocasuarina torulosa	5	9	TG		5							
Syncarpia glomulifera	3	1	TG		3							
Acacia floribunda	0.2	3	SG			0.2						
Lantana camara	3	3	HT									3
Cordyline stricta	0.1	2	OG							0.1		
Alphitonia excelsa	0.2	10	TG		0.2							
Acacia ulicifolia	0.2	1	SG			0.2						
Polyscias sambucifolia	0.1	3	SG			0.1						
Pimelea linifolia	7	9	SG			7						
Breynia oblongifolia	0.1	5	SG			0.1						
Citronella moorei	1	1	TG		1							
Ozothamnus diosmifolius	0.2	2	SG			0.2						
Persoonia linearis	0.1	4	SG			0.1						
Clerodendrum tomentosum	0.2	10	TG		0.2							
Psychotria loniceroides	0.1	1	SG			0.1						
Pteridium esculentum	0.3	9	EG						0.3			
Lomandra longifolia	2	16	GG				2					
Imperata cylindrica	30	200	GG				30					
Cymbidium suave	0.1	2	OG							0.1		
Cissus hypoglauca	0.1	5	OG							0.1		
Entolasia stricta	1	20	GG				1					
Hibbertia scandens	0.1	1	OG							0.1		
Hibbertia dentata	0.2	13	OG							0.2		
Pandorea pandorana	0.1	5	OG							0.1		
Dianella caerulea	0.2	6	FG					0.2				
Gahnia aspera	1	5	GG				1					
Glycine clandestina	0.1	5	OG							0.1		
Grona varians	0.1	6	OG							0.1		
Viola betonicifolia	0.1	6	FG					0.1				
Dioscorea transversa	0.1	4	OG							0.1		
Themeda triandra	2	15	GG				2					
Billardiera scandens	0.1	10	OG							0.1		
Pseuderanthemum variabile	0.1	10	FG					0.1				
Goodenia heterophylla	0.1	3	FG					0.1				
Cheilanthes sieberi	0.1	2	EG						0.1			
Xanthorrhoea spp.	3	15	OG							3		
Eustrephus latifolius	0.1	3	OG							0.1		
Parsonsia straminea	0.2	2	OG							0.2		
Stephania japonica	0.1	4	OG							0.1		
Clematis glycinoides	0.1	3	OG							0.1		
Rubus parvifolius	0.2	5	SG			0.2						
Smilax australis	0.2	10	OG							0.2		
Oxalis perennans	0.1	8	FG					0.1				
Oplismenus aemulus	0.1	5	GG				0.1					
Lobelia purpurascens	0.1	5	FG					0.1				

Easting	348338
Northing	6339473
Orientation	182
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	14
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	47
BAM Attributes 1x1 plot (%)	46

D1.18 3263 – Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good)

HTP-MS-12

Date	31/08/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS12		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3263	Mod-good	54	54	6	15	10	12	0	11	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	85.1	85.1	45.1	16.5	15.6	4.9	0	3	0	0	
Acacia schinoides	3	10	SG			3							
Acacia parvipinnula	0.4	2	SG			0.4							
Allocasuarina torulosa	4	10	TG		4								
Austrostipa pubescens	0.2	4	GG				0.2						
Billardiera scandens	0.2	5	OG							0.2			
Brachyscome multifida	0.1	5	FG					0.1					
Breynia oblongifolia	0.2	2	SG			0.2							
Cassinia cunninghamii	3	40	SG			3							
Cissus hypoglauca	0.8	10	OG							0.8			
Corymbia maculata	15	20	TG		15								
Dianella caerulea var. producta	0.8	20	FG					0.8					
Dianella revoluta var. revoluta	0.1	5	FG					0.1					
Entolasia marginata	0.6	10	GG				0.6						
Entolasia stricta	10	80	GG				10						
Eucalyptus agglomerata	10	5	TG		10								
Eucalyptus punctata	6	3	TG		6								
Exocarpos strictus	0.4	3	SG			0.4							
Gahnia aspera	0.8	10	GG				0.8						
Geitonoplesium cymosum	0.2	5	OG							0.2			
Glycine clandestina	0.1	5	OG							0.1			
Gonocarpus teucrioides	2	80	FG					2					
Goodenia heterophylla	0.8	20	FG					0.8					
Hardenbergia violacea	0.6	3	OG							0.6			
Hibbertia dentata	0.1	1	OG							0.1			
Hibbertia scandens	0.1	1	OG							0.1			
Imperata cylindrica	0.4	10	GG				0.4						
Lagenifera stipitata	0.1	3	FG					0.1					
Lepidosperma laterale	1	10	GG				1						
Leucopogon lanceolatus	0.2	3	SG			0.2							
Lobelia purpurascens	0.1	10	FG					0.1					
Lomandra filiformis subsp. filiformis	0.6	10	GG				0.6						
Lomandra longifolia	1	20	GG				1						
Microlaena stipoides var. stipoides	0.8	20	GG				0.8						
Oxytes brachypoda	0.1	1	FG					0.1					
Ozothamnus diosmifolius	2	30	SG			2							
Pandorea pandorana	0.1	1	OG							0.1			
Panicum simile	0.2	10	GG				0.2						
Parsonsia straminea	0.6	5	OG							0.6			
Persoonia linearis	1	2	SG			1							
Phyllanthus hirtellus	1	50	SG			1							
Platysace lanceolata	1	20	SG			1							
Podolobium ilicifolium	3	20	SG			3							
Polyscias sambucifolia	0.1	1	SG			0.1							
Pomax umbellata	0.4	10	FG					0.4					
Pseuderanthemum variabile	0.1	5	FG					0.1					
Psychotria loniceroides	1	6	SG			1							
Ripogonum fawcettianum	0.1	1	OG							0.1			
Senecio diaschides	0.2	5	FG					0.2					
Smilax australis	0.1	2	OG							0.1			
Solanum prinophyllum	0.1	4	FG					0.1					
Solanum stelligerum	0.1	1	SG			0.1							
Syncarpia glomulifera subsp. glomulifera	10	15	TG		10								
Trochocarpa laurina	0.1	1	TG		0.1								
Zieria smithii	0.1	1	SG			0.1							

Easting	336158
Northing	6348814
Orientation	18
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	3
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	112
BAM Attributes 1x1 plot (%)	75

HTP-MS-16

Date	26/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS16		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3263	Mod-good	54	54	5	19	9	10	0	11	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	92.8	92.8	50	21.2	15.9	2.1	0	3.6	0	0	
Acacia irrorata subsp. irrorata	2	10	SG			2							
Acacia schinoides	1	3	SG			1							
Acacia spp. HTP-MS16-04	1	6	SG			1							
Allocasuarina torulosa	6	15	TG		6								
Astrotricha latifolia	5	15	SG			5							
Billardiera scandens	0.4	5	OG							0.4			
Breynia oblongifolia	0.4	3	SG			0.4							
Cissus hypoglauca	0.8	10	OG							0.8			
Clematis glycinoides	0.4	4	OG							0.4			
Corymbia maculata	22	25	TG		22								
Dianella caerulea	0.8	10	FG					0.8					
Diospyros australis	0.6	2	SG			0.6							
Entolasia marginata	1	30	GG				1						
Entolasia stricta	8	100	GG				8						
Eucalyptus agglomerata	12	4	TG		12								
Eucalyptus punctata	8	3	TG		8								
Gahnia melanocarpa	0.1	1	GG				0.1						
Galium leiocarpum	0.1	5	FG					0.1					
Geitonoplesium cymosum	0.1	1	OG							0.1			
Gonocarpus teucrioides	0.2	6	FG					0.2					
Goodenia heterophylla	0.1	1	FG					0.1					
Goodenia ovata	1	8	SG			1							
Grona varians	0.1	3	OG							0.1			
Hardenbergia violacea	0.1	1	OG							0.1			
Hibbertia scandens	0.1	1	OG							0.1			
Hydrocotyle sibthorpioides	0.1	1	FG					0.1					
Imperata cylindrica	0.6	10	GG				0.6						
Indigofera australis	1	10	SG			1							
Kennedia rubicunda	0.1	2	OG							0.1			
Lagenifera stipitata	0.1	1	FG					0.1					
Lepidosperma laterale	0.2	5	GG				0.2						
Leucopogon juniperinus	0.1	1	SG			0.1							
Leucopogon lanceolatus	0.2	2	SG			0.2							
Lobelia purpurascens	0.2	5	FG					0.2					
Lomandra filiformis subsp. filiformis	0.4	6	GG				0.4						
Lomandra longifolia	5	80	GG				5						
Myrsine variabilis	0.8	5	SG			0.8							
Ozothamnus diosmifolius	0.1	2	SG			0.1							
Pandorea pandorana	0.4	2	OG							0.4			
Parsonsia straminea	0.1	2	OG							0.1			
Persoonia linearis	0.8	1	SG			0.8							
Pittosporum multiflorum	0.1	2	SG			0.1							
Pittosporum undulatum	0.1	1	SG			0.1							
Platysace lanceolata	4	40	SG			4							
Plectranthus parviflorus	0.2	3	FG					0.2					
Poa affinis	0.4	5	GG				0.4						
Podolobium ilicifolium	0.4	3	SG			0.4							
Polyscias sambucifolia	0.6	5	SG			0.6							
Pomax umbellata	0.2	10	FG					0.2					
Psychotria loniceroides	2	10	SG			2							
Smilax australis	1	10	OG							1			
Solanum prinophyllum	0.1	1	FG					0.1					
Syncarpia glomulifera	2	1	TG		2								
Themeda triandra	0.2	3	GG				0.2						

Easting	339214
Northing	6345462
Orientation	139
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	3
30-49	5
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	2
Length logs (m)	23
BAM Attributes 1x1 plot (%)	86
Litter (%)	95
	65
	85
	95
	90

LCSM-21

Date	25/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-21		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3263	Mod-good	34	34	7	13	6	2	1	5	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	128.8	128.8	86.2	10.3	31.4	0.2	0.1	0.6	0	0	
Eucalyptus agglomerata	30	2	TG		30								
Angophora costata	20	6	TG		20								
Eucalyptus punctata	30	4	TG		30								
Syncarpia glomulifera subsp. glomulifera	2	1	TG		2								
Allocasuarina torulosa	4	4	TG		4								
Acacia parvipinnula	3	3	SG			3							
Leucopogon juniperinus	0.2	2	SG			0.2							
Astrotricha latifolia	5	20	SG			5							
Exocarpos strictus	0.5	5	SG			0.5							
Malvaceae indeterminate	0.3	3	SG			0.3							
Clerodendrum tomentosum	0.1	2	TG		0.1								
Podolobium ilicifolium	0.1	1	SG			0.1							
Polyscias sambucifolia	0.1	1	SG			0.1							
Podolobium ilicifolium	0.1	1	SG			0.1							
Pittosporum spinescens	0.5	5	SG			0.5							
Zieria smithii	0.1	1	SG			0.1							
Glochidion ferdinandi	0.1	1	TG		0.1								
Zieria arborescens	0.2	1	SG			0.2							
Lomandra gracilis	0.1	10	GG				0.1						
Cissus hypoglauca	0.1	2	OG							0.1			
Imperata cylindrica	0.1	50	GG				0.1						
Austrostipa spp.	30	100	GG				30						
Lomandra longifolia	1	10	GG				1						
Platysace lanceolata	0.1	1	SG			0.1							
Entolasia stricta	0.1	10	GG				0.1						
Smilax australis	0.1	2	OG							0.1			
Brachyscome spp.	0.1	1	FG					0.1					
Myrsine variabilis	0.1	1	SG			0.1							
Dianella caerulea	0.1	1	FG					0.1					
Parsonsia straminea	0.1	1	OG							0.1			
Passiflora herbertiana	0.2	5	OG							0.2			
Pteridium esculentum	0.1	1	EG						0.1				
Oplismenus spp.	0.1	1	GG				0.1						
Cissus antarctica	0.1	1	OG							0.1			

Easting	341435
Northing	6344670
Orientation	260
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	31
BAM Attributes 1x1 plot (%)	88
Litter (%)	

LCSM-24

Date	26/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-24		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3263	Mod-good	26	26	8	8	3	2	1	4	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	130.6	130.6	83.4	38.3	1.2	0.4	0.1	7.2	0	0	
Corymbia maculata	30	6	TG		30								
Angophora costata	10	5	TG		10								
Syncarpia glomulifera	10	6	TG		10								
Eucalyptus agglomerata	30	6	TG		30								
Allocasuarina torulosa	3	3	TG		3								
Acacia schinoides	20	200	SG			20							
Platysace lanceolata	10	100	SG			10							
Podolobium ilicifolium	5	50	SG			5							
Hibbertia aspera	1	20	SG			1							
Persoonia linearis	2	10	SG			2							
Exocarpos strictus	0.1	1	SG			0.1							
Denhamia silvestris	0.1	1	SG			0.1							
Acacia maidenii	0.2	4	TG		0.2								
Notelaea longifolia	0.1	1	TG		0.1								
Clerodendrum tomentosum	0.1	1	TG		0.1								
Santalum obtusifolium	0.1	1	SG			0.1							
Dianella caerulea	0.3	15	FG					0.3					
Hardenbergia violacea	5	500	OG							5			
Kennedia rubicunda	2	200	OG							2			
Lomandra longifolia	0.1	1	GG				0.1						
Smilax australis	0.1	1	OG							0.1			
Lindsaea microphylla	0.1	1	EG						0.1				
Entolasia stricta	1	1000	GG				1						
Goodenia heterophylla	0.1	3	FG					0.1					
Lomandra cylindrica	0.1	1	GG				0.1						
Clematis aristata	0.1	1	OG							0.1			

Easting	337210
Northing	
Orientation	23
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	48
BAM Attributes 1x1 plot (%)	86.6
Litter (%)	

LCSM-25

Date	27/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-25		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3263	Mod-good	49	47	5	21	5	6	1	9	2	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	231.9	231.7	91	67	70.9	0.8	0.1	1.9	0.2	0	
Eucalyptus punctata	20	5	TG		20								
Angophora costata	10	3	TG		10								
Eucalyptus agglomerata	30	5	TG		30								
Syncarpia glomulifera	30	200	TG		30								
Astrotricha latifolia	60	2000	SG			60							
Acacia schinoides	1	10	SG			1							
Breynia oblongifolia	0.1	10	SG			0.1							
Psychotria loniceroides	0.1	1	SG			0.1							
Asterolasia spp.	2	25	SG			2							
Ozothamnus diosmifolius	0.5	10	SG			0.5							
Platysace lanceolata	0.2	5	SG			0.2							
Exocarpos strictus	1	10	SG			1							
Allocasuarina torulosa	1	10	TG		1								
Cassinia spp.	0.1	1	SG			0.1							
Santalum obtusifolium	0.1	1	SG			0.1							
Prostanthera incisa	0.4	15	SG			0.4							
Zieria smithii	0.1	1	SG			0.1							
Polyscias sambucifolia	0.1	1	SG			0.1							
Podolobium ilicifolium	0.1	1	SG			0.1							
Pomaderris ligustrina	0.5	5	SG			0.5							
Persoonia linearis	0.1	1	SG			0.1							
Olearia elliptica	0.2	2	SG			0.2							
Leucopogon juniperinus	0.1	1	SG			0.1							
Lomatia myricoides	0.1	1	SG			0.1							
Pittosporum spinescens	0.1	1	SG			0.1							
Pellaea falcata	0.1	10	EG						0.1				
Billardiera scandens	1	100	OG							1			
Entolasia stricta	70	2000	GG				70						
Geitonoplesium cymosum	0.1	1	OG							0.1			
Hibbertia dentata	0.1	1	OG							0.1			
Gahnia clarkei	0.1	1	GG				0.1						
Kennedia rubicunda	0.1	1	OG							0.1			
Smilax australis	0.2	5	OG							0.2			
Cissus hypoglauca	0.1	1	OG							0.1			
Dianella caerulea	0.2	20	FG					0.2					
Gahnia sieberiana	0.5	5	GG				0.5						
Dichondra sp. Inglewood	0.1	20	FG					0.1					
Gonocarpus spp.	0.1	10	FG					0.1					
Hypochaeris radicata	0.1	10	EX								0.1		
Lagenophora stipitata	0.1	10	FG					0.1					
Clematis aristata	0.1	1	OG							0.1			
Lepidosperma laterale	0.2	2	GG				0.2						
Gamochaeta spp.	0.1	20	EX								0.1		
Veronica plebeia	0.2	20	FG					0.2					
Grona varians	0.1	10	OG							0.1			
Rubus spp.	0.1	10	SG			0.1							
Glycine tabacina	0.1	10	OG							0.1			
Pseuderanthemum variabile	0.1	1	FG					0.1					
Lomandra gracilis	0.1	1	GG				0.1						

Easting	336850
Northing	6347962
Orientation	216
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	36
BAM Attributes 1x1 plot (%)	64
Litter (%)	

D1.19 3314 – Central Hunter Slopes Grey Box Forest (Disturbed_Grassland)

HTP-MS-23

Date	9/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-23		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Disturbed Grassland	37	21	0	2	12	5	0	2	15	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	94	73.4	0	10.2	58.2	0.9	0	4.1	19.6	1	
Aristida ramosa	1	20	GG				1						
Aristida vagans	1	30	GG				1						
Asperula conferta	0.4	20	FG					0.4					
Aster subulatus	2	50	EX								2		
Austrostipa verticillata	25	200	GG				25						
Bidens pilosa	0.8	40	EX								0.8		
Bothriochloa decipiens var. decipiens	10	100	GG				10						
Carex inversa	0.4	20	GG				0.4						
Chloris gayana	1	20	HT									1	
Chloris ventricosa	0.4	5	GG				0.4						
Cirsium vulgare	2	50	EX								2		
Convolvulus angustissimus	0.1	1	OG							0.1			
Cynodon dactylon	15	200	GG				15						
Dichanthium sericeum	1	30	GG				1						
Einadia nutans	0.1	5	FG					0.1					
Eleusine indica	1	30	EX								1		
Lobelia concolor	0.2	20	FG					0.2					
Lolium perenne	5	200	EX								5		
Lomandra confertifolia	0.8	30	GG				0.8						
Lysimachia arvensis	0.8	20	EX								0.8		
Marrubium vulgare	0.1	5	EX								0.1		
Melinis repens	0.4	10	EX								0.4		
Panicum effusum	2	40	GG				2						
Plantago lanceolata	3	200	EX								3		
Rapistrum rugosum	4	100	OG							4			
Rytidosperma racemosum	1	30	GG				1						
Rytidosperma tenuius	0.6	10	GG				0.6						
Sclerolaena muricata	0.2	3	SG			0.2							
Scutellaria racemosa	0.6	30	EX								0.6		
Senecio madagascariensis	0.6	10	EX								0.6		
Senecio quadridentatus	0.1	3	FG					0.1					
Sida rhombifolia	3	100	EX								3		
Sonchus oleraceus	0.1	5	EX								0.1		
Sporobolus creber	10	100	SG			10							
Tragopogon porrifolius subsp. porrifolius	0.1	1	EX								0.1		
Tribulus terrestris	0.1	2	EX								0.1		
Vittadinia cuneata	0.1	2	FG					0.1					

Easting	307574
Northing	6402673
Orientation	119
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	3
Leaf Litter (%)	

NE-2

Date	6/12/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HVO_NE_2		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Disturbed Grassland	16	13	1	0	7	4	0	1	2	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	56.8	55.5	1	0	52.7	1.7	0	0.1	1.1	0.2	
Acacia salicina	1	10	TG		1								
Aristida spp.	30	1000	GG				30						
Calocephalus citreus	0.5	100	FG					0.5					
Senecio madagascariensis	0.2	50	HT									0.2	
Plantago lanceolata	1	200	EX								1		
Sporobolus creber	15	1000	GG				15						
Cymbopogon refractus	1	100	GG				1						
Convolvulus graminetinus	0.1	2	OG							0.1			
2_4	0.2	100	GG				0.2						
Carex spp.	0.5	50	GG				0.5						
Verbena spp.	1	50	FG					1					
Brachyscome spp.	0.1	1	FG					0.1					
Brunoniella australis	0.1	20	FG					0.1					
Conyza spp.	0.1	1	EX								0.1		
Aristida spp.	5	1000	GG				5						
Cynodon dactylon	1	200	GG				1						

Easting	305239
Northing	6405649
Orientation	285
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	2.2
Litter (%)	

TS-12

Date	8/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TS-12		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Disturbed Grassland	19	7	0	0	1	5	0	1	10	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	30.4	10.7	0	0	7	1.7	0	2	14.6	5.1	
Acetosella vulgaris	0.1	1	HT									0.1	
Austrostipa verticillata	7	30	GG				7						
Brunoniella australis	0.4	10	FG					0.4					
Cyclospermum leptophyllum	0.4	10	EX								0.4		
Einadia nutans	0.5	10	FG					0.5					
Fumaria muralis subsp. muralis	0.1	1	EX								0.1		
Galenia pubescens	5	20	HT									5	
Geranium solanderi	0.1	1	FG					0.1					
Grona varians	2	30	OG							2			
Lolium perenne	1	20	EX								1		
Lysimachia arvensis	0.4	10	EX								0.4		
Pavonia hastata	0.2	5	EX								0.2		
Plantago lanceolata	4	50	EX								4		
Senecio madagascariensis	1	20	EX								1		
Sida corrugata	0.5	10	FG					0.5					
Sida rhombifolia	3	10	EX								3		
Sonchus oleraceus	0.5	10	EX								0.5		
Verbena bonariensis	4	30	EX								4		
Veronica plebeia	0.2	5	FG					0.2					

Easting	307000
Northing	6403150
Orientation	143
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	5.8
Litter (%)	

TS-13

Date	9/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TS-13		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Disturbed Grassland	25	10	0	2	5	3	0	0	13	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	40.2	25.2	0	1.4	23.2	0.6	0	0	13.9	1.1	
Austrostipa verticillata	10	40	GG				10						
Acetosella vulgaris	0.1	1	HT									0.1	
Aristida ramosa	4	30	GG				4						
Asperula conferta	0.1	1	FG					0.1					
Bothriochloa decipiens var. decipiens	0.2	5	GG				0.2						
Brunoniella australis	0.1	5	FG					0.1					
Chloris gayana	1	5	HT									1	
Convolvulus arvensis	0.1	1	EX								0.1		
Crotalaria mitchellii	0.4	10	SG			0.4							
Dichanthium sericeum	4	30	GG				4						
Dysphania carinata	0.4	10	FG					0.4					
Hypochaeris radicata	0.2	5	EX								0.2		
Lobelia concolor	0.4	10	EX								0.4		
Lolium perenne	1	20	EX								1		
Lysimachia arvensis	0.1	1	EX								0.1		
Marrubium vulgare	0.1	1	EX								0.1		
Medicago polymorpha	0.1	5	EX								0.1		
Plantago lanceolata	8	50	EX								8		
Rapistrum rugosum	3	20	EX								3		
Sclerolaena muricata	1	10	SG			1							
Sida rhombifolia	0.2	2	EX								0.2		
Sonchus oleraceus	0.4	10	EX								0.4		
Sporobolus creber	5	50	GG				5						
Tragopogon porrifolius subsp. porrifolius	0.1	1	EX								0.1		
Tribulus terrestris	0.2	10	EX								0.2		

Easting	307367
Northing	6402788
Orientation	121
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	12
Litter (%)	

D1.20 3314 – Central Hunter Slopes Grey Box Forest (Poor)

HTP-DR-07

Date	1/06/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	HTP_DR07		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Poor	45	34	5	1	17	10	0	1	7	4	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	117.2	64.2	18	0.2	44.4	1.5	0	0.1	6.5	46.5	
Eucalyptus moluccana	10	3	TG		10								
Allocasuarina luehmannii	1	2	TG		1								
Brachychiton populneus	2	1	TG		2								
Notelaea microcarpa	2	10	TG		2								
Acacia salicina	3	10	TG		3								
Verbena bonariensis	2	20	EX								2		
Hyparrhenia hirta	30	1000	HT									30	
Chloris gayana	15	500	HT									15	
Plantago lanceolata	1	100	EX								1		
Senecio madagascarensis	0.5	50	HT									0.5	
Cirsium vulgare	2	30	EX								2		
Sida rhombifolia	1	20	EX								1		
Spergularia rubra	0.2	30	EX								0.2		
Asperula conferta	0.1	50	FG					0.1					
Dichanthium sericeum	1	100	GG				1						
Aristida ramosa	20	1000	GG				20						
Phyllanthus virgatus	0.1	5	FG					0.1					
Dichondra repens	0.2	300	FG					0.2					
Lomandra confertifolia subsp. pallida	0.4	5	GG				0.4						
Pimelea curviflora	0.2	20	SG			0.2							
Microlaena stipoides	5	500	GG				5						
Austrostipa scabra	5	300	GG				5						
Galenia pubescens	1	20	HT									1	
Sida hackettiana	0.3	10	FG					0.3					
Cymbopogon refractus	0.2	10	GG				0.2						
Bothriochloa decipiens	2	300	GG				2						
Sporobolus creber	1	100	GG				1						
Bidens pilosa	0.2	20	EX								0.2		
Chloris ventricosa	1	50	GG				1						
Diaitaria divaricatissima	0.2	20	GG				0.2						
Lomandra filiformis subsp. filiformis	0.1	20	GG				0.1						
Glycine tabacina	0.1	10	OG							0.1			
Paspalidium distans	0.1	5	GG				0.1						
Lomandra multiflora subsp. multiflora	0.2	2	GG				0.2						
Chrysocephalum apiculatum	0.1	20	FG					0.1					
Panicum queenslandicum	1	50	GG				1						
Anthrosachne scabra	2	100	GG				2						
Geranium homeanum	0.1	10	FG					0.1					
Gomphocarpus fruticosus	0.1	5	EX								0.1		
Austrostipa aristiglumis	0.2	10	GG				0.2						
Dianella revoluta	0.1	5	FG					0.1					
Mentha satureioides	0.1	20	FG					0.1					
Pseuderanthemum variabile	0.2	20	FG					0.2					
Oxytes brachypodum	0.2	10	FG					0.2					
Cynodon dactylon	5	1000	GG				5						

Easting	306962
Northing	6412724
Orientation	40
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	1
20-29	No
10-19	No
5-9	Yes
<5	Yes
Hollows	0
Length logs (m)	5
BAM Attributes 1x1 plot (%)	29

HTP-MS-88

Date	13/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-88		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3314	Poor	41	26	3	4	9	9	0	1	12	3
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	67.9	35.6	15.2	1.6	15.7	3	0	0.1	19.3	13
Eucalyptus moluccana	15	5	TG		15							
Sida rhombifolia	10	500	EX								10	
Senecio madagascariensis	5	100	HT									5
Heliotropium amplexicaule	5	100	HT									5
Galenia pubescens	3	40	HT									3
Bidens subalternans	2	50	EX								2	
Austrostipa verticillata	0.1	2	GG				0.1					
Aristida ramosa	10	100	GG				10					
Dichondra repens	1	50	FG					1				
Hybanthus vernonii	0.4	20	FG					0.4				
Calotis lappulacea	0.2	10	FG					0.2				
Eremophila debilis	0.4	10	SG			0.4						
Lomandra confertifolia	1	50	GG				1					
Microlaena stipoides var. stipoides	1	40	GG				1					
Anthosachne scabra	1	30	GG				1					
Bidens pilosa	2	100	EX								2	
Gomphocarpus fruticosus	0.4	10	EX								0.4	
Einadia nutans subsp. linifolia	0.1	5	FG					0.1				
Stackhousia viminea	0.1	5	FG					0.1				
Brunoniella australis	0.2	10	FG					0.2				
Glycine tabacina	0.1	5	OG							0.1		
Acacia salicina	0.1	1	TG		0.1							
Teucrium junceum	0.4	3	SG			0.4						
Cymbopogon refractus	0.4	5	GG				0.4					
Lomandra multiflora subsp. multiflora	0.1	1	GG				0.1					
Conyza bonariensis	1	20	EX								1	
Cynosurus echinatus	1	40	EX								1	
Sida corrugata	0.1	5	FG					0.1				
Enchylaena tomentosa	0.4	10	SG			0.4						
Myoporum montanum	0.4	2	SG			0.4						
Austrostipa scabra	2	50	GG				2					
Vittadinia cuneata	0.8	50	FG					0.8				
Opuntia stricta	0.8	5	EX								0.8	
Chrysocephalum semipapposum	0.1	5	FG					0.1				
Sisymbrium orientale	0.4	10	EX								0.4	
Verbena bonariensis	0.2	5	EX								0.2	
Notelaea microcarpa	0.1	1	TG		0.1							
Passiflora caerulea	0.1	1	EX								0.1	
Plantago lanceolata	1	50	EX								1	
Richardia humistrata	0.4	10	EX								0.4	
Juncus usitatus	0.1	1	GG				0.1					

Easting	306622
Northing	6413048
Orientation	265
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	4
BAM Attributes 1x1 plot (%)	47

TC-08

Date	19/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-08		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Poor	32	13	1	2	3	7	0	0	16	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	84.2	5.4	4	0.3	0.4	0.7	0	0	3.6	75.2	
Acacia salicina	4	27	TG		4								
Austrostipa ramosissima	0.2	5	GG				0.2						
Bidens pilosa	0.1	30	EX								0.1		
Briza minor	0.1	10	EX								0.1		
Bursaria spinosa	0.2	1	SG			0.2							
Cirsium vulgare	0.1	5	EX								0.1		
Cirsium vulgare	0.1	5	EX								0.1		
Conyza bonariensis	0.1	1	EX								0.1		
Conyza spp.	0.1	2	EX								0.1		
Cyperus gracilis	0.1	20	GG				0.1						
Daucus glochidiatus	0.1	20	FG					0.1					
Dichondra sp. Inglewood	0.1	20	FG					0.1					
Eremophila debilis	0.1	1	SG			0.1							
Galium aparine	0.1	2	EX								0.1		
Gomphocarpus physocarpus	2	100	EX								2		
Hydrocotyle laxiflora	0.1	3	FG					0.1					
Hyparrhenia hirta	75	300	HT									75	
Lomandra multiflora subsp. multiflora	0.1	10	GG				0.1						
Lysimachia arvensis	0.1	10	EX								0.1		
Opuntia stricta	0.1	1	EX								0.1		
Oxalis perennans	0.1	10	FG					0.1					
Plantago lanceolata	0.1	30	EX								0.1		
Pomax umbellata	0.1	2	FG					0.1					
Pseuderanthemum variabile	0.1	10	FG					0.1					
Romulea rosea	0.1	3	HT									0.1	
Senecio madagascariensis	0.1	20	HT									0.1	
Sida rhombifolia	0.2	20	EX								0.2		
Solanum nigrum	0.1	10	EX								0.1		
Sonchus oleraceus	0.1	15	EX								0.1		
Stachys arvensis	0.1	3	EX								0.1		
Verbena bonariensis	0.1	10	EX								0.1		
Wahlenbergia communis	0.1	3	FG					0.1					

Easting	306314
Northing	6412776
Orientation	308
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	9
BAM Attributes 1x1 plot (%)	21

D1.21 3314 – Central Hunter Slopes Grey Box Forest (Thinned)

DL-37

Date	23/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_37		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Thinned	45	35	2	10	10	9	1	3	8	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	110.7	109.7	60	23.4	23.4	2.2	0.3	0.4	0.8	0.2	
Allocasuarina luehmannii	20	100	TG		20								
Amyema pendula	0.1	2	OG							0.1			
Aristida vagans	2	100	GG				2						
Arthropodium milleflorum	0.1	4	FG					0.1					
Asperula conferta	0.1	5	FG					0.1					
Bidens subalternans	0.1	1	EX								0.1		
Breynia oblongifolia	0.1	1	SG			0.1							
Cheilanthes sieberi	0.3	10	EG						0.3				
Chloris ventricosa	1	50	GG				1						
Cirsium vulgare	0.1	2	EX								0.1		
Commelina cyanea	0.5	5	FG					0.5					
Cymbopogon refractus	10	50	GG				10						
Cyperus gracilis	0.2	50	GG				0.2						
Desmodium varians	0.2	60	OG							0.2			
Digitaria ramularis	5	100	GG				5						
Dodonaea sinuolata	1	5	SG			1							
Dodonaea viscosa	10	100	SG			10							
Einadia polygonoides	0.1	2	FG					0.1					
Entolasia stricta	1	20	GG				1						
Eragrostis leptostachya	2	3	GG				2						
Eremophila debilis	0.3	10	SG			0.3							
Eucalyptus moluccana	40	15	TG		40								
Exocarpos strictus	0.5	3	SG			0.5							
Fimbristylis dichotoma	0.2	50	GG				0.2						
Glycine clandestina	0.1	2	OG							0.1			
Gomphocarpus fruticosus	0.1	2	EX								0.1		
Lantana camara	0.1	2	HT									0.1	
Lepidium africanum	0.1	2	EX								0.1		
Leptochloa asthenes	1	50	GG				1						
Lobelia purpurascens	0.2	50	FG					0.2					
Lomandra multiflora subsp. multifl	1	5	GG				1						
Maireana microphylla	0.1	10	SG			0.1							
Melaleuca styphelioides	10	1	SG			10							
Myoporum montanum	1	5	SG			1							
Olearia elliptica	0.2	10	SG			0.2							
Opuntia aurantiaca	0.1	1	EX								0.1		
Opuntia stricta	0.1	1	EX								0.1		
Oxalis perennans	0.1	50	FG					0.1					
Phyllanthus gunnii	0.2	10	SG			0.2							
Pseuderanthemum variabile	0.8	100	FG					0.8					
Richardia stellaris	0.1	10	EX								0.1		
Senecio madagascariensis	0.1	5	HT									0.1	
Stylidium graminifolium	0.1	2	FG					0.1					
Verbena bonariensis	0.1	2	EX								0.1		
Vernonia cinerea	0.2	20	FG					0.2					

Easting	327171
Northing	6377212
Orientation	135
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	4
20-29	y
10-19	y
5-9	y
<5	y
Regen	y
Hollows	0
Length logs (m)	160
BAM Attributes 1x1 plot (%)	70
Litter (%)	

HTP-MS-03

Date	6/01/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-03		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Thinned	51	44	4	7	17	12	0	4	6	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	104.1	102.5	37.1	10.8	49.8	3.9	0	0.9	1.1	0.5	
Eucalyptus moluccana	8	3	TG		8								
Allocasuarina luehmannii	28	80	TG		28								
Cassinia quinquefaria	5	60	SG			5							
Myoporum montanum	0.5	5	SG			0.5							
Xanthorrhoea acaulis	0.5	20	OG							0.5			
Acacia falcata	2	20	SG			2							
Aristida ramosa	15	200	GG				15						
Bursaria spinosa subsp. spinosa	3	40	SG			3							
Lomandra multiflora subsp. multiflora	0.5	20	GG				0.5						
Vernonia cinerea	0.5	50	FG					0.5					
Glycine clandestina	0.2	40	OG							0.2			
Aristida vagans	20	200	GG				20						
Calotis lappulacea	0.5	20	FG					0.5					
Brunoniella australis	1	100	FG					1					
Conyza sumatrensis	0.5	40	EX								0.5		
Cymbopogon refractus	2	40	GG				2						
Microlaena stipoides var. stipoides	1	50	GG				1						
Dichondra repens	1	80	FG					1					
Oxytes brachypoda	0.1	10	FG					0.1					
Grona varians	0.1	5	FG					0.1					
Cirsium vulgare	0.2	10	EX								0.2		
Austrostipa scabra subsp. scabra	1	50	GG				1						
Panicum queenslandicum	1	50	GG				1						
Chloris truncata	5	100	GG				5						
Paranthera microphylla	0.1	10	FG					0.1					
Lomandra filiformis subsp. filiformis	0.2	20	GG				0.2						
Veronica plebeia	0.1	10	FG					0.1					
Senecio madagascariensis	0.1	10	EX								0.1		
Vittadinia cuneata var. hirsuta	0.1	10	FG					0.1					
Centaurea solstitialis	0.1	5	EX								0.1		
Notelaea microcarpa	0.1	1	TG		0.1								
Clematis glycinoides	0.1	5	OG							0.1			
Eragrostis brownii	0.5	40	GG				0.5						
Themeda triandra	0.2	10	GG				0.2						
Convolvulus erubescens	0.1	1	OG							0.1			
Opuntia stricta	0.1	1	EX								0.1		
Eremophila debilis	0.1	5	SG			0.1							
Breynia oblongifolia	0.1	1	SG			0.1							
Dianella revoluta var. revoluta	0.2	10	FG					0.2					
Hyparrhenia hirta	0.5	30	HT									0.5	
Eucalyptus tereticornis	1	1	TG		1								
Eragrostis leptostachya	0.5	40	GG				0.5						
Sporobolus creber	2	100	GG				2						
Pterostylis spp.	0.1	1	FG					0.1					
Fimbristylis dichotoma	0.1	5	GG				0.1						
Acacia decora	0.1	1	SG			0.1							
Carex inversa	0.1	5	GG				0.1						
Paronychia brasiliana	0.1	10	EX								0.1		
Dichanthium sericeum subsp. sericeum	0.2	30	GG				0.2						
Wahlenbergia gracilis	0.1	10	FG					0.1					
Chloris ventricosa	0.5	30	GG				0.5						

Easting	306223
Northing	6413821
Orientation	233
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	8
BAM Attributes 1x1 plot (%)	50

HTP-MS-05

Date	6/01/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-05		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Thinned	37	27	3	6	10	7	0	1	7	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	106.4	84.6	41.1	2.5	37	3.9	0	0.1	6.1	15.7	
Eucalyptus moluccana	5	2	TG		5								
Allocasuarina luehmannii	36	100	TG		36								
Olearia elliptica	0.1	1	SG			0.1							
Austrostipa verticillata	10	100	GG				10						
Calotis lappulacea	1	50	FG					1					
Cymbopogon refractus	10	100	GG				10						
Einadia nutans subsp. nutans	1	50	FG					1					
Dichondra repens	0.5	50	FG					0.5					
Galenia pubescens	15	100	HT									15	
Sporobolus creber	8	100	GG				8						
Chloris ventricosa	5	80	GG				5						
Cirsium vulgare	5	100	EX								5		
Brunoniella australis	1	100	FG					1					
Bothriochloa decipiens var. decipiens	1	50	GG				1						
Lomandra multiflora subsp. multiflora	0.2	20	GG				0.2						
Eremophila debilis	2	50	SG			2							
Solanum cinereum	0.1	5	SG			0.1							
Vittadinia dissecta	0.1	5	FG					0.1					
Chloris gayana	0.2	5	HT									0.2	
Notelaea microcarpa	0.1	1	TG		0.1								
Aristida ramosa	2	40	GG				2						
Carex inversa	0.1	10	GG				0.1						
Digitaria sanguinalis	0.1	5	EX								0.1		
Verbena bonariensis	0.2	10	EX								0.2		
Conyza sumatrensis	0.5	50	EX								0.5		
Fimbristylis dichotoma	0.2	20	GG				0.2						
Oxytes brachypoda	0.2	20	FG					0.2					
Myoporum montanum	0.1	1	SG			0.1							
Senecio madagascariensis	0.1	5	EX								0.1		
Verbena rigida var. rigida	0.1	10	EX								0.1		
Hyparrhenia hirta	0.5	10	HT									0.5	
Wahlenbergia gracilis	0.1	5	FG					0.1					
Opuntia stricta	0.1	1	EX								0.1		
Enchylaena tomentosa	0.1	3	SG			0.1							
Eragrostis brownii	0.5	30	GG				0.5						
Glycine clandestina	0.1	5	OG							0.1			
Maireana microphylla	0.1	1	SG			0.1							

Easting	307000
Northing	6412600
Orientation	182
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	34
BAM Attributes 1x1 plot (%)	62

NE-1

Date	6/12/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HVO_NE_1		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3314	Thinned	27	21	4	4	5	8	0	0	5	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	71.9	44.7	21.1	3.2	17.1	3.3	0	0	22.2	5	
Acacia salicina	8	30	TG		8								
Acacia salicina	8	30	TG		8								
Acacia implexa	2	10	SG			2							
Geijera salicifolia	5	5	TG		5								
Psydrax odorata	1	1	SG			1							
Pavonia hastata	20	1000	EX								20		
Teucrium junceum	0.1	2	SG			0.1							
Cirsium spp.	1	10	EX								1		
Plantago lanceolata	1	200	EX								1		
Scaevola aemula	0.1	30	GG				0.1						
Verbena spp.	0.5	50	FG					0.5					
Haloragis spp.	0.1	1	FG					0.1					
Notelaea microcarpa	0.1	1	TG		0.1								
Ajuga australis	0.2	50	FG					0.2					
Conyza spp.	0.1	1	EX								0.1		
Goodenia hederacea	1	200	FG					1					
Verbena spp.	1	5	FG					1					
Chloris gayana	5	500	HT									5	
Centaurium tenuiflorum	0.1	10	EX								0.1		
Asperula conferta	0.2	50	FG					0.2					
Phyllanthus spp.	0.1	20	SG			0.1							
Aristida calycina	10	1000	GG				10						
Lomandra multiflora subs	1	100	GG				1						
Lomandra confertifolia	1	100	GG				1						
Sida corrugata	0.2	300	FG					0.2					
Oxalis spp.	0.1	50	FG					0.1					
Austrostipa rudis subsp. r	5	500	GG				5						

Easting	305619
Northing	6405115
Orientation	272
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	15
Litter (%)	

D1.22 3315 – Central Hunter Ironbark-Spotted Gum Forest (Derived)

DL-75

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-75		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3315	Derived	21	13	0	0	11	1	1	0	7	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	123.1	104.5	0	0	99.3	0.2	5	0	13.6	5	
Bidens pilosa	1	3	EX								1		
Carex inversa	0.3	10	GG				0.3						
Cheilanthes sieberi	5	100	EG						5				
Chondrilla juncea	1	50	EX								1		
Chrysocephalum apiculatum	0.2	5	FG					0.2					
Cymbopogon refractus	70	200	GG				70						
Cynodon dactylon	10	100	GG				10						
Cynodon spp.	0.5	50	GG				0.5						
Cyperus sesquiflorus	0.3	50	EX								0.3		
Digitaria spp.	2	100	GG				2						
Eragrostis elongata	0.4	50	GG				0.4						
Eragrostis leptostachya	2	100	GG				2						
Hypochaeris glabra	10	500	EX								10		
Hypochaeris radicata	0.2	5	EX								0.2		
Lomandra cylindrica	0.1	4	GG				0.1						
Microlaena stipoides	10	500	GG				10						
Panicum effusum	1	50	GG				1						
Plantago lanceolata	0.1	4	EX								0.1		
Senecio madagascariensis	5	25	HT									5	
Sporobolus creber	3	20	GG				3						
Verbena rigida var. rigida	1	10	EX								1		

Easting	328429
Northing	6374132
Orientation	171
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	0
10-19	0
5-9	0
Regen	0
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	5

DL-76

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-76		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3315	Derived	35	20	1	2	11	4	2	0	12	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	112.4	105	0.4	0.6	99.6	1.1	3.3	0	5.8	1.6	
Sporobolus creber	50	100	GG				50						
Cymbopogon refractus	20	50	GG				20						
Aristida ramosa	15	50	GG				15						
Eragrostis leptostachya	5	30	GG				5						
Digitaria spp.	4	50	GG				4						
Cheilanthes sieberi	3	100	EG						3				
Microlaena stipoides	2	50	GG				2						
Cyperus gracilis	1	100	GG				1						
Bidens pilosa	1	50	EX								1		
Verbena rigida var. rigida	1	30	EX								1		
Lomandra multiflora subsp. multiflora	1	10	GG				1						
Eragrostis curvula	1	10	HT									1	
Panicum effusum	0.9	5	GG				0.9						
Stellaria media	0.5	1000	EX								0.5		
Oxalis perennans	0.5	100	FG					0.5					
Cyperus sesquiflorus	0.5	100	EX								0.5		
Senecio madagascariensis	0.5	50	HT									0.5	
Eragrostis brownii	0.5	20	GG				0.5						
Setaria parviflora	0.5	20	EX								0.5		
Chondrilla juncea	0.5	15	EX								0.5		
Sida rhombifolia	0.5	10	EX								0.5		
Acacia implexa	0.5	1	SG			0.5							
Hypochaeris glabra	0.4	10	EX								0.4		
Plantago lanceolata	0.4	10	EX								0.4		
Eucalyptus crebra	0.4	1	TG		0.4								
Cheilanthes distans	0.3	20	EG						0.3				
Veronica plebeia	0.3	5	FG					0.3					
Verbena officinalis	0.2	10	EX								0.2		
Chrysocephalum apiculatum	0.2	5	FG					0.2					
Bidens subalternans	0.2	5	EX								0.2		
Eragrostis elongata	0.2	5	GG				0.2						
Geranium homeanum	0.1	5	FG					0.1					
Hypochaeris radicata	0.1	2	EX								0.1		
Styphelia spp.	0.1	1	SG			0.1							
Opuntia stricta var. stricta	0.1	1	HT									0.1	

Easting	327919
Northing	6374311
Orientation	150
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	0
10-19	0
5-9	0
<5	Yes
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	0

DL-78

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-78		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3315	Derived	30	15	0	1	10	3	1	0	11	4	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	92	79.3	0	0.4	77.2	1.1	0.6	0	8	4.7	
Aristida ramosa	3	20	GG				3						
Bothriochloa macra	1	100	GG				1						
Carex inversa	0.3	60	GG				0.3						
Cenchrus clandestinus	0.4	20	EX								0.4		
Cheilanthes sieberi	0.6	50	EG						0.6				
Chondrilla juncea	0.1	5	EX								0.1		
Chrysocephalum apiculatum	0.8	20	FG					0.8					
Cymbopogon refractus	20	50	GG				20						
Cynodon dactylon	1	50	GG				1						
Cyperus gracilis	0.5	100	GG				0.5						
Cyperus sesquiflorus	0.3	10	EX								0.3		
Ehrharta erecta	0.2	5	HT									0.2	
Eragrostis curvula	1	5	HT									1	
Eragrostis elongata	0.5	10	GG				0.5						
Hypochaeris glabra	0.2	50	EX								0.2		
Juncus usitatus	0.5	6	GG				0.5						
Linum marginale	0.1	5	FG					0.1					
Opuntia stricta	0.5	6	EX								0.5		
Oxalis perennans	0.2	40	FG					0.2					
Panicum effusum	0.4	3	GG				0.4						
Paspalum dilatatum	0.5	6	HT									0.5	
Phyllanthus gunnii	0.4	20	SG			0.4							
Plantago lanceolata	4	500	EX								4		
Senecio madagascariensis	3	100	HT									3	
Setaria parviflora	0.3	20	EX								0.3		
Sida rhombifolia	0.5	10	EX								0.5		
Sporobolus creber	50	1000	GG				50						
Stellaria media	0.3	100	EX								0.3		
Verbena officinalis	0.4	10	EX								0.4		
Verbena rigida	1	50	EX								1		

Easting	326865
Northing	6375235
Orientation	264
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	no
Regen	no
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	0

D1.23 3315 – Central Hunter Ironbark-Spotted Gum Forest (Thinned)

DL-64

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-64		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3315	Thinned	64	54	6	9	19	12	1	7	9	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	196.5	193.9	28.4	4.3	126.4	30.2	0.1	4.5	2.5	0.1	
Acacia implexa	0.5	1	SG			0.5							
Acacia linearifolia	0.2	1	TG		0.2								
Acacia parramattensis	0.2	1	TG		0.2								
Amyema pendula	0.4	3	OG							0.4			
Aristida ramosa	5	10	GG				5						
Austrostipa scabra	1	5	GG				1						
Bidens pilosa	0.5	3	EX								0.5		
Bidens subalternans	0.1	5	EX								0.1		
Brachychiton populneus	2	1	TG		2								
Breynia oblongifolia	0.1	3	SG			0.1							
Brown inflorence grass with white skirt	1	5	GG				1						
Bursaria spinosa	0.2	2	SG			0.2							
Carex inversa	1	50	GG				1						
Cheilanthes sieberi	0.1	30	EG						0.1				
Chloris ventricosa	0.3	2	GG				0.3						
Chrysocephalum semipapposum	0.5	10	FG					0.5					
Conyza bonariensis	0.3	5	EX								0.3		
Corymbia maculata	3	2	TG		3								
Cymbopogon refractus	40	100	GG				40						
Cynodon dactylon	3	100	GG				3						
Cyperus gracilis	1	500	GG				1						
Denhamia silvestris	0.3	2	SG			0.3							
Dianella caerulea var. assera	0.3	3	FG					0.3					
Dianella prunina	0.8	6	FG					0.8					
Dichondra repens	15	1000	FG					15					
Digitaria diffusa	0.4	20	GG				0.4						
Digitaria parviflora	5	20	GG				5						
Einadia nutans	0.5	20	FG					0.5					
Entolasia stricta	20	100	GG				20						
Eragrostis brownii	10	100	GG				10						
Eucalyptus crebra	3	1	TG		3								
Eucalyptus moluccana	20	15	TG		20								
Fimbristylis dichotoma	0.5	20	GG				0.5						
Gahnia aspera	1	10	GG				1						
Glycine clandestina	0.5	30	OG							0.5			
Glycine microphylla	0.6	20	OG							0.6			
Glycine tabacina	1	60	OG							1			
Glycine tabacina	0.5	20	OG							0.5			
Grona varians	0.5	16	OG							0.5			
Hypochaeris glabra	0.5	10	EX								0.5		
Hypochaeris radicata	0.5	10	EX								0.5		
Lobelia purpurascens	10	200	FG					10					
Lomandra multiflora subsp. multiflora	0.2	5	GG				0.2						
Microlaena stipoides	1	50	GG				1						
Microlaena stipoides	5	50	GG				5						
Muellerina eucalyptoides	1	10	OG							1			
Olearia elliptica	0.2	1	SG			0.2							
Opercularia diphylla	0.1	30	FG					0.1					
Oplismenus aemulus	1	50	GG				1						
Opuntia stricta	0.1	1	EX								0.1		
Oxalis perennans	0.5	30	FG					0.5					
Pittosporum revolutum	0.5	1	SG			0.5							
Plantago lanceolata	0.1	1	EX								0.1		
Pseuderanthemum variabile	0.4	100	FG					0.4					
Richardia stellaris	0.1	2	EX								0.1		
Senecio madagascariensis	0.1	2	HT									0.1	
Sigesbeckia australiensis	1	50	FG					1					
Skeleton weed	0.3	5	EX								0.3		
Small shrub alt mid vein leaves to 5cm	0.1	2	SG			0.1							
Solanum stelligerum	2	5	SG			2							
Solenogyne bellioides	1	100	FG					1					
Sporobolus creber	30	100	GG				30						
Trema tomentosa var. aspera	0.4	2	SG			0.4							
Wahlenbergia gracilis	0.1	5	FG					0.1					

Easting	330185
Northing	6373714
Orientation	214
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	5
20-29	yes
10-19	yes
5-9	yes
Regen	no
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	75

DL-74

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-74		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3315	Thinned	39	37	4	11	14	6	1	1	2	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	110	109.7	45	29.7	33.6	1	0.3	0.1	0.3	0	
Acacia ambylygona	20	35	SG			20							
Acacia implexa	4	6	SG			4							
Acacia parramattensis	2	3	TG		2								
Acacia parvipinnula	0.5	3	SG			0.5							
Allocasuarina luehmannii	30	20	TG		30								
Aristida personata	1	10	GG				1						
Aristida ramosa	20	30	GG				20						
Breynia oblongifolia	0.2	3	SG			0.2							
Bursaria spinosa	2	14	SG			2							
Carex inversa	0.5	30	GG				0.5						
Cheilanthes sieberi	0.3	50	EG						0.3				
Chrysocephalum apiculatum	0.1	5	FG					0.1					
Conyza bonariensis	0.1	1	EX								0.1		
Corymbia maculata	10	8	TG		10								
Cymbopogon refractus	0.5	6	GG				0.5						
Dianella revoluta	0.2	3	FG					0.2					
Digitaria ramularis	2	20	GG				2						
Einadia hastata	0.2	30	FG					0.2					
Entolasia stricta	1	30	GG				1						
Eucalyptus crebra	3	10	TG		3								
Exocarpos strictus	1	3	SG			1							
Gahnia aspera	5	15	GG				5						
Glycine microphylla	0.1	10	OG							0.1			
Grevillea montana	1	15	SG			1							
Hibbertia diffusa	0.3	4	SG			0.3							
Hibbertia empetrifolia subsp. empetrifolia	0.4	5	SG			0.4							
Lepidosperma laterale	1	10	GG				1						
Lomandra confertifolia subsp. pallida	0.5	3	GG				0.5						
Lomandra confertifolia subsp. rubiginosa	0.2	5	GG				0.2						
Lomandra multiflora subsp. multiflora	0.2	2	GG				0.2						
Microlaena stipoides	1	20	GG				1						
Olearia elliptica	0.1	3	SG			0.1							
Oplismenus aemulus	0.5	10	GG				0.5						
Persoonia linearis	0.2	3	SG			0.2							
Plantago debilis	0.1	2	FG					0.1					
Pomax umbellata	0.3	10	FG					0.3					
Rough toothed alt herb	0.1	1	FG					0.1					
Schoenus apogon	0.2	5	GG				0.2						
Sida spinosa	0.2	20	EX								0.2		

Easting	328215
Northing	6373954
Orientation	268
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	Yes
20-29	Yes
10-19	Yes
5-9	Yes
Regen	yes
Hollows	0
Length logs (m)	16

BAM Attributes 1x1 plot (%)	47

DL-77

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-77		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3315	Thinned	55	42	5	9	14	9	2	3	11	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	111.8	104.1	29.5	10.3	58.7	3.7	0.5	1.4	2.7	5	
Acacia amblygona	0.3	1	SG			0.3							
Acacia cultriformis	1	1	SG			1							
Acacia parramattensis	0.5	1	TG		0.5								
Acacia salicina	10	5	TG		10								
Allocasuarina verticillata	3	2	TG		3								
Amyema pendula	1	5	OG							1			
Aristida ramosa	5	20	GG				5						
Aristida ramosa	2	10	GG				2						
Aristida vagans	1	40	GG				1						
Bidens subalternans	0.3	20	EX								0.3		
Bothriochloa macra	0.3	5	GG				0.3						
Brachychiton populneus	1	1	TG		1								
Breynia oblongifolia	0.2	2	SG			0.2							
Carex inversa	20	0.5	GG				20						
Cheilanthes distans	0.3	50	EG						0.3				
Cheilanthes sieberi	0.2	15	EG						0.2				
Chondrilla juncea	0.3	2	EX								0.3		
Chrysocephalum apiculatum	0.5	15	FG					0.5					
Conyza bonariensis	0.2	3	EX								0.2		
Cymbopogon refractus	0.5	3	GG				0.5						
Cynodon dactylon	0.4	20	GG				0.4						
Cyperus gracilis	0.4	20	GG				0.4						
Cyperus sesquiflorus	0.1	10	EX								0.1		
Dianella prunina	1	10	FG					1					
Dichondra repens	0.2	100	FG					0.2					
Digitaria diffusa	0.4	5	GG				0.4						
Digitaria spp.	3	20	GG				3						
Dodonaea viscosa	1	2	SG			1							
Einadia hastata	0.7	20	FG					0.7					
Einadia spp.	0.1	3	FG					0.1					
Einadia trigonos	0.2	10	FG					0.2					
Eremophila debilis	1	10	SG			1							
Eucalyptus paniculata	15	7	TG		15								
Fimbristylis dichotoma	0.2	4	GG				0.2						
Gahnia aspera	5	20	GG				5						
Galenia pubescens	2	20	HT									2	
Glycine microphylla	0.1	5	OG							0.1			
Glycine tabacina	0.3	4	OG							0.3			
Hypericum gramineum	0.1	3	FG					0.1					
Hypochaeris glabra	0.3	2	EX								0.3		
Hypochaeris radicata	0.2	50	EX								0.2		
Lobelia purpurascens	0.5	50	FG					0.5					
Lomandra filiformis subsp. filiformis	0.5	3	GG				0.5						
Maireana microphylla	0.6	1	SG			0.6							
Microlaena stipoides	20	100	GG				20						
Olearia elliptica	5	7	SG			5							
Opuntia stricta	0.1	2	EX								0.1		
Oxalis perennans	0.4	50	FG					0.4					
Persoonia linearis	0.2	2	SG			0.2							
Phalaris minor	0.3	10	EX								0.3		
Senecio madagascariensis	3	30	HT									3	
Sonchus oleraceus	0.2	3	EX								0.2		
Stellaria media	0.3	50	EX								0.3		
Verbena rigida	0.4	10	EX								0.4		
White flowered shrub	1	5	SG			1							

Easting	327788
Northing	6374494
Orientation	170
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	Yes
20-29	Yes
10-19	Yes
5-9	Yes
<5	Yes
Hollows	0
Length logs (m)	8
BAM Attributes 1x1 plot (%)	64

D1.24 3328 – Lower Hunter Red Gum-Paperbark Riverflat Forest (Mod-good)

DL-32

Date	19/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_32		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3328	Mod-good	23	13	1	2	5	5	0	0	7	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	132.7	127.7	70	5.1	31.1	21.5	0	0	3.7	1.3	
Aster subulatus	0.3	15	EX								0.3		
Cirsium vulgare	0.1	4	EX								0.1		
Commelina cyanea	1	20	FG					1					
Conyza bonariensis	0.5	10	EX								0.5		
Cynodon dactylon	20	200	GG				20						
Cyperus spp.	0.2	20	GG				0.2						
Einadia hastata	0.1	1	FG					0.1					
Juncus subsecundus	0.5	15	GG				0.5						
Juncus usitatus	0.4	5	GG				0.4						
Melaleuca linariifolia	5	3	SG			5							
Melaleuca styphelioides	70	24	TG		70								
Myoporum montanum	0.1	1	SG			0.1							
Oplismenus imbecillis	10	500	GG				10						
Paspalum dilatatum	0.5	15	HT									0.5	
Persicaria hydropiper	5	10	FG					5					
Persicaria praetermissa	15	3	FG					15					
Rubus fruticosus agg.	0.5	1	HT									0.5	
Senecio madagascariensis	0.3	15	HT									0.3	
Setaria parviflora	2	19	EX								2		
Sida rhombifolia	0.3	10	EX								0.3		
Sigesbeckia australiensis	0.4	10	FG					0.4					
Trifolium repens	0.1	5	EX								0.1		
Verbena bonariensis	0.4	20	EX								0.4		

Easting	333450
Northing	6360223
Orientation	342
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	15
20-29	N
10-19	Y
5-9	N
<5	N
Regen	N
Hollows	0
Length logs (m)	1
BAM Attributes 1x1 plot (%)	4.6

D1.25 3431 – Central Hunter Ironbark Grassy Woodland (Disturbed_Grassland)

DL-40

Date	27/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	328074
Plot Name	DL_40		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6374693
PCT	3431	Disturbed grassland	27	16	0	0	10	5	1	0	10	1		Orientation	10
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	104.8	95.8	0	0	93.3	1.9	0.6	0	8.5	0.5		BAM Attributes 20x50m plot	
Aristida ramosa	5	30	GG				5							Stem classes	
Bidens pilosa	0.1	3	EX								0.1			80+	0
Carex inversa	1	100	GG				1							50-79	0
Cenchrus clandestinus	5	50	EX								5			30-49	0
Cheilanthes sieberi	0.6	100	EG						0.6					20-29	n
Chrysocephalum apiculatum	0.6	20	FG					0.6						10-19	n
Chrysocephalum semipapposum	0.5	10	FG					0.5						5-9	n
Conyza bonariensis	0.5	15	EX								0.5			<5	n
Cymbopogon refractus	10	50	GG				10							Regen	n
Cynodon dactylon	20	100	GG				20							Hollows	0
Eragrostis elongata	0.6	10	GG				0.6							Length logs (m)	0
Eragrostis leptostachya	0.5	10	GG				0.5								
Eragrostis leptostachya	1	50	GG				1							BAM Attributes 1x1 plot (%)	0
Fimbristylis dichotoma	0.2	40	GG				0.2								
Hypochaeris radicata	0.5	20	EX								0.5				
Oxalis perennans	0.6	100	FG					0.6							
Oxalis radicosa	0.1	10	FG					0.1							
Panicum effusum	5	30	GG				5								
Plantago lanceolata	0.6	10	EX								0.6				
Schkuhria pinnata	0.1	2	EX								0.1				
Senecio madagascariensis	0.5	10	HT									0.5			
Setaria parviflora	0.3	10	EX								0.3				
Sida rhombifolia	0.2	20	EX								0.2				
Sporobolus creber	50	300	GG				50								
Tricoryne elatior	0.1	5	FG					0.1							
Verbena officinalis	0.2	3	EX								0.2				
Verbena rigida var. rigida	1	50	EX								1				

DR-01

Date	31/05/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	305242
Plot Name	HTP_DR01		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6408006
PCT	3431	Disturbed Grassland	29	18	0	1	10	6	0	1	9	2		Orientation	63
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	88.7	82.9	0	1	80.2	1.6	0	0.1	3.8	2		BAM Attributes 20x50m plot	
Bothriochloa biloba	55	2000	GG				55							Stem classes	
Enteropogon ramosus	1	50	GG				1							80+	0
Senecio madagascarensis	1	100	HT									1		50-79	0
Plantago lanceolata	0.5	100	EX								0.5			30-49	0
Dichanthium sericeum	1	500	GG				1							20-29	No
Cirsium vulgare	0.1	2	EX								0.1			10-19	No
Sida spinosa	0.6	50	EX								0.6			5-9	No
Mentha satureioides	1	1000	FG					1						<5	No
Gomphocarpus fruticosus	0.6	30	EX								0.6			Hollows	0
Aristida ramosa	0.1	5	GG				0.1							Length logs (m)	0
Glycine clandestina	0.1	5	OG							0.1					
Salvia verbenaca	0.8	50	EX								0.8			BAM Attributes 1x1 plot (%)	1
Euchiton sphaericus	0.2	30	FG					0.2							
Verbena officinalis	0.6	30	EX								0.6				
Sporobolus creber	20	1000	GG				20								
Rytidosperma erianthum	0.2	10	GG				0.2								
Schkuhria pinnata var. abrotanoides	0.3	30	EX								0.3				
Digitaria divaricatissima	0.5	20	GG				0.5								
Chrysocephalum apiculatum	0.1	10	FG					0.1							
Sida rhombifolia	0.2	1	EX								0.2				
Asperula conferta	0.1	20	FG					0.1							
Dichondra repens	0.1	10	FG					0.1							
Einadia nutans	0.1	10	FG					0.1							
Chloris ventricosa	1	50	GG				1								
Conyza sp.	0.1	5	EX								0.1				
Austrostipa aristiglumis	1	10	GG				1								
Maireana microphylla	1	1	SG			1									
Galenia pubescens	1	5	HT									1			
Panicum queenslandicum	0.4	10	GG				0.4								

DR-04

Date	31/05/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56	Easting	305838
Plot Name	HTP_DR04		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6409509
PCT	3431	Disturbed Grassland	24	14	0	2	10	2	0	0	7	3		Orientation	193
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	91.7	84.6	0	3	80.4	1.2	0	0	4.7	2.4		BAM Attributes 20x50m plot	
Sporobolus creber	30	1000	GG				30							Stem classes	
Bothriochloa biloba	10	1000	GG				10							80+	0
Conyza sp.	0.2	20	EX								0.2			50-79	0
Plantago turrifera	0.5	50	FG					0.5						30-49	0
Senecio madagascarensis	1	20	HT									1		20-29	0
Sida rhombifolia	3	20	EX								3			10-19	no
Panicum queenslandicum	5	500	GG				5							5-9	no
Heliotropium amplexicaule	1	40	HT									1		<5	no
Gomphocarpus fruticosus	0.8	20	EX								0.8			Hollows	0
Chloris ventricosa	20	1000	GG				20							Length logs (m)	0
Solanum rostratum	0.1	5	EX								0.1				
Bidens pilosa	0.1	5	EX								0.1			BAM Attributes 1x1 plot (%)	1
Verbena officinalis	0.4	20	EX								0.4				
Aristida ramosa	3	200	GG				3								
Paspalum dilatatum	0.4	5	HT									0.4			
Maireana microphylla	1	1	SG			1									
Chrysocephalum apiculatum	0.7	50	FG					0.7							
Cirsium vulgare	0.1	5	EX								0.1				
Carex inversa	0.2	30	GG				0.2								
Dichanthium sericeum	2	200	GG				2								
Eremophila debilis	2	100	SG			2									
Digitaria diffusa	0.1	10	GG				0.1								
Fimbristylis dichotoma	0.1	20	GG				0.1								
Bothriochloa decipiens	10	500	GG				10								

DR-05

Date	31/05/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56	Easting	305961
Plot Name	HTP_DR05		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6409872
PCT	3431	Disturbed Grassland	24	15	0	1	8	4	1	1	8	1		Orientation	40
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	84.6	79	0	0.4	77.5	0.9	0.1	0.1	5.4	0.2		BAM Attributes 20x50m plot	
Sporobolus creber	40	2000	GG				40							Stem classes	
Bothriochloa decipiens	10	1000	GG				10							80+	0
Dichanthium sericeum	1	100	GG				1							50-79	0
Senecio madagascarensis	0.2	20	HT									0.2		30-49	0
Gomphocarpus fruticosus	0.1	10	EX								0.1			20-29	no
Panicum capillare	3	200	EX								3			10-19	no
Chrysocephalum apiculatum	0.2	20	FG					0.2						5-9	no
Centaurium tenuiflorum	0.1	10	EX								0.1			<5	no
Fimbristylis dichotoma	0.1	20	GG				0.1							Hollows	0
Wahlenbergia communis	0.1	5	FG					0.1						Length logs (m)	0
Aristida ramosa	10	1000	GG				10								
Lomandra confertifolia subsp. pallida	1	5	GG				1							BAM Attributes 1x1 plot (%)	2
Plantago lanceolata	1	50	EX								1				
Mentha satureioides	0.5	50	FG					0.5							
Verbena officinalis	0.5	30	EX								0.5				
Setaria parviflora	0.5	20	EX								0.5				
Chloris ventricosa	15	1000	GG				15								
Bidens pilosa	0.1	10	EX								0.1				
Eremophila debilis	0.4	10	SG			0.4									
Dichondra repens	0.1	5	FG					0.1							
Cheilanthes sieberi	0.1	10	EG						0.1						
Eriochloa pseudoacrotricha	0.4	30	GG				0.4								
Cirsium vulgare	0.1	5	EX								0.1				
Convolvulus erubescens	0.1	10	OG							0.1					

D1.26 3431 – Central Hunter Ironbark Grassy Woodland (Plantation)

DR-02

Date	31/05/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56	Easting	305322
Plot Name	HTP_DR02		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6408260
PCT	3431	Plantation	38	29	3	5	11	8	1	1	7	2		Orientation	230
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	72	65.3	25.5	10	27.2	2	0.5	0.1	4.9	1.8		BAM Attributes 20x50m plot	
Allocasuarina luehmannii	20	10	TG		20									Stem classes	
Eucalyptus blakelyi / camaldulensis mix - pla	5	8	TG		5									80+	0
Austrostipa verticillata	5	50	GG				5							50-79	0
Enchylaena tomentosa	1	30	SG			1								30-49	0
Eremophila debilis	3	100	SG			3								20-29	yes
Dichondra repens	0.4	100	FG					0.4						10-19	yes
Sida rhombifolia	1	10	EX								1			5-9	yes
Chloris ventricosa	5	100	GG				5							<5	yes
Senecio madagascarensis	0.8	20	HT									0.8		Hollows	0
Galenia pubescens	1	10	HT									1		Length logs (m)	5
Conyza sp.	0.2	20	EX								0.2				
Maireana microphylla	2	5	SG			2								BAM Attributes 1x1 plot (%)	19
Bothriochloa biloba	10	1000	GG				10								
Sporobolus creber	5	500	GG				5								
Plantago turrifera	0.1	10	FG					0.1							
Sida corrugata	0.8	20	FG					0.8							
Einadia nutans	0.3	10	FG					0.3							
Glycine clandestina	0.1	10	OG							0.1					
Verbena officinalis	0.2	10	EX								0.2				
Calotis lappulacea	0.1	10	FG					0.1							
Panicum capillare	3	100	EX								3				
Eriochloa pseudoacrotricha	0.1	10	GG				0.1								
Cheilanthes sieberi	0.5	100	EG						0.5						
Wahlenbergia communis	0.1	5	FG					0.1							
Austrostipa scabra	1	20	GG				1								
Euphorbia drummondii	0.1	5	FG					0.1							
Centaurium tenuiflorum	0.1	10	EX								0.1				
Carex inversa	0.1	5	GG				0.1								
Sclerolaena muricata var. villosa	3	10	SG			3									
Acacia salicina	0.5	2	TG		0.5										
Solanum rostratum	0.1	5	EX								0.1				
Lomandra confertifolia subsp. pallida	0.6	10	GG				0.6								
Chrysocephalum apiculatum	0.1	20	FG					0.1							
Fimbristylis dichotoma	0.1	20	GG				0.1								
Aristida ramosa	0.1	10	GG				0.1								
Cirsium vulgare	0.3	1	EX								0.3				
Cymbopogon refractus	0.2	5	GG				0.2								
Sclerolaena muricata var. semiglabra	1	1	SG			1									

DR-03

Date	31/05/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56	Easting	305490
Plot Name	HTP_DR03		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6408393
PCT	3431	Plantation	37	26	3	3	11	7	1	1	9	2		Orientation	322
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	68.9	60.6	27	3.4	26.7	3	0.4	0.1	3.1	5.2		BAM Attributes 20x50m plot	
Allocasuarina luehmannii	15	20	TG		15									Stem classes	
Eucalyptus blakelyi	10	8	TG		10									80+	0
Acacia salicina	2	10	TG		2									50-79	1
Austrostipa verticillata	5	50	GG				5							30-49	0
Chloris ventricosa	5	200	GG				5							20-29	yes
Chrysocephalum apiculatum	2	100	FG					2						10-19	yes
Sida rhombifolia	1	20	EX								1			5-9	yes
Eremophila debilis	2	100	SG			2								<5	yes
Cheilanthes sieberi	0.4	50	EG						0.4					Hollows	0
Sporobolus creber	5	200	GG				5							Length logs (m)	6
Glycine clandestina	0.1	10	OG							0.1					
Sida corrugata	0.2	30	FG					0.2						BAM Attributes 1x1 plot (%)	28
Pseuderanthemum variabile	0.1	5	FG					0.1							
Dichondra repens	0.3	1000	FG					0.3							
Senecio madagascarensis	0.2	20	HT									0.2			
Wahlenbergia communis	0.1	5	FG					0.1							
Galenia pubescens	5	40	HT									5			
Conyza sp.	0.1	10	EX								0.1				
Maireana microphylla	1	1	SG			1									
Bothriochloa biloba	10	500	GG				10								
Solanum rostratum	0.1	5	EX								0.1				
Lepidium africanum	0.2	20	EX								0.2				
Cirsium vulgare	0.4	20	EX								0.4				
Calotis lappulacea	0.2	20	FG					0.2							
Aristida ramosa	0.5	30	GG				0.5								
Verbena officinalis	0.1	10	EX								0.1				
Panicum capillare	1	50	EX								1				
Enchylaena tomentosa	0.4	20	SG			0.4									
Lomandra confertifolia subsp. pallida	0.3	5	GG				0.3								
Carex inversa	0.1	20	GG				0.1								
Centaurium tenuiflorum	0.1	10	EX								0.1				
Eriochloa pseudoacrotricha	0.2	20	GG				0.2								
Bidens pilosa	0.1	5	EX								0.1				
Fimbristylis dichotoma	0.1	20	GG				0.1								
Austrostipa scabra subsp. falcata	0.4	20	GG				0.4								
Vittadinia pustulata	0.1	5	FG					0.1							
Rytidosperma caespitosum	0.1	5	GG				0.1								

HTP-MS-01

Date	31/05/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-01		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3431	Plantation	36	24	2	2	9	9	1	1	12	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	108.7	80.4	10	0.2	64.6	4.5	0.1	1	28.3	0	
Dichondra repens	2	100	FG					2					
Sporobolus creber	20	200	GG				20						
Aristida ramosa	5	100	GG				5						
Bothriochloa macra	20	200	GG				20						
Asperula conferta	1	100	FG					1					
Carex inversa	1	100	GG				1						
Plantago lanceolata	15	200	EX								15		
Cheilanthes sieberi subsp. sieberi	0.1	20	EG						0.1				
Senecio madagascariensis	8	100	EX								8		
Oxalis perennans	0.2	50	FG					0.2					
Wahlenbergia gracilis	0.1	10	FG					0.1					
Brunoniella australis	0.5	100	FG					0.5					
Sida trichopoda	0.2	40	FG					0.2					
Verbena officinalis	0.1	10	EX								0.1		
Chloris ventricosa	15	200	GG				15						
Mentha diemenica	0.2	50	FG					0.2					
Conyza bonariensis	2	100	EX								2		
Eremophila debilis	0.1	10	SG			0.1							
Glycine clandestina	1	100	OG							1			
Lomandra confertifolia subsp. pallida	0.5	20	GG				0.5						
Setaria parviflora	0.5	50	EX								0.5		
Cirsium vulgare	1	50	EX								1		
Verbena rigida var. rigida	0.2	30	EX								0.2		
Sida rhombifolia	1	40	EX								1		
Fimbristylis dichotoma	0.1	20	GG				0.1						
Gamochaeta purpurea	0.1	10	EX								0.1		
Gomphocarpus fruticosus	0.1	5	EX								0.1		
Grona varians	0.2	40	FG					0.2					
Aristida vagans	1	50	GG				1						
Wahlenbergia communis	0.1	10	FG					0.1					
Bidens subalternans	0.1	10	EX								0.1		
Verbena bonariensis	0.2	20	EX								0.2		
Dichanthium sericeum subsp. sericeum	2	80	GG				2						
Enchylaena tomentosa	0.1	2	SG			0.1							
Enchylaena tomentosa	0.1	2	SG			0.1							
Eucalyptus blakelyi / camaldulensis mix - plo	5	8	TG		5								
Allocasuarina luehmannii	5	15	TG		5								

Easting	305625
Northing	6408868
Orientation	229
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	18

D1.27 3431 – Central Hunter Ironbark Grassy Woodland (Poor)

DL-26

Date	12/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_26		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3431	Poor	41	35	3	5	11	10	1	5	4	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	160	88.5	65.4	1	18.1	2.2	0.1	1.7	1.4	70.1	
Acacia implexa	0.1	1	SG			0.1							
Allocasuarina luehmannii	15	30	TG		15								
Angophora floribunda	0.4	4	TG		0.4								
Aristida ramosa	10	50	GG				10						
Asperula conferta	0.1	100	FG					0.1					
Breynia oblongifolia	0.1	1	SG			0.1							
Cassinia sifton	0.1	1	SG			0.1							
Cheilanthes sieberi	0.1	100	EG						0.1				
Chloris ventricosa	1	20	GG				1						
Chrysocephalum apiculatum	0.1	5	FG					0.1					
Cirsium vulgare	0.2	3	EX								0.2		
Cymbopogon refractus	2	5	GG				2						
Dianella caerulea	0.1	1	FG					0.1					
Dianella longifolia	0.5	2	FG					0.5					
Dichanthium sericeum	0.1	20	GG				0.1						
Dichondra repens	0.3	1000	FG					0.3					
Digitaria ramularis	0.4	15	GG				0.4						
Eragrostis brownii	1	20	GG				1						
Eragrostis leptostachya	1	20	GG				1						
Eremophila debilis	0.6	10	SG			0.6							
Eucalyptus blakelyi	50	18	TG		50								
Fimbristylis dichotoma	0.5	15	GG				0.5						
Glossocardia bidens	0.2	50	FG					0.2					
Glycine clandestina	0.1	50	OG							0.1			
Glycine microphylla	0.8	30	OG							0.8			
Glycine tabacina	0.5	60	OG							0.5			
Hydrocotyle laxiflora	0.1	50	FG					0.1					
Hypericum gramineum	0.1	30	FG					0.1					
Juncus cognatus	0.1	1	EX								0.1		
Kennedia rubicunda	0.1	2	OG							0.1			
Lantana camara	70	100	HT									70	
Lomandra multiflora subsp. multifl	1	20	GG				1						
Olea europaea	0.1	1	HT									0.1	
Opuntia stricta	0.1	1	EX								0.1		
Phyllanthus gunnii	0.1	100	SG			0.1							
Pseuderanthemum variabile	0.5	100	FG					0.5					
Rhyocarpia minima	0.2	100	OG							0.2			
Rytidosperma spp.	0.1	2	GG				0.1						
Sporobolus creber	1	10	GG				1						
Verbena bonariensis	1	20	EX								1		
Vernonia cinerea	0.2	40	FG					0.2					

Easting	324399
Northing	6387196
Orientation	198
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	8
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	27
Litter (%)	

DL-52

Date	4/03/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_52		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3431	Poor	30	21	2	0	11	7	1	0	8	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	123.7	80.2	20	0	44.3	15.7	0.2	0	43.2	0.3	
Acacia parramattensis	5	10	TG		5								
Aristida ramosa	2	12	GG				2						
Bidens pilosa	20	50	EX								20		
Bidens subalternans	0.2	10	EX								0.2		
Carex breviculmis	0.3	20	GG				0.3						
Cheilanthes sieberi	0.2	20	EG						0.2				
Chrysocephalum apiculatum	5	60	FG					5					
Conyza bonariensis	0.4	10	EX								0.4		
Cymbopogon refractus	1	10	GG				1						
Digitaria ramularis	1	10	GG				1						
Einadia polygonoides	0.3	10	FG					0.3					
Einadia trigonos	0.1	6	FG					0.1					
Entolasia stricta	2	50	GG				2						
Eragrostis elongata	0.5	6	GG				0.5						
Eragrostis leptostachya	1	20	GG				1						
Eucalyptus crebra	15	30	TG		15								
Euchiton sphaericus	0.1	1	FG					0.1					
Gahnia aspera	1	3	GG				1						
Lobelia concolor	10	500	FG					10					
Lomandra multiflora subsp. multiflora	0.5	2	GG				0.5						
Microlaena stipoides	30	400	GG				30						
Murdannia graminea	0.1	2	FG					0.1					
Richardia stellaris	1	50	EX								1		
Senecio madagascariensis	0.3	15	HT									0.3	
Setaria parviflora	1	10	EX								1		
Sida rhombifolia	20	25	EX								20		
Sisymbrium officinale	0.1	3	EX								0.1		
Sporobolus creber	5	20	GG				5						
Tricoryne elatior	0.1	5	FG					0.1					
Verbena officinalis	0.5	10	EX								0.5		

Easting	329254
Northing	6373571
Orientation	201
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	y
10-19	y
5-9	y
<5	y
Regen	y
Hollows	0
Length logs (m)	17
BAM Attributes 1x1 plot (%)	21

HTP-MS-02

Date	31/05/2023		**Covers**	**Native**	Trees	Shrubs	Grass	Forb	Fern	Other	**Exotic**	**HighThreat**	56		**Easting**	305653
Plot Name	HTP-MS-02		**# spp**	**Count**	Count	Count	Count	Count	Count	Count	**Count**	**Count**			**Northing**	6409013
PCT	3431	Poor	**39**	**27**	2	2	12	9	1	1	11	1			**Orientation**	144
			Sum cover	**Sum**	Sum	Sum	Sum	Sum	Sum	Sum	**Sum**	**Sum**			**Plot size**	20 X 20 X 50
Species	**Cover**	**Abundance**	**74**	**63.2**	7	0.3	49.6	5.6	0.2	0.5	10.7	0.1			BAM Attributes 20x50m plot	
Allocasuarina luehmannii	5	20	TG		5										Stem classes	
Acacia salicina	2	10	TG		2										**80+**	0
Sporobolus creber	20	200	GG				20								**50-79**	0
Chloris ventricosa	15	200	GG				15								**30-49**	1
Chrysocephalum apiculatum	3	100	FG					3							**20-29**	yes
Sida corrugata	0.5	40	FG					0.5							**10-19**	no
Bothriochloa decipiens var. decipiens	2	50	GG				2								**5-9**	yes
Aristida ramosa	5	100	GG				5								**<5**	yes
Senecio madagascariensis	4	200	EX								4				Hollows	0
Setaria parviflora	2	50	EX								2				Length logs (m)	0
Plantago lanceolata	3	100	EX								3					
Sida rhombifolia	0.5	30	EX								0.5				BAM Attributes 1x1 plot (%)	9
Dichondra repens	1	100	FG					1								
Conyza bonariensis	0.5	50	EX								0.5					
Fimbristylis dichotoma	0.2	30	GG				0.2									
Maireana microphylla	0.1	2	SG			0.1										
Rytidosperma bipartitum	0.1	5	GG				0.1									
Austrostipa scabra subsp. scabra	1	50	GG				1									
Eremophila debilis	0.2	20	SG			0.2										
Centaurea solstitialis	0.1	10	EX								0.1					
Calotis lappulacea	0.5	20	FG					0.5								
Glycine clandestina	0.5	50	OG							0.5						
Lomandra confertifolia subsp. pallida	0.2	20	GG				0.2									
Gamochaeta purpurea	0.1	5	EX								0.1					
Cheilanthes sieberi subsp. sieberi	0.2	30	EG						0.2							
Dichanthium sericeum subsp. sericeum	5	100	GG				5									
Gomphocarpus fruticosus	0.1	1	EX								0.1					
Verbena bonariensis	0.2	10	EX								0.2					
Panicum queenslandicum var. queenslandicum	0.5	30	GG				0.5									
Verbena rigida var. rigida	0.1	10	EX								0.1					
Wahlenbergia communis	0.1	10	FG					0.1								
Carex inversa	0.1	5	GG				0.1									
Galenia pubescens	0.1	1	HT									0.1				
Euchiton involucratus	0.1	5	FG					0.1								
Verbena officinalis	0.1	10	EX								0.1					
Vittadinia cuneata var. cuneata f. cuneata	0.1	5	FG					0.1								
Sida trichopoda	0.2	50	FG					0.2								
Maireana enchylaenoides	0.1	5	FG					0.1								
Dichanthium sericeum subsp. sericeum	0.5	50	GG				0.5									

D1.28 3431 – Central Hunter Ironbark Grassy Woodland (Thinned)

DL-30

Date	14/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	325475
Plot Name	DL_30		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6382586
PCT	3431	Thinned	29	23	2	6	7	6	0	2	4	2		Orientation	340
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	138.7	130.9	55	2.1	70.7	2.5	0	0.6	1.8	6		BAM Attributes 20x50m plot	
Acacia implexa	0.2	1	SG			0.2								Stem classes	
Allocasuarina luehmannii	15	20	TG		15									80+	0
Aristida ramosa	30	100	GG				30							50-79	1
Austrostipa scabra	15	60	GG				15							30-49	1
Bidens subalternans	0.5	15	EX								0.5			20-29	Y
Breynia oblongifolia	0.2	2	SG			0.2								10-19	Y
Commelina cyanea	0.3	5	FG					0.3						5-9	Y
Cymbopogon refractus	10	50	GG				10							<5	Y
Dichondra sp. Inglewood	0.4	200	FG					0.4						Regen	Y
Eragrostis brownii	15	80	GG				15							Hollows	1
Eremophila debilis	0.5	16	SG			0.5								Length logs (m)	10
Eucalyptus moluccana	40	30	TG		40										
Exocarpos strictus	1	1	SG			1								BAM Attributes 1x1 plot (%)	36
Fimbristylis dichotoma	0.1	5	GG				0.1								
Glossocardia bidens	0.1	2	FG					0.1							
Glycine clandestina	0.5	20	OG							0.5					
Glycine latifolia	0.1	5	OG							0.1					
Gomphocarpus fruticosus	0.5	60	EX								0.5				
Lantana camara	1	6	HT									1			
Lomandra multiflora subsp. multif	0.1	3	GG				0.1								
Olea europaea	5	15	HT									5			
Phyllanthus gunnii	0.1	4	SG			0.1									
Platysace ericoides	0.1	10	SG			0.1									
Pseuderanthemum variabile	0.2	100	FG					0.2							
Sida rhombifolia	0.5	15	EX								0.5				
Teucrium junceum	0.9	5	FG					0.9							
Themeda triandra	0.5	4	GG				0.5								
Verbena officinalis	0.3	2	EX								0.3				
Vernonia cinerea	0.6	30	FG					0.6							

DL-45

Date	1/03/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	325017
Plot Name	DL_45		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6381490
PCT	3431	Thinned	43	36	1	3	12	14	1	5	5	2		Orientation	164
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	157	76	40	1.6	30.1	3	0.3	1	50.7	30.3		BAM Attributes 20x50m plot	
Amyema miquelii	0.1	1	OG							0.1				Stem classes	
Aristida ramosa	10	60	GG				10							80+	2
Aristida vagans	0.4	10	GG				0.4							50-79	1
Asperula conferta	0.1	2	FG					0.1						30-49	2
Austrostipa verticillata	5	4	GG				5							20-29	y
Bidens pilosa	0.2	5	EX								0.2			10-19	y
Bothriochloa macra	0.3	30	GG				0.3							5-9	y
Calotis lappulacea	0.2	7	FG					0.2						<5	y
Carex inversa	0.1	3	GG				0.1							Regen	
Cheilanthes sieberi	0.3	5	EG						0.3					Hollows	1
Chloris ventricosa	0.5	20	GG				0.5							Length logs (m)	36
Chrysocephalum semipapposum	0.2	10	FG					0.2							
Cymbopogon refractus	2	5	GG				2							BAM Attributes 1x1 plot (%)	16
Cyperus gracilis	0.3	60	GG				0.3								
Desmodium varians	0.2	80	OG							0.2					
Dichondra repens	0.2	50	FG					0.2							
Einadia polygonoides	0.6	20	FG					0.6							
Entolasia stricta	10	100	GG				10								
Eragrostis leptostachya	0.1	5	GG				0.1								
Eremophila debilis	0.5	20	SG			0.5									
Eucalyptus moluccana	40	21	TG		40										
Exocarpos strictus	0.6	2	SG			0.6									
Gahnia aspera	0.4	1	GG				0.4								
Glycine clandestina	0.2	50	OG							0.2					
Glycine microphylla	0.2	15	OG							0.2					
Glycine tabacina	0.3	100	OG							0.3					
Lantana camara	30	15	HT									30			
Lepidium bonariense	0.1	1	EX								0.1				
Lobelia purpurascens	0.3	50	FG					0.3							
Lythrum hyssopifolia	0.1	1	FG					0.1							
Maireana microphylla	0.5	1	SG			0.5									
Opercularia diphylla	0.2	20	FG					0.2							
Opuntia stricta	0.1	1	EX								0.1				
Oxalis chnoodes	0.1	5	FG					0.1							
Plantago debilis	0.1	2	FG					0.1							
Pseuderanthemum variabile	0.3	100	FG					0.3							
Richardia stellaris	0.3	20	EX								0.3				
Rostellularia adscendens	0.1	5	FG					0.1							
Senecio madagascariensis	0.3	5	HT									0.3			
Sida corrugata	0.1	3	FG					0.1							
Sporobolus creber	1	10	GG				1								
Verbena bonariensis	50	200	EX								50				
Vernonia cinerea	0.4	50	FG					0.4							

DL-46

Date	1/03/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_46		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3431	Thinned	48	38	3	4	12	15	1	3	8	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	111.8	100.2	42	6	47.7	3.5	0.2	0.8	11.1	0.5	
Allocasuarina luehmannii	2	2	TG		2								
Amyema pendula subsp. pendula	0.2	1	OG							0.2			
Aristida ramosa	10	15	GG				10						
Aristida vagans	1	40	GG				1						
Arthropodium milleflorum	0.1	2	FG					0.1					
Asperula conferta	0.1	30	FG					0.1					
Bidens pilosa	0.1	3	EX								0.1		
Bidens subalternans	0.2	5	EX								0.2		
Bothriochloa macra	0.1	3	GG				0.1						
Cheilanthes sieberi	0.2	30	EG						0.2				
Chloris ventricosa	0.6	10	GG				0.6						
Chrysocephalum semipapposum	0.3	50	FG					0.3					
Conyza bonariensis	0.2	10	EX								0.2		
Cymbopogon refractus	5	15	GG				5						
Cyperus gracilis	15	0.5	GG				15						
Desmodium brachypodum	0.5	6	FG					0.5					
Dichondra repens	0.4	200	FG					0.4					
Entolasia stricta	10	50	GG				10						
Eragrostis leptostachya	1	30	GG				1						
Eremophila debilis	1	10	SG			1							
Eucalyptus crebra	10	7	TG		10								
Eucalyptus moluccana	30	19	TG		30								
Exocarpos strictus	4	3	SG			4							
Fimbristylis dichotoma	0.5	10	GG				0.5						
Glausos yellow flowered herb	0.1	5	FG					0.1					
Glossocardia bidens	0.3	5	FG					0.3					
Glycine clandestina	0.3	20	OG							0.3			
Glycine tabacina	0.3	50	OG							0.3			
Lantana camara	0.4	3	HT									0.4	
Lobelia purpurascens	0.5	100	FG					0.5					
Lomandra filiformis	0.1	5	GG				0.1						
Myoporum montanum	0.9	1	SG			0.9							
Panicum effusum	0.4	5	GG				0.4						
Phyllanthus gunnii	0.1	2	SG			0.1							
Plantago debilis	0.1	4	FG					0.1					
Prostrate shrub	0.5	1	FG					0.5					
Pseuderanthemum variabile	0.2	50	FG					0.2					
Richardia stellaris	0.1	20	EX								0.1		
Senecio madagascariensis	0.1	3	HT									0.1	
Setaria parviflora	0.2	5	EX								0.2		
Sida rhombifolia	0.1	3	EX								0.1		
Sida spinosa	0.2	3	EX								0.2		
Sporobolus creber	4	10	GG				4						
Tricoryne elatior	0.1	4	FG					0.1					
Verbena bonariensis	10	50	EX								10		
Vernonia cinerea	0.1	5	FG					0.1					
Wahlenbergia communis	0.1	1	FG					0.1					
White flowered herb opposite leav	0.1	5	FG					0.1					

Easting	324891
Northing	6381398
Orientation	332
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	y
10-19	y
5-9	y
<5	y
Regen	
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	23

DL-47

Date	1/03/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_47		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3431	Thinned	35	30	2	7	6	11	1	3	4	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	90.7	89.9	65	3.8	17.5	3.1	0.1	0.4	0.6	0.2	
Acacia implexa	0.3	3	SG			0.3							
Allocasuarina luehmannii	60	300	TG		60								
Aristida ramosa	10	30	GG				10						
Brachyscome spp.	0.1	3	FG					0.1					
Cheilanthes sieberi	0.1	3	EG						0.1				
Chrysocephalum semipapposum	0.2	2	FG					0.2					
Clematis aristata	0.1	1	OG							0.1			
Cymbopogon refractus	2	15	GG				2						
Daviesia genistifolia	0.2	3	SG			0.2							
Dianella revoluta	0.2	5	FG					0.2					
Dichondra repens	0.4	100	FG					0.4					
Digitaria ramularis	3	10	GG				3						
Einadia polygonoides	0.2	5	FG					0.2					
Enteropogon acicularis	1	4	GG				1						
Entolasia stricta	1	30	GG				1						
Epracics spp.	0.1	2	SG			0.1							
Eragrostis leptostachya	0.5	15	GG				0.5						
Eremophila debilis	2	5	SG			2							
Eucalyptus crebra	5	3	TG		5								
Exocarpos strictus	1	5	SG			1							
Glossocardia bidens	0.1	5	FG					0.1					
Glycine clandestina	0.1	5	OG							0.1			
Glycine tabacina	0.2	10	OG							0.2			
Olearia viscosa	0.1	1	SG			0.1							
Opuntia stricta	0.2	2	EX								0.2		
Phyllanthus gunnii	0.1	10	SG			0.1							
prostrate shrub	1	3	FG					1					
Pseuderanthemum variabile	0.3	50	FG					0.3					
Richardia stellaris	0.1	3	EX								0.1		
Rostellularia adscendens	0.1	3	FG					0.1					
Senecio madagascariensis	0.2	10	HT									0.2	
Sida corrugata	0.1	3	FG					0.1					
Sonchus oleraceus	0.1	1	EX								0.1		
Verbena bonariensis	0.2	3	EX								0.2		
Vernonia cinerea	0.4	50	FG					0.4					

Easting	324815
Northing	6381115
Orientation	154
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	4
20-29	y
10-19	y
5-9	y
<5	y
Regen	y
Hollows	0
Length logs (m)	14
BAM Attributes 1x1 plot (%)	20

DR-06

Date	1/06/2023		**Covers**	**Native**	Trees	Shrubs	Grass	Forb	Fern	Other	**Exotic**	**HighThrea**	56	**Easting**	306146
Plot Name	HTP_DR06		**# spp**	**Count**	Count	Count	Count	Count	Count	Count	**Count**	**Count**		**Northing**	6413645
PCT	3431	Thinned	**57**	**47**	6	10	17	12	0	2	9	1		**Orientation**	330
			Sum cover	**Sum**	Sum	Sum	Sum	Sum	Sum	Sum	**Sum**	**Sum**		**Plot size**	20 X 20 X 50
Species	**Cover**	**Abundance**	**128**	**106.5**	29	8	62.3	6.9	0	0.3	1.5	20		**BAM Attributes 20x50m plot**	
Eucalyptus tereticornis	20	15	TG		20									**Stem classes**	
Allocasuarina luehmannii	1	1	TG		1									**80+**	0
Notelaea microcarpa	5	4	TG		5									**50-79**	2
Bursaria spinosa	1	10	SG			1								**30-49**	1
Teucrium junceum	1	1	SG			1								**20-29**	yes
Olearia elliptica	1	5	SG			1								**10-19**	yes
Cassinia quinquefaria	2	20	SG			2								**5-9**	yes
Acacia falcata	1	5	SG			1								**<5**	yes
Acacia decora	1	10	SG			1								**Hollows**	0
Verbena bonariensis	0.3	10	EX								0.3			**Length logs (m)**	10
Eucalyptus crebra	1	1	TG		1										
Breynia oblongifolia	0.3	10	SG			0.3								**BAM Attributes 1x1 plot (%)**	**53**
Brachychiton populneus	1	1	TG		1										
Dianella revoluta	1	20	FG					1							
Lomandra confertifolia subsp. pallida	2	20	GG				2								
Hyparrhenia hirta	20	500	HT									20			
Lomandra filiformis subsp. filiformis	1	100	GG				1								
Oxytes brachypodum	1	200	FG					1							
Templetonia stenophylla	0.2	10	FG					0.2							
Aristida ramosa	20	1000	GG				20								
Scaevola ramosissima	1	50	FG					1							
Aristida vagans	5	100	GG				5								
Opuntia stricta	0.5	10	EX								0.5				
Einadia nutans subsp. linifolia	0.1	10	FG					0.1							
Lomandra multiflora subsp. multiflora	0.2	5	GG				0.2								
Eragrostis leptostachya	5	100	GG				5								
Microlaena stipoides	10	1000	GG				10								
Conyza sp.	0.1	10	EX								0.1				
Dichondra repens	1	200	FG					1							
Chloris ventricosa	5	500	GG				5								
Gomphocarpus fruticosus	0.1	5	EX								0.1				
Eucalyptus moluccana	1	1	TG		1										
Austrostipa scabra	6	100	GG				6								
Anthrosachne scabra	5	100	GG				5								
Cirsium vulgare	0.1	10	EX								0.1				
Clematis glycinoides	0.1	1	OG							0.1					
Panicum queenslandicum	0.8	20	GG				0.8								
Themeda triandra	1	50	GG				1								
Calotis lappulacea	0.1	20	FG					0.1							
Bidens pilosa	0.1	10	EX								0.1				
Digitaria divaricatissima	0.1	10	GG				0.1								
Glycine tabacina	0.2	30	OG							0.2					
Eremophila debilis	0.4	50	SG			0.4									
Mentha satureioides	0.2	30	FG					0.2							
Pimelea linifolia	0.1	5	SG			0.1									
Schoenus ericetorum	0.1	20	GG				0.1								
Sporobolus creber	0.8	20	GG				0.8								
Sida rhombifolia	0.1	1	EX								0.1				
Veronica plebeia	2	100	FG					2							
Cotoneaster pannosus	0.1	1	EX								0.1				
Centaurium tenuiflorum	0.1	10	EX								0.1				
Hydrocotyle laxiflora	0.1	10	FG					0.1							
Fimbristylis dichotoma	0.1	10	GG				0.1								
Asperula conferta	0.1	10	FG					0.1							
Vernonia cinerea	0.1	10	FG					0.1							
Acacia implexa	0.2	1	SG			0.2									
Paspalidium distans	0.2	20	GG				0.2								

D1.29 3438 – Hunter Escarpment Footslopes Ironbark Forest (Mod-good)

DL-63

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-63		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3438	Mod-good	35	33	5	8	11	5	0	4	2	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	170.3	170.1	71.1	13.7	65.9	18.4	0	1	0.2	0	
Acacia amblygona	3	15	SG			3							
Acacia cultriformis	0.1	2	SG			0.1							
Acacia falcata	5	30	SG			5							
Acacia parramattensis	0.1	3	TG		0.1								
Amyema spp.	0.1	3	OG							0.1			
Bidens subalternans	0.1	5	EX								0.1		
Breynia oblongifolia	1	5	SG			1							
Bursaria spinosa	1	8	SG			1							
Chloris ventricosa	3	10	GG				3						
Corymbia maculata	40	60	TG		40								
Cymbopogon refractus	2	40	GG				2						
Cyperus gracilis	0.4	100	GG				0.4						
Dianella caerulea	2	10	FG					2					
Dianella prunina	1	10	FG					1					
Dichondra repens	0.3	500	FG					0.3					
Digitaria parviflora	30	80	GG				30						
Entolasia stricta	5	50	GG				5						
Eragrostis brownii	1	50	GG				1						
Eucalyptus crebra	20	5	TG		20								
Eucalyptus moluccana	10	17	TG		10								
Gahnia aspera	10	3	GG				10						
Glycine clandestina	0.1	30	OG							0.1			
Grona varians	0.3	10	OG							0.3			
Hardenbergia violacea	0.5	2	OG							0.5			
Hypochaeris radicata	0.1	2	EX								0.1		
Lobelia pratioides	15	1000	FG					15					
Lomandra multiflora subsp. multif	1	10	GG				1						
Notelaea longifolia	1	5	TG		1								
Olearia elliptica	3	10	SG			3							
Oplismenus aemulus	3	50	GG				3						
Pimelea neo-anglica	0.5	2	SG			0.5							
Poa spp.	10	30	GG				10						
Pseuderanthemum variabile	0.1	50	FG					0.1					
Themeda triandra	0.5	3	GG				0.5						
Trema tomentosa var. aspera	0.1	2	SG			0.1							

Easting	330126
Northing	6373532
Orientation	183
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	2
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	1
Length logs (m)	0
BAM Attributes 1x1 plot (%)	61

DL-66

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-66		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3438	Mod-good	37	36	5	9	10	5	2	5	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	136.1	135.9	54.9	15.4	60.4	2.1	0.6	2.5	0.2	0	
Acacia linearifolia	0.4	6	TG		0.4								
Acacia ulicifolia	1	10	SG			1							
Aristida ramosa	10	50	GG				10						
Bidens subalternans	0.2	5	EX								0.2		
Brachychiton populneus	0.5	1	TG		0.5								
Breynia oblongifolia	0.4	3	SG			0.4							
Bursaria spinosa	5	8	SG			5							
Cheilanthes distans	0.1	15	EG						0.1				
Cheilanthes sieberi	0.5	50	EG						0.5				
Choretrum sp. A	0.1	1	SG			0.1							
Corymbia maculata	40	19	TG		40								
Cymbopogon refractus	3	10	GG				3						
Cyperus gracilis	3	100	GG				3						
Desmodium rhytidophyllum	0.5	3	FG					0.5					
Dianella prunina	0.8	3	FG					0.8					
Dichelachne crinita	1	3	GG				1						
Entolasia stricta	1	4	GG				1						
Eragrostis brownii	1	50	GG				1						
Eucalyptus crebra	10	7	TG		10								
Eucalyptus punctata	4	1	TG		4								
Exocarpos cupressiformis	2	5	SG			2							
Glycine microphylla	0.5	50	OG							0.5			
Glycine tabacina	0.4	30	OG							0.4			
Grona varians	0.2	100	OG							0.2			
Hardenbergia violacea	0.4	3	OG							0.4			
Lagenophora stipitata	0.4	10	FG					0.4					
Lomandra filiformis	0.4	5	GG				0.4						
Lomandra multiflora subsp. multiflora	0.5	10	GG				0.5						
Macrozamia communis	1	2	OG							1			
Melichrus urceolatus	2	50	SG			2							
Olearia elliptica	4	20	SG			4							
Oplismenus aemulus	0.5	10	GG				0.5						
Oxytes brachypoda	0.3	5	FG					0.3					
Persoonia linearis	0.3	1	SG			0.3							
Pimelea neo-anglica	0.6	2	SG			0.6							
Pseuderanthemum variabile	0.1	50	FG					0.1					
Themeda triandra	40	60	GG				40						

Easting	330065
Northing	6373275
Orientation	82
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	1
Length logs (m)	25
BAM Attributes 1x1 plot (%)	75

DL-73

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-73		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3438	Mod-good	62	58	5	18	17	10	2	6	3	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	135.7	135.3	40.1	70.7	18.7	2.9	0.3	2.6	0.3	0.1	
Acacia cultriformis	2	13	SG			2							
Acacia falcata	0.5	2	SG			0.5							
Acacia implexa	1	5	SG			1							
Acacia parramattensis	10	30	TG		10								
Alt cordate vine leaves 15 cm length 5 cm width	0.3	10	OG							0.3			
Aristida personata	0.2	20	GG				0.2						
Aristida ramosa	10	40	GG				10						
Austrostipa verticillata	0.5	2	GG				0.5						
Bidens pilosa	0.1	1	EX								0.1		
Bothriochloa decipiens var. decipiens	0.5	20	GG				0.5						
Brachychiton populneus	0.1	2	TG		0.1								
Breynia oblongifolia	0.3	2	SG			0.3							
Bursaria spinosa	10	30	SG			10							
Carex inversa	0.2	40	GG				0.2						
Cassinia spp.	1	15	SG			1							
Cheilanthes austrotenuifolia	0.2	5	EG						0.2				
Cheilanthes distans	0.1	100	EG						0.1				
Choretrum sp. A	0.4	6	SG			0.4							
Corymbia maculata	10	6	TG		10								
Cymbopogon refractus	2	15	GG				2						
Cyperus gracilis	0.5	50	GG				0.5						
Desmodium rhytidophyllum	0.4	30	FG					0.4					
Dianella prunina	0.2	3	FG					0.2					
Dianella revoluta	0.4	3	FG					0.4					
Dichondra repens	0.5	500	FG					0.5					
Digitaria ramularis	0.5	15	GG				0.5						
Discolorus alt shrub 5cm long 1 cm width	0.4	2	SG			0.4							
Dodonaea viscosa subsp. cuneata	5	20	SG			5							
Entolasia stricta	0.4	20	GG				0.4						
Eragrostis leptostachya	0.6	20	GG				0.6						
Eucalyptus crebra	15	10	TG		15								
Eucalyptus moluccana	5	3	TG		5								
Exocarpos strictus	3	14	SG			3							
Gahnia aspera	0.2	3	GG				0.2						
Galium binifolium	0.3	50	FG					0.3					
Glycine clandestina	0.5	20	OG							0.5			
Glycine tabacina	0.3	10	OG							0.3			
Grass sedge	0.2	15	GG				0.2						
Grevillea montana	1	1	SG			1							
Grona varians	0.2	20	OG							0.2			
Hardenbergia violacea	0.3	7	OG							0.3			
Lantana camara	0.1	1	HT									0.1	
Lepidosperma laterale	1	4	GG				1						
Leucopogon lanceolatus	0.2	5	SG			0.2							
Lobelia purpurascens	0.4	20	FG					0.4					
Macrozamia communis	1	3	OG							1			
Olearia elliptica	40	100	SG			40							
Oplismenus aemulus	0.1	2	GG				0.1						
Opuntia stricta	0.1	1	EX								0.1		
Oxalis perennans	0.1	15	FG					0.1					
Oxytes brachypoda	0.3	3	FG					0.3					
Panicum effusum	0.4	5	GG				0.4						
Persoonia linearis	0.3	2	SG			0.3							
Phyllanthus gunnii	0.1	2	SG			0.1							
Pimelea neo-anglica	0.5	6	SG			0.5							
Plantago debilis	0.1	2	FG					0.1					
Pullenia gunnii	0.2	20	FG					0.2					
Sporobolus creber	1	15	GG				1						
Square stemmed shrub toothed alt leaves	3	20	SG			3							
Themeda triandra	0.4	6	GG				0.4						
Trema tomentosa var. aspera	2	3	SG			2							
Verbena bonariensis	0.1	1	EX								0.1		

Easting	328787
Northing	6373343
Orientation	145
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	1
30-49	6
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	1
Length logs (m)	50
BAM Attributes 1x1 plot (%)	59

D1.30 3439 – Hunter Escarpment Grey Gum Sheltered Forest (Mod-good)

Benchmark

D1.31 3444 – Lower Hunter Spotted Gum-Ironbark Forest (Derived)

TC-07

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC-07		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Derived	27	23	2	7	7	6	1	0	3	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	90.1	89.6	0.3	48.2	40.4	0.6	0.1	0	0.4	0.1
Eucalyptus moluccana	0.2	2	TG		0.2							
Acacia elongata	35	60	SG			35						
Casuarina glauca	0.1	1	TG		0.1							
Grevillea montana	1	10	SG			1						
Dodonaea sinuolata	10	20	SG			10						
Lobelia purpurascens	0.1	30	FG					0.1				
Acacia falcata	1	10	SG			1						
Dichondra repens	0.1	15	FG					0.1				
Cheilanthes sieberi	0.1	30	EG						0.1			
Senecio madagascariensis	0.1	10	HT									0.1
Callistemon linearis	1	5	SG			1						
Lysimachia arvensis	0.2	30	EX								0.2	
Wahlenbergia communis	0.1	5	FG					0.1				
Lomandra multiflora subsp. multiflora	3	20	GG				3					
Melichrus urceolatus	0.1	1	SG			0.1						
Gahnia aspera	15	40	GG				15					
Eragrostis brownii	0.1	20	GG				0.1					
Lepidosperma gunnii	7	30	GG				7					
Cymbopogon refractus	0.3	30	GG				0.3					
Conyza bilbaoana	0.1	10	EX								0.1	
Cyperus gracilis	7	60	GG				7					
Digitaria diffusa	8	40	GG				8					
Cyclospermum leptophyllum	0.1	10	EX								0.1	
Oxalis perennans	0.1	5	FG					0.1				
Centella asiatica	0.1	10	FG					0.1				
Chorizema parviflorum	0.1	2	SG			0.1						
Laxmannia gracilis	0.1	5	FG					0.1				

Easting	326388
Northing	6378325
Orientation	120
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	19

D1.32 3444 – Lower Hunter Spotted Gum-Ironbark Forest (Mod-good)

DL-43

Date	29/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	326780
Plot Name	DL_43		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6377690
PCT	3444	Mod-good	36	36	7	9	8	7	1	4	0	0		Orientation	305
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	142.4	142.4	63.3	28.9	46.5	2.1	0.1	1.5	0	0		BAM Attributes 20x50m plot	
Acacia parramattensis	0.3	2	TG		0.3									Stem classes	
Allocasuarina luehmannii	10	15	TG		10									80+	0
Aristida vagans	1	30	GG				1							50-79	1
Callitris endlicheri	1	2	TG		1									30-49	11
Cassytha glabella	0.2	10	OG							0.2				20-29	y
Cheilanthes sieberi	0.1	10	EG						0.1					10-19	y
Corymbia maculata	30	20	TG		30									5-9	y
Cymbopogon refractus	3	30	GG				3							<5	y
Dianella revoluta	0.6	5	FG					0.6						Regen	y
Dianella tasmanica	0.4	10	FG					0.4						Hollows	0
Digitaria ramularis	1	30	GG				1							Length logs (m)	11
Dodonaea viscosa subsp. angustifo	20	50	SG			20									
Entolasia stricta	20	200	GG				20							BAM Attributes 1x1 plot (%)	39
Eucalyptus fibrosa	2	5	TG		2										
Eucalyptus moluccana	15	5	TG		15										
Eucalyptus punctata	5	2	TG		5										
Exocarpos strictus	2	5	SG			2									
Fimbristylis dichotoma	0.2	50	GG				0.2								
Gahnia aspera	0.5	2	GG				0.5								
Glycine tabacina	0.1	20	OG							0.1					
Goodenia ovata	0.1	1	SG			0.1									
Grevillea montana	1	3	SG			1									
Laxmannia gracilis	0.3	5	FG					0.3							
Lepidosperma cf. laterale	20	80	GG				20								
Lobelia purpurascens	0.4	200	FG					0.4							
Lomandra filiformis subsp. filiform	0.8	10	GG				0.8								
Melaleuca nodosa	4	5	SG			4									
Monotoca scoparia	0.3	2	SG			0.3									
Olearia elliptica	1	5	SG			1									
Oxalis perennans	0.1	50	FG					0.1							
Parsonsia straminea	0.2	5	OG							0.2					
Pseuderanthemum variabile	0.2	200	FG					0.2							
Shrub with toothed at end of leaf	0.3	2	SG			0.3									
Silver back small shrub alternate le	0.2	1	SG			0.2									
Stylidium graminifolium	0.1	40	FG					0.1							
Xanthorrhoea spp.	1	2	OG							1					

DL-44

Date	29/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	326231
Plot Name	DL_44		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6378182
PCT	3444	Mod-good	37	35	7	10	9	5	1	3	2	0		Orientation	312
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	118.8	118.6	71.5	34.3	9.7	2.2	0.1	0.8	0.2	0		BAM Attributes 20x50m plot	
Acacia amblygona	0.2	3	SG			0.2								Stem classes	
Acacia parramattensis	1	3	TG		1									80+	0
Aristida vagans	0.4	6	GG				0.4							50-79	0
Brunoniella australis	1	100	FG					1						30-49	5
Bursaria spinosa	1	3	SG			1								20-29	y
Callitris glaucophylla	10	25	TG		10									10-19	y
Cheilanthes sieberi	0.1	30	EG						0.1					5-9	y
Conyza bonariensis	0.1	2	EX								0.1			<5	y
Corymbia maculata	20	14	TG		20									Regen	y
Dodonaea sinuolata	25	80	SG			25								Hollows	0
Entolasia stricta	5	50	GG				5							Length logs (m)	21
Eragrostis leptostachya	0.5	10	GG				0.5								
Eucalyptus fibrosa	10	3	TG		10									BAM Attributes 1x1 plot (%)	61
Eucalyptus moluccana	5	4	TG		5										
Eucalyptus punctata	25	5	TG		25										
Exocarpos strictus	5	20	SG			5									
Gahnia aspera	0.6	4	GG				0.6								
Glycine microphylla	0.1	2	OG							0.1					
Glycine tabacina	0.1	5	OG							0.1					
Goodenia rotundifolia	0.1	4	FG					0.1							
Grevillea montana	0.2	2	SG			0.2									
Lepidosperma cf. laterale	1	20	GG				1								
Lobelia purpurascens	0.6	100	FG					0.6							
Lomandra filiformis subsp. filiform	0.9	40	GG				0.9								
Lomandra multiflora subsp. multifl	1	30	GG				1								
Macrozamia communis	0.6	1	OG							0.6					
Monotoca scoparia	1	6	SG			1									
Notelaea longifolia	0.5	2	TG		0.5										
Olearia elliptica	1	10	SG			1									
Persoonia linearis	0.1	2	SG			0.1									
Pseuderanthemum variabile	0.3	100	FG					0.3							
Richardia stellaris	0.1	10	EX								0.1				
Rytidosperma fulvum	0.2	5	GG				0.2								
Rytidosperma spp.	0.1	1	GG				0.1								
Solanum cinereum	0.3	3	SG			0.3									
Stylidium graminifolium	0.2	5	FG					0.2							
Styphelia triflora	0.5	3	SG			0.5									

DL-62

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-62		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3444	Mod-good	52	51	6	16	14	9	1	5	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	166.2	166	66	60.3	33.9	3.9	0.3	1.6	0.2	0	
Acacia cultriformis	1	20	SG			1							
Acacia parramattensis	0.5	3	TG		0.5								
Allocasuarina torulosa	5	20	TG		5								
Aristida vagans	5	100	GG				5						
Breynia oblongifolia	0.9	20	SG			0.9							
Bursaria spinosa	50	200	SG			50							
Cassytha glabella	0.1	5	OG							0.1			
Cheilanthes sieberi	0.3	100	EG						0.3				
Correa reflexa	1	10	SG			1							
Corymbia maculata	40	15	TG		40								
Cymbopogon refractus	3	10	GG				3						
Daviesia ulicifolia	0.4	10	SG			0.4							
Denhamia silvestris	0.1	5	SG			0.1							
Dianella prunina	0.4	5	FG					0.4					
Dianella tasmanica	0.6	3	FG					0.6					
Dichelachne micrantha	1	20	GG				1						
Dichondra repens	0.5	500	FG					0.5					
Digitaria parviflora	15	100	GG				15						
Entolasia stricta	1	20	GG				1						
Eragrostis brownii	3	100	GG				3						
Eucalyptus crebra	5	3	TG		5								
Eucalyptus fibrosa	15	3	TG		15								
Gahnia aspera	0.5	3	GG				0.5						
Glycine clandestina	0.4	5	OG							0.4			
Goodenia ovata	0.3	10	SG			0.3							
Grevillea montana	0.5	20	SG			0.5							
Hardenbergia violacea	0.5	1	OG							0.5			
Hibbertia diffusa	1	4	SG			1							
Hypericum gramineum	0.1	2	FG					0.1					
Hypochaeris glabra	0.2	2	EX								0.2		
Lepidosperma gunnii	0.5	2	GG				0.5						
Lepidosperma laterale	1	10	GG				1						
Leucopogon lanceolatus	0.2	1	SG			0.2							
Lissanthe strigosa	0.5	5	SG			0.5							
Lissanthe strigosa	0.2	3	SG			0.2							
Lobelia purpurascens	1	100	FG					1					
Lomandra filiformis subsp. coriacea	0.5	3	GG				0.5						
Lomandra multiflora subsp. multiflora	0.1	4	GG				0.1						
Melichrus urceolatus	2	5	SG			2							
Muellerina eucalyptoides	0.5	2	OG							0.5			
Notelaea longifolia	0.5	3	TG		0.5								
Oplismenus aemulus	0.3	20	GG				0.3						
Panicum effusum	1	20	GG				1						
Persoonia linearis	1	20	SG			1							
Phyllanthus hirtellus	0.6	30	SG			0.6							
Pseuderanthemum variabile	0.1	10	FG					0.1					
Pterostylis concinna	0.1	10	FG					0.1					
Solenogyne bellioides	1	100	FG					1					
Stephania japonica var. discolor	0.1	1	OG							0.1			
Themeda triandra	2	12	GG				2						
Trema tomentosa var. aspera	0.6	10	SG			0.6							
Vernonia cinerea	0.1	4	FG					0.1					

Easting	330251
Northing	6373930
Orientation	23
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	11
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	78

DL-70

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-70		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3444	Mod-good	52	51	4	18	13	8	2	6	1	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	163.3	163.2	86	23.4	47.6	3.8	0.5	1.9	0.1	0	
Acacia amblygona	0.5	3	SG			0.5							
Acacia cultriformis	1	5	SG			1							
Acacia implexa	4	50	SG			4							
Acacia linifolia	1	8	SG			1							
Acacia parramattensis	30	100	TG		30								
Aristida vagans	1	30	GG				1						
Astrotricha latifolia	0.3	1	SG			0.3							
Bursaria spinosa	3	15	SG			3							
Cheilanthes distans	0.1	30	EG						0.1				
Cheilanthes sieberi	0.4	50	EG						0.4				
Correa reflexa	2	20	SG			2							
Corymbia maculata	40	17	TG		40								
Cymbopogon refractus	20	100	GG				20						
Daviesia ulicifolia	0.4	2	SG			0.4							
Denhamia silvestris	2	30	SG			2							
Desmodium rhytidophyllum	0.2	3	FG					0.2					
Dianella prunina	0.5	3	FG					0.5					
Dianella revoluta	0.3	5	FG					0.3					
Dichondra repens	0.3	100	FG					0.3					
Digitaria parviflora	5	50	GG				5						
Dodonaea viscosa	1	15	SG			1							
Entolasia stricta	10	100	GG				10						
Eragrostis brownii	3	15	GG				3						
Eucalyptus fibrosa	10	3	TG		10								
Eucalyptus punctata	6	1	TG		6								
Exocarpos strictus	0.5	3	SG			0.5							
Gahnia aspera	1	10	GG				1						
Glycine clandestina	0.4	5	OG							0.4			
Glycine microphylla	0.3	10	OG							0.3			
Glycine tabacina	0.3	10	OG							0.3			
Goodenia rotundifolia	0.3	10	FG					0.3					
Grevillea montana	0.4	2	SG			0.4							
Grey opposite shrub	1	5	SG			1							
Grona varians	0.2	20	OG							0.2			
Hardenbergia violacea	0.5	15	OG							0.5			
Lepidosperma gunnii	1	20	GG				1						
Lepidosperma laterale	1	10	GG				1						
Lomandra filiformis subsp. filiformis	1	15	GG				1						
Lomandra multiflora subsp. multiflora	1	10	GG				1						
Olearia elliptica	5	30	SG			5							
Oplismenus aemulus	0.5	10	GG				0.5						
Opposite vine with white mid vein	0.2	3	OG							0.2			
Opuntia stricta	0.1	1	EX								0.1		
Oxytes brachypoda	2	10	FG					2					
Panicum simile	0.1	2	GG				0.1						
Persoonia linearis	0.3	2	SG			0.3							
Phyllanthus hirtellus	0.5	30	SG			0.5							
Podolobium ilicifolium	0.2	1	SG			0.2							
Pseuderanthemum variabile	0.1	10	FG					0.1					
Small opposite herb furry	0.1	3	FG					0.1					
Themeda triandra	3	50	GG				3						
Toothed shrub alt discolourus	0.3	5	SG			0.3							

Easting	328511
Northing	6373742
Orientation	95
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	0
Length logs (m)	8
BAM Attributes 1x1 plot (%)	52

D1.33 3446 – Lower North Foothills Ironbark-Box-Gum Grassy Forest (Mod-good)

DL-39

Date	27/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	329802
Plot Name	DL_39		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6372582
PCT	3446	Mod-good	41	41	4	11	9	13	1	3	0	0		Orientation	110
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	165.9	165.9	80	16.1	63.6	4.9	0.4	0.9	0	0		BAM Attributes 20x50m plot	
Acacia implexa	1	19	SG			1								Stem classes	
Acrotriche divaricata	0.7	40	SG			0.7								80+	0
Allocasuarina littoralis	30	100	TG		30									50-79	0
Alternate rough herb	0.2	50	FG					0.2						30-49	0
Aristida vagans	0.9	10	GG				0.9							20-29	y
Breynia oblongifolia	0.8	5	SG			0.8								10-19	y
Bursaria spinosa	0.5	5	SG			0.5								5-9	y
Cheilanthes sieberi	0.4	100	EG						0.4					<5	y
Corymbia maculata	30	80	TG		30									Regen	y
Cymbopogon refractus	5	20	GG				5							Hollows	0
Desmodium brachypodum	0.5	5	FG					0.5						Length logs (m)	5
Desmodium rhytidophyllum	0.3	15	FG					0.3							
Dianella caerulea var. cinerascens	0.6	30	FG					0.6						BAM Attributes 1x1 plot (%)	71
Dianella longifolia	0.4	5	FG					0.4							
Dichondra repens	0.3	100	FG					0.3							
Digitaria ramularis	0.8	20	GG				0.8								
Entolasia stricta	50	100	GG				50								
Eragrostis leptostachya	2	50	GG				2								
Eucalyptus crebra	5	3	TG		5										
Eucalyptus punctata	15	20	TG		15										
Exocarpos strictus	5	30	SG			5									
Glycine latifolia	0.3	100	OG							0.3					
Glycine tabacina	0.3	50	OG							0.3					
Goodenia rotundifolia	0.5	60	FG					0.5							
Hardenbergia violacea	0.3	5	OG							0.3					
Hibbertia diffusa	1	30	SG			1									
Leucopogon juniperinus	1	30	SG			1									
Lobelia purpurascens	0.2	100	FG					0.2							
Lomandra filiformis subsp. coriace	1	20	GG				1								
Microlaena stipoides	2	80	GG				2								
Olearia elliptica	2	30	SG			2									
Panicum effusum	0.9	10	GG				0.9								
Persoonia linearis	1	6	SG			1									
Phyllanthus gunnii	0.1	20	SG			0.1									
Podolobium ilicifolium	3	20	SG			3									
Pomax umbellata	0.4	100	FG					0.4							
Pseuderanthemum variabile	0.4	100	FG					0.4							
Sida cunninghamii	0.2	80	FG					0.2							
Themeda triandra	1	10	GG				1								
Tricoryne elatior	0.3	5	FG					0.3							
Vernonia cinerea	0.6	50	FG					0.6							

D1.34 3489 – Hunter Escarpment Grey Box Forest (Mod-good)

DL-31

Date	19/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_31		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3489	Mod-good	64	56	7	15	12	15	1	6	8	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	172.9	171.7	62.3	14.2	90.1	2.4	0.1	2.6	1.2	0	
Acacia implexa	0.5	2	SG			0.5							
Acacia linearifolia	2	10	TG		2								
Allocasuarina torulosa	15	20	TG		15								
Alphitonia excelsa	0.3	2	TG		0.3								
Amyema cambagei	0.2	3	OG							0.2			
Arthropodium milleflorum	0.1	5	FG					0.1					
Asperula conferta	0.3	1000	FG					0.3					
Bidens subalternans	0.1	5	EX								0.1		
Brachychiton populneus	1	3	TG		1								
Breynia oblongifolia	1	30	SG			1							
Bursaria spinosa	5	10	SG			5							
Cheilanthes sieberi	0.1	2	EG						0.1				
Chloris ventricosa	1	5	GG				1						
Chrysocephalum apiculatum	0.1	5	FG					0.1					
Cirsium vulgare	0.2	3	EX								0.2		
Commelina cyanea	0.2	20	FG					0.2					
Conyza bonariensis	0.1	4	EX								0.1		
Cymbopogon refractus	10	100	GG				10						
Cyperus gracilis	0.2	500	GG				0.2						
Daviesia genistifolia	0.2	1	SG			0.2							
Desmodium spp.	1	50	OG							1			
Dianella prunina	0.1	3	FG					0.1					
Dichondra repens	0.2	1000	FG					0.2					
Dodonaea triquetra	0.6	8	SG			0.6							
Einadia hastata	0.2	20	FG					0.2					
Eragrostis brownii	0.5	50	GG				0.5						
Eragrostis leptostachya	0.5	3	GG				0.5						
Eremophila debilis	0.2	3	SG			0.2							
Eucalyptus acmenoides	1	2	TG		1								
Eucalyptus crebra	3	3	TG		3								
Eucalyptus moluccana	40	11	TG		40								
Fimbristylis dichotoma	0.1	3	GG				0.1						
Geitonoplesium cymosum	0.2	3	OG							0.2			
Geranium homeanum	0.1	5	FG					0.1					
Glycine clandestina	0.5	20	OG							0.5			
Glycine latifolia	0.5	100	OG							0.5			
Glycine microphylla	0.2	20	OG							0.2			
Hibbertia spp.	0.1	2	SG			0.1							
Hibbertia spp.	0.5	3	SG			0.5							
Hypericum gramineum	0.1	3	FG					0.1					
Lobelia purpurascens	0.1	200	FG					0.1					
Lomandra longifolia	0.3	5	GG				0.3						
Melichrus urceolatus	0.6	50	SG			0.6							
Microlaena stipoides	1	10	GG				1						
Myrsine howittiana	0.2	4	SG			0.2							
Oplismenus imbecillis	0.5	15	GG				0.5						
Opuntia stricta	0.1	1	EX								0.1		
Oxalis perennans	0.1	10	FG					0.1					
Panicum simile	1	10	GG				1						
Persoonia linearis	1	3	SG			1							
Phyllanthus gunnii	0.3	50	SG			0.3							
Plantago lanceolata	0.1	2	EX								0.1		
Pseuderanthemum variabile	0.3	100	FG					0.3					
Richardia brasiliensis	0.4	30	EX								0.4		
Rubus moluccanus	0.5	20	SG			0.5							
Sida rhombifolia	0.1	5	EX								0.1		
Sigesbeckia australiensis	0.3	50	FG					0.3					
Solanum prinophyllum	0.1	5	FG					0.1					
Solanum stelligerum	3	15	SG			3							
Sporobolus creber	5	15	GG				5						
Themeda triandra	70	200	GG				70						
Trema tomentosa var. aspera	0.5	4	SG			0.5							
Verbena bonariensis	0.1	2	EX								0.1		
Veronica plebeia	0.1	5	FG					0.1					

Easting	333428
Northing	6360076
Orientation	0
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	6
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	17
BAM Attributes 1x1 plot (%)	90

D1.35 3581 – Hunter Coast Foothills Apple Forest (Mod-good)

TC-16

Date	30/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC-16		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3581	Mod-good	42	42	7	6	6	8	2	13	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	81.1	81.1	34.5	28.6	14.3	0.9	1.1	1.7	0	0
Acacia floribunda	0.1	2	SG			0.1						
Acacia ulicifolia	8	24	SG			8						
Acrotriche divaricata	5	2	SG			5						
Allocasuarina torulosa	5	13	TG		5							
Angophora costata	15	14	TG		15							
Billardiera scandens	0.1	4	OG							0.1		
Cordyline stricta	0.1	1	OG							0.1		
Corymbia gummifera	0.5	1	TG		0.5							
Dianella caerulea	0.1	3	FG					0.1				
Entolasia stricta	3	10	GG				3					
Eucalyptus agglomerata	1	1	TG		1							
Eucalyptus pilularis	10	4	TG		10							
Eucalyptus punctata	2	3	TG		2							
Exocarpos cupressiformis	0.5	3	SG			0.5						
Geitonoplesium cymosum	0.1	1	OG							0.1		
Glycine clandestina	0.1	8	OG							0.1		
Goodenia heterophylla	0.2	20	FG					0.2				
Grona varians	0.1	3	OG							0.1		
Hardenbergia violacea	0.1	1	OG							0.1		
Hibbertia scandens	0.2	3	OG							0.2		
Hybanthus monopetalus	0.1	10	FG					0.1				
Hypericum gramineum	0.1	2	FG					0.1				
Imperata cylindrica	5	40	GG				5					
Lagenophora gracilis	0.1	3	FG					0.1				
Lepidosperma laterale	0.1	2	GG				0.1					
Lindsaea microphylla	0.1	2	EG						0.1			
Lomandra longifolia	5	15	GG				5					
Oplismenus aemulus	0.2	15	GG				0.2					
Pandorea pandorana	0.1	1	OG							0.1		
Parsonsia straminea	0.1	2	OG							0.1		
Persoonia linearis	10	19	SG			10						
Pimelea linifolia	5	0.2	SG			5						
Pomax umbellata	0.1	10	FG					0.1				
Pseuderanthemum variabile	0.1	10	FG					0.1				
Pteridium esculentum	1	12	EG						1			
Sarcopetalum harveyanum	0.1	1	OG							0.1		
Smilax australis	0.1	1	OG							0.1		
Stephania japonica	0.1	1	OG							0.1		
Syncarpia glomulifera	1	1	TG		1							
Themeda triandra	1	20	GG				1					
Viola betonicifolia	0.1	3	FG					0.1				
Xanthorrhoea spp.	0.4	4	OG							0.4		

Easting	348557
Northing	6339848
Orientation	219
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	17
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	20
BAM Attributes 1x1 plot (%)	54

D1.36 3599 – Blue Mountains Peppermint Shrub Forest (Mod-good)

TC-05

Date	17/04/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	TC-05		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3599	Mod-good	28	28	5	12	2	3	1	5	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	163.5	163.5	58	53.9	3.5	0.4	0.5	47.2	0	0	
Angophora costata	25	5	TG		25								
Eucalyptus piperita	7	1	TG		7								
Syncarpia glomulifera	10	8	TG		10								
Allocasuarina torulosa	1	8	TG		1								
Xanthorrhoea arborea	6	7	OG							6			
Lambertia formosa	2	5	SG			2							
Acacia terminalis subsp.	40	50	SG			40							
Acacia difformis	15	20	TG		15								
Diospyros australis	2	7	SG			2							
Banksia spinulosa	6	7	SG			6							
Pimelea ligustrina	1	15	SG			1							
Podolobium ilicifolium	0.5	3	SG			0.5							
Exocarpos strictus	0.1	1	SG			0.1							
Telopea speciosissima	0.1	1	SG			0.1							
Phyllanthus gunnii	1	4	SG			1							
Amyema spp.	0.1	1	OG							0.1			
Persoonia linearis	0.1	1	SG			0.1							
Xanthosia pilosa	0.1	1	FG					0.1					
Hardenbergia violacea	1	5	OG							1			
Lomandra obliqua	0.5	3	GG				0.5						
Cassytha pubescens	40	1	OG							40			
Billardiera scandens	0.1	1	OG							0.1			
Pteridium esculentum	0.5	3	EG						0.5				
Chloanthes stoechadis	1	4	SG			1							
Entolasia stricta	3	5	GG				3						
Pomax umbellata	0.1	1	FG					0.1					
Actinotus helianthi	0.2	5	FG					0.2					
Hibbertia empetrifolia s	0.1	1	SG			0.1							

Easting	333980
Northing	6354902
Orientation	111
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	2
30-49	4
20-29	y
10-19	y
5-9	y
<5	y
Regen	y
Hollows	3
Length logs (m)	20
BAM Attributes 1x1 plot (%)	74
Litter (%)	30
	100
	80
	90
	70

TC-12

Date	29/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-12		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3599	Mod-good	20	20	4	9	2	2	0	3	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	98.7	98.7	78	16.2	3	0.2	0	1.3	0	0	
Acacia obtusifolia	2	20	SG			2							
Acacia parvipinnula	2	20	SG			2							
Allocasuarina torulosa	60	100	TG		60								
Angophora costata	5	17	TG		5								
Billardiera scandens	0.1	5	OG							0.1			
Chloanthes stoechadis	0.1	1	SG			0.1							
Dianella caerulea	0.1	1	FG					0.1					
Entolasia stricta	2	20	GG				2						
Eucalyptus piperita	10	8	TG		10								
Gompholobium latifolium	0.1	2	SG			0.1							
Goodenia heterophylla	0.1	2	FG					0.1					
Hardenbergia violacea	0.2	20	OG							0.2			
Lomandra obliqua	1	50	GG				1						
Lomatia silaifolia	2	10	SG			2							
Ozothamnus diosmifolius	5	0.5	SG			5							
Platysace linearifolia	2	15	SG			2							
Podolobium ilicifolium	2	25	SG			2							
Syncarpia glomulifera	3	13	TG		3								
Xanthorrhoea spp.	1	2	OG							1			
Xylomelum pyriforme	1	3	SG			1							

Easting	333753
Northing	6351171
Orientation	18
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	10
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	48
BAM Attributes 1x1 plot (%)	80

TC-17

Date	31/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-17		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3599	Mod-good	26	26	5	15	2	1	1	2	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	38.5	38.5	13.3	21.7	0.7	0.1	0.2	2.5	0	0	
Acacia parvipinnula	10	25	SG			10							
Acacia terminalis	3	20	SG			3							
Acacia ulicifolia	0.2	4	SG			0.2							
Allocasuarina torulosa	1	20	TG		1								
Angophora costata	8	8	TG		8								
Banksia serrata	0.1	2	TG		0.1								
Banksia spinulosa	1	2	SG			1							
Entolasia stricta	0.5	20	GG				0.5						
Eucalyptus scias	4	2	TG		4								
Exocarpos cupressiformis	0.1	2	SG			0.1							
Goodenia heterophylla	0.1	5	FG					0.1					
Hardenbergia violacea	0.5	25	OG							0.5			
Hibbertia obtusifolia	0.5	20	SG			0.5							
Lambertia formosa	0.5	2	SG			0.5							
Leptospermum trinervium	1	7	SG			1							
Lomandra obliqua	0.2	10	GG				0.2						
Lomatia silaifolia	0.5	6	SG			0.5							
Persoonia linearis	0.5	5	SG			0.5							
Pimelea linifolia	2	10	SG			2							
Platysace linearifolia	0.2	5	SG			0.2							
Podolobium ilicifolium	2	15	SG			2							
Pteridium esculentum	0.2	10	EG						0.2				
Rubus parvifolius	0.1	3	SG			0.1							
Syncarpia glomulifera	0.2	1	TG		0.2								
Tetratheca thymifolia	0.1	1	SG			0.1							
Xanthorrhoea spp.	2	8	OG							2			

Easting	333872
Northing	6354529
Orientation	100
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	2
50-79	0
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	47
BAM Attributes 1x1 plot (%)	44

D1.37 3605 – Hunter Range Ironbark Forest (Mod-good)

DL-04

Date	24/08/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-04		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3605	Mod-good	24	24	5	8	7	2	1	1	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	115.6	115.6	32	75.9	6.4	0.2	0.1	1	0	0	
Acacia parvipinnula	0.5	5	SG			0.5							
Angophora costata	4	6	TG		4								
Aristida vagans	0.1	10	GG				0.1						
Austrostipa pubescens	5	15	GG				5						
Daviesia ulicifolia	20	100	SG			20							
Dianella longifolia	0.1	5	FG					0.1					
Entolasia stricta	0.5	20	GG				0.5						
Eucalyptus fergusonii	3	3	TG		3								
Eucalyptus globoidea	5	4	TG		5								
Eucalyptus punctata	5	1	TG		5								
Eucalyptus racemosa	15	5	TG		15								
Exocarpos strictus	0.1	2	SG			0.1							
Grevillea spp.	5	25	SG			5							
Hardenbergia violacea	1	50	OG							1			
Lepidosperma laterale	0.1	2	GG				0.1						
Leucopogon lanceolatus	0.1	5	SG			0.1							
Lindsaea microphylla	0.1	5	EG						0.1				
Lomandra longifolia	0.2	2	GG				0.2						
Lomandra multiflora subsp. multifla	0.1	3	GG				0.1						
Lomandra obliqua	0.4	100	GG				0.4						
Persoonia spp.	0.1	10	SG			0.1							
Phyllanthus hirtellus	0.1	10	SG			0.1							
Podolobium ilicifolium	50	150	SG			50							
Pomax umbellata	0.1	50	FG					0.1					

Easting	333606
Northing	6357647
Orientation	63
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	19
BAM Attributes 1x1 plot (%)	57

DL-21

Date	23/01/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_21		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3605	Mod-good	30	30	8	9	5	5	0	3	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	66	66	44.4	13.9	6.3	1.1	0	0.3	0	0	
Acacia implexa	1	4	SG			1							
Acacia linearifolia	0.1	3	TG		0.1								
Acacia parramattensis	2	10	TG		2								
Allocasuarina torulosa	5	7	TG		5								
Angophora euryphylla	1	1	TG		1								
Brachychiton populneus	0.3	1	TG		0.3								
Bursaria spinosa	5	16	SG			5							
Daviesia ulicifolia	0.5	1	SG			0.5							
Dianella caerulea var. caerulea	0.3	15	FG					0.3					
Entolasia stricta	5	100	GG				5						
Eucalyptus punctata	5	3	TG		5								
Eucalyptus racemosa	1	2	TG		1								
Eucalyptus sparsifolia	30	15	TG		30								
Euphorbia spp.	0.2	10	FG					0.2					
Geitonoplesium cymosum	0.1	3	OG							0.1			
Goodenia heterophylla	0.3	30	FG					0.3					
Hibbertia empetrifolia subsp. empe	0.3	15	SG			0.3							
Jacksonia scoparia	0.3	3	SG			0.3							
Lepidosperma laterale	0.5	5	GG				0.5						
Lomandra longifolia	0.5	2	GG				0.5						
Lomandra obliqua	0.2	30	GG				0.2						
Pandorea pandorana	0.1	5	OG							0.1			
Panicum simile	0.1	5	GG				0.1						
Persoonia linearis	5	30	SG			5							
Plectranthus parviflorus	0.2	4	FG					0.2					
Podolobium ilicifolium	1	10	SG			1							
Polyscias sambucifolia	0.3	4	SG			0.3							
Pomax umbellata	0.1	30	FG					0.1					
Smilax australis	0.1	4	OG							0.1			
Trema tomentosa var. aspera	0.5	6	SG			0.5							

Easting	332059
Northing	6369194
Orientation	144
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	7
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	2
Length logs (m)	28
BAM Attributes 1x1 plot (%)	65
Litter (%)	

DL-22

Date	24/01/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	DL_22		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3605	Mod-good	28	28	6	7	7	5	0	3	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	151.3	151.3	34.4	57.5	57	1	0	1.4	0	0
Acacia buxifolia	0.4	2	SG			0.4						
Acacia linearifolia	0.1	5	TG		0.1							
Acacia parramattensis	3	20	TG		3							
Allocasuarina torulosa	0.3	1	TG		0.3							
Angophora euryphylla	1	3	TG		1							
Austrostipa pubescens	5	20	GG				5					
Billardiera scandens	0.1	5	OG							0.1		
Breynia oblongifolia	0.3	2	SG			0.3						
Corymbia maculata	5	6	TG		5							
Dianella longifolia	0.1	2	FG					0.1				
Dianella revoluta	0.5	10	FG					0.5				
Entolasia stricta	50	1000	GG				50					
Eucalyptus sparsifolia	25	12	TG		25							
Gonocarpus teucrioides	0.1	3	FG					0.1				
Goodenia rotundifolia	0.1	5	FG					0.1				
Hardenbergia violacea	1	30	OG							1		
Hibbertia spp.	0.5	30	SG			0.5						
Jacksonia scoparia	0.3	5	SG			0.3						
Kennedia rubicunda	0.3	5	OG							0.3		
Lepidosperma laterale	0.1	5	GG				0.1					
Lomandra confertifolia	0.1	3	GG				0.1					
Lomandra longifolia	1	15	GG				1					
Persoonia linearis	1	6	SG			1						
Platysace lanceolata	5	50	SG			5						
Plectranthus parviflorus	0.2	15	FG					0.2				
Podolobium ilicifolium	50	50	SG			50						
Rytidosperma spp.	0.3	5	GG				0.3					
Themeda triandra	0.5	6	GG				0.5					

56

Easting	329106
Northing	6370742
Orientation	340
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	14
BAM Attributes 1x1 plot (%)	66

HTP-MS-15

Date	13/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS15		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3605	Mod-good	47	47	8	17	13	6	0	3	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	103.8	103.8	41	25.4	25.7	10.2	0	1.5	0	0
Acacia parvipinnula	2	10	SG			2						
Allocasuarina torulosa	1	8	TG		1							
Angophora costata	6	4	TG		6							
Aristida calycina var. calycina	0.2	5	GG				0.2					
Austrostipa pubescens	4	50	GG				4					
Billardiera scandens	0.1	2	OG							0.1		
Bursaria spinosa subsp. spinosa	0.1	1	SG			0.1						
Cleistochloa rigida	6	50	GG				6					
Conospermum longifolium	0.1	1	SG			0.1						
Corymbia maculata	4	6	TG		4							
Cymbopogon refractus	0.8	10	GG				0.8					
Daviesia genistifolia	1	10	SG			1						
Denhamia silvestris	0.8	5	SG			0.8						
Dianella caerulea var. producta	2	30	FG					2				
Dianella revoluta	0.8	10	FG					0.8				
Digitaria breviglumis	0.4	10	GG				0.4					
Entolasia stricta	3	40	GG				3					
Eucalyptus beyeriana	1	1	TG		1							
Eucalyptus fracta	4	7	TG		4							
Eucalyptus punctata	10	7	TG		10							
Eucalyptus sparsifolia	14	10	TG		14							
Goodenia heterophylla	1	20	FG					1				
Goodenia ovata	0.1	2	SG			0.1						
Goodenia rotundifolia	0.4	10	FG					0.4				
Hardenbergia violacea	0.4	5	OG							0.4		
Hibbertia diffusa	0.1	3	SG			0.1						
Hibbertia empetrifolia subsp. empetrifolia	0.8	15	SG			0.8						
Hibbertia spp.	1	15	SG			1						
Indigofera australis	0.6	5	SG			0.6						
Lepidosperma gunnii	4	50	GG				4					
Lepidosperma laterale	0.4	5	GG				0.4					
Leptospermum sphaerocarpum	2	10	SG			2						
Leucopogon lanceolatus	0.2	2	SG			0.2						
Leucopogon muticus	3	15	SG			3						
Lomandra confertifolia subsp. rubiginosa	4	40	GG				4					
Lomandra filiformis subsp. filiformis	0.1	3	GG				0.1					
Macrozamia communis	1	5	OG							1		
Panicum simile	0.8	15	GG				0.8					
Patersonia sericea	4	10	FG					4				
Persoonia linearis	5	30	SG			5						
Phyllanthus hirtellus	0.6	10	SG			0.6						
Poa affinis	1	15	GG				1					
Podolobium ilicifolium	3	20	SG			3						
Pomax umbellata	2	40	FG					2				
Pultenaea spinosa	5	30	SG			5						
Rytidosperma pilosum	1	30	GG				1					
Syncarpia glomulifera	1	2	TG		1							

56

Easting	330617
Northing	6371576
Orientation	199
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	15
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	7
Length logs (m)	24
BAM Attributes 1x1 plot (%)	93
Litter (%)	85
	90
	95
	100
	95

HTP-MS-26

Date	10/10/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-26		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3605	Mod-good	40	40	8	10	10	8	0	4	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	113.6	113.6	37.4	45.5	23.5	2.6	0	4.6	0	0	
Eucalyptus punctata	12	5	TG		12								
Eucalyptus agglomerata	15	10	TG		15								
Angophora costata	3	2	TG		3								
Eucalyptus crebra	0.5	1	TG		0.5								
Syncarpia glomulifera	1	1	TG		1								
Allocasuarina torulosa	0.8	3	TG		0.8								
Acacia parvipinnula	35	200	SG			35							
Hardenbergia violacea	4	80	OG							4			
Podolobium ilicifolium	5	100	SG			5							
Exocarpos strictus	1	10	SG			1							
Entolasia stricta	15	100	GG				15						
Goodenia heterophylla	1	30	FG					1					
Denhamia silvestris	0.8	10	SG			0.8							
Panicum simile	5	80	GG				5						
Persoonia linearis	1	10	SG			1							
Ozothamnus diosmifolius	0.6	8	SG			0.6							
Billardiera scandens	0.4	5	OG							0.4			
Dianella caerulea	0.8	10	FG					0.8					
Phyllanthus hirtellus	0.8	10	SG			0.8							
Dianella tasmanica	0.1	1	FG					0.1					
Lomandra confertifolia subsp. rubiginc	0.4	10	GG				0.4						
Brachyscome multifida	0.2	5	FG					0.2					
Entolasia marginata	2	30	GG				2						
Schoenus melanostachys	0.1	2	GG				0.1						
Pseuderanthemum variabile	0.1	5	FG					0.1					
Cassinia cunninghamii	0.4	5	SG			0.4							
Pomax umbellata	0.2	8	FG					0.2					
Carex spp.	0.1	3	GG				0.1						
Oxytes brachypoda	0.1	1	FG					0.1					
Olearia spp.	0.8	5	SG			0.8							
Lepidosperma laterale	0.2	5	GG				0.2						
Austrostipa pubescens	0.4	5	GG				0.4						
Poa affinis	0.1	3	GG				0.1						
Hibbertia aspera	0.1	1	SG			0.1							
Glycine clandestina	0.1	2	OG							0.1			
Lomandra filiformis subsp. filiformis	0.2	5	GG				0.2						
Notelaea longifolia	0.1	1	TG		0.1								
Dianella revoluta	0.1	1	FG					0.1					
Eucalyptus sparsifolia	5	4	TG		5								
Geitonoplesium cymosum	0.1	1	OG							0.1			

Easting	334676
Northing	6352968
Orientation	330
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	3

BAM Attributes 1x1 plot (%)	56
Leaf Litter (%)	

D1.38 3617 – Sydney Hinterland Peppermint-Apple Forest (Mod-good)

HTP-MS-65

Date	27/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-65		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3617	Mod-good	38	38	5	18	4	4	2	5	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	126.3	126.3	57	34.3	22	4.3	0.2	8.5	0	0	
Acacia suaveolens	0.8	10	SG			0.8							
Acacia terminalis	0.1	1	SG			0.1							
Acrotriche divaricata	5	20	SG			5							
Amperea xiphoclada	0.8	20	SG			0.8							
Banksia serrata	15	30	TG		15								
Banksia spinulosa	10	40	SG			10							
Bossiaea heterophylla	0.4	5	SG			0.4							
Cassytha glabella	1	50	OG							1			
Caustis flexuosa	2	40	GG				2						
Corymbia gummifera	3	8	TG		3								
Cyathochaeta diandra	2	80	GG				2						
Cymbidium suave	0.1	1	OG							0.1			
Dampiera stricta	2	40	FG					2					
Dianella caerulea	0.2	10	FG					0.2					
Dillwynia retorta	1	5	SG			1							
Drosera peltata	0.1	1	FG					0.1					
Elaeocarpus reticulatus	1	5	SG			1							
Entolasia stricta	15	100	GG				15						
Epacris longiflora	1	10	SG			1							
Epacris pulchella	1	20	SG			1							
Eucalyptus piperita	12	5	TG		12								
Eucalyptus sieberi	22	12	TG		22								
Gompholobium latifolium	1	15	SG			1							
Hakea dactyloides	3	20	SG			3							
Hakea salicifolia	1	10	SG			1							
Lindsaea linearis	0.1	5	EG						0.1				
Lomatia silaifolia	0.4	10	SG			0.4							
Mirbelia rubiifolia	0.8	20	SG			0.8							
Panicum simile	3	100	GG				3						
Patersonia glabrata	2	50	FG					2					
Persoonia levis	5	30	SG			5							
Petrophile pulchella	1	5	SG			1							
Platysace linearifolia	1	10	SG			1							
Schizaea bifida	0.1	5	EG						0.1				
Smilax glyciphylla	0.4	5	OG							0.4			
Syncarpia glomulifera subsp. glomulifera	5	20	TG		5								
Xanthorrhoea latifolia	2	5	OG							2			
Xanthorrhoea resinosa	5	30	OG							5			

Easting	345225
Northing	6338807
Orientation	93
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	6
30-49	7
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	28
BAM Attributes 1x1 plot (%)	62
Litter (%)	55
	60
	60
	70
	65

LCSM-05

Date	20/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-05		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3617	Mod-good	27	26	6	11	3	3	1	2	0	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	63.3	62.3	52.3	5.5	2.3	1.3	0.5	0.4	0	1	
Eucalyptus piperita	30	4	TG		30								
Syncarpia glomulifera	10	10	TG		10								
Corymbia gummifera	10	5	TG		10								
Pinus spp. (P. contorta, P. elliottii,	1	1	HT									1	
Banksia serrata	2	2	TG		2								
Persoonia linearis	2	2	SG			2							
Acacia ulicifolia	1	20	SG			1							
Leucopogon lanceolatus	0.1	1	SG			0.1							
Platysace linearifolia	0.2	20	SG			0.2							
Dillwynia spp.	0.2	20	SG			0.2							
Epacris pulchella	0.1	10	SG			0.1							
Acacia maidenii	0.2	1	TG		0.2								
Acrotriche divaricata	0.5	20	SG			0.5							
Gompholobium grandiflorum	0.2	1	SG			0.2							
Allocasuarina torulosa	0.1	1	TG		0.1								
Acacia stricta	0.1	1	SG			0.1							
Persoonia levis	1	2	SG			1							
Gahnia spp.	2	20	GG				2						
Amperea xiphoclada	0.1	20	SG			0.1							
Caustis flexuosa	0.2	20	GG				0.2						
Pteridium esculentum	0.5	50	EG						0.5				
Dianella caerulea	0.2	20	FG					0.2					
Dampiera purpurea	1	1000	FG					1					
Xanthorrhoea spp.	0.3	2	OG							0.3			
Lomandra cylindrica	0.1	20	GG				0.1						
Mitrasacme polymorpha	0.1	10	FG					0.1					
Hibbertia dentata	0.1	2	OG							0.1			

Easting	344218
Northing	6339460
Orientation	1
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	1
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	2
Length logs (m)	36
BAM Attributes 1x1 plot (%)	77.6
Litter (%)	

LCSM-06

Date	20/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-06		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3617	Mod-good	37	36	4	17	3	5	2	5	0	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	112.6	107.6	62	13	25	5.6	0.4	1.6	0	5	
Eucalyptus sieberi	30	3	TG		30								
Corymbia gummifera	10	10	TG		10								
Pinus spp. (P. contorta, P. elliotti	5	2	HT									5	
Syncarpia glomulifera	20	50	TG		20								
Banksia serrata	2	2	TG		2								
Persoonia levis	1	4	SG			1							
Persoonia linearis	2	10	SG			2							
Banksia marginata	2	20	SG			2							
Hakea dactyloides	0.5	5	SG			0.5							
Acrotriche divaricata	5	50	SG			5							
Lomatia silaifolia	0.2	2	SG			0.2							
Leucopogon lanceolatus	0.3	5	SG			0.3							
Gompholobium grandiflorum	0.2	2	SG			0.2							
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Acacia stricta	0.1	1	SG			0.1							
Pultenaea spp.	0.1	2	SG			0.1							
Telopea speciosissima	0.5	10	SG			0.5							
Epacris pulchella	0.1	10	SG			0.1							
Lissanthe sapida	0.2	5	SG			0.2							
Conospermum tenuifolium	0.2	50	SG			0.2							
Platysace linearifolia	0.2	20	SG			0.2							
Xanthorrhoea spp.	1	10	OG							1			
Pteridium esculentum	0.2	5	EG						0.2				
Dampiera purpurea	5	1000	FG					5					
Billardiera scandens	0.2	20	OG							0.2			
Amperea xiphoclada	0.3	50	SG			0.3							
Dianella caerulea	0.2	20	FG					0.2					
Lepyrodia scariosa	5	500	GG				5						
Patersonia spp.	0.2	20	FG					0.2					
Entolasia stricta	10	2000	GG				10						
Caustis flexuosa	10	2000	GG				10						
Smilax glyciphylla	0.2	20	OG							0.2			
Cassytha glabella	0.1	10	OG							0.1			
Lindsaea linearis	0.2	50	EG						0.2				
Hibbertia dentata	0.1	10	OG							0.1			
Mitrasacme polymorpha	0.1	10	FG					0.1					
Drosera spp.	0.1	1	FG					0.1					

Easting	344442
Northing	6339518
Orientation	140
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	19
BAM Attributes 1x1 plot (%)	85
Litter (%)	

TC-18

Date	31/01/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TC-18		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3617	Mod-good	42	42	4	18	6	3	1	10	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	76.6	76.6	39.2	23.4	9.4	0.7	0.2	3.7	0	0	
Acacia longifolia	5	30	SG			5							
Allocasuarina torulosa	0.2	6	TG		0.2								
Angophora costata	16	5	TG		16								
Banksia spinulosa	0.2	2	SG			0.2							
Billardiera scandens	0.1	4	OG							0.1			
Breynia oblongifolia	0.1	2	SG			0.1							
Chiloglottis reflexa	0.1	10	FG					0.1					
Cissus hypoglauca	0.2	6	OG							0.2			
Clematis glycinoides	0.1	1	OG							0.1			
Correa reflexa	3	10	SG			3							
Dianella caerulea	0.5	10	FG					0.5					
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Entolasia stricta	5	20	GG				5						
Eucalyptus piperita	15	3	TG		15								
Eustrephus latifolius	0.1	1	OG							0.1			
Gahnia aspera	0.2	3	GG				0.2						
Goodenia heterophylla	0.1	3	FG					0.1					
Goodenia ovata	0.5	6	SG			0.5							
Hardenbergia violacea	0.2	6	OG							0.2			
Hibbertia dentata	2	40	OG							2			
Hibbertia scandens	0.3	3	OG							0.3			
Hymenosporum flavum	0.2	1	SG			0.2							
Kennedia rubicunda	0.1	2	OG							0.1			
Lambertia formosa	0.2	2	SG			0.2							
Leucopogon lanceolatus	0.2	4	SG			0.2							
Lomandra confertifolia	0.1	2	GG				0.1						
Lomandra longifolia	3	8	GG				3						
Lomandra obliqua	0.1	5	GG				0.1						
Lomatia silaifolia	5	12	SG			5							
Oplismenus aemulus	1	20	GG				1						
Persoonia linearis	3	6	SG			3							
Pittosporum revolutum	0.1	1	SG			0.1							
Platysace linearifolia	0.2	10	SG			0.2							
Podolobium ilicifolium	2	10	SG			2							
Polyscias sambucifolia	0.1	2	SG			0.1							
Pteridium esculentum	0.2	4	EG						0.2				
Smilax australis	0.1	1	OG							0.1			
Syncarpia glomulifera	8	4	TG		8								
Tetratheca thymifolia	0.5	12	SG			0.5							
Xanthorrhoea spp.	0.5	3	OG							0.5			
Xylomelum pyriforme	1	5	SG			1							
Zieria smithii	2	25	SG			2							

Easting	333076
Northing	6353638
Orientation	280
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	12
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	58
BAM Attributes 1x1 plot (%)	61

TS-04

Date	19/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	TS-04		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3617	Mod-good	30	30	5	10	4	5	0	6	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	104.5	104.5	66	13.7	7	12.2	0	5.6	0	0	
Eucalyptus sieberi	15	5	TG		15								
Banksia serrata	25	30	TG		25								
Corymbia gummifera	3	2	TG		3								
Syncarpia glomulifera	20	50	TG		20								
Ceratopetalum gummiferum	3	5	TG		3								
Petrophile pulchella	3	5	SG			3							
Persoonia levis	2	5	SG			2							
Gompholobium latifolium	1	3	SG			1							
Epacris pulchella	1	10	SG			1							
Golden pea - trifoliate leaf, 4cm long	4	10	SG			4							
Hakea dactyloides	0.5	2	SG			0.5							
Acrotriche divaricata	1	10	SG			1							
Billardiera scandens	0.1	1	OG							0.1			
Banksia spinulosa	1	5	SG			1							
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Caustis flexuosa	5	50	GG				5						
Fake terraces	1	30	GG				1						
Patersonia glabrata	5	50	FG					5					
Spruge/stackhousia like plant	4	100	FG					4					
Xanthorrhoea spp.	5	30	OG							5			
Asperula spp.	0.1	10	FG					0.1					
Lomandra obliqua	0.5	20	GG				0.5						
Leucopogon spp.	0.1	10	SG			0.1							
Dampiera stricta	3	50	FG					3					
Dampiera spp.Thinner	0.1	5	FG					0.1					
Hibbertia dentata	0.1	1	OG							0.1			
Devils twine	0.2	1	OG							0.2			
Parsonsia straminea	0.1	5	OG							0.1			
Entolsia like	0.5	20	GG				0.5						
Smilax australis	0.1	1	OG							0.1			

Easting	345095
Northing	6339131
Orientation	0
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	3
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	13
BAM Attributes 1x1 plot (%)	96
Litter (%)	

D1.39 3621 – Sydney Hinterland Turpentine-Apple Gully Forest (Mod-good)

LCSM-04

Date	19/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-04		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3621	Mod-good	35	35	7	12	4	4	1	7	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	163.9	163.9	107.3	36.4	5.4	1.3	0.1	13.4	0	0	
Eucalyptus piperita	20	3	TG		20								
Syncarpia glomulifera	60	50	TG		60								
Corymbia gummifera	10	5	TG		10								
Allocasuarina torulosa	2	2	TG		2								
Eucalyptus scias	15	3	TG		15								
Banksia marginata	5	10	SG			5							
Acrotriche divaricata	20	100	SG			20							
Persoonia linearis	2	10	SG			2							
Acacia ulicifolia	0.5	2	SG			0.5							
Pultenaea spp.	1	10	SG			1							
Hakea salicifolia	2	5	SG			2							
Leptospermum polygalifolium	0.5	2	SG			0.5							
Leucopogon lanceolatus	0.1	2	SG			0.1							
Elaeocarpus reticulatus	5	50	SG			5							
Lomatia silaifolia	0.1	1	SG			0.1							
Notelaea longifolia	0.1	2	TG		0.1								
Xerochrysum bracteatum	0.1	1	FG					0.1					
Trochocarpa laurina	0.2	1	TG		0.2								
Bossiaea heterophylla	0.1	2	SG			0.1							
Hibbertia dentata	10	200	OG							10			
Cassytha glabella	1	100	OG							1			
Smilax australis	1	100	OG							1			
Dianella caerulea	1	100	FG					1					
Dampiera purpurea	0.1	10	FG					0.1					
Entolasia marginata	0.1	10	GG				0.1						
Amperea xiphoclada	0.1	10	SG			0.1							
Pseuderanthemum variabile	0.1	10	FG					0.1					
Smilax glyciphylla	0.2	10	OG							0.2			
Entolasia stricta	5	500	GG				5						
Lomandra longifolia	0.2	5	GG				0.2						
Parsonsia straminea	1	20	OG							1			
Billardiera scandens	0.1	10	OG							0.1			
Pandorea pandorana	0.1	1	OG							0.1			
Lepidosperma laterale	0.1	1	GG				0.1						
Pteridium esculentum	0.1	10	EG						0.1				

Easting	344507
Northing	6339200
Orientation	1
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	87
BAM Attributes 1x1 plot (%)	83
Litter (%)	

LCSM-07

Date	20/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-07		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3621	Mod-good	36	36	5	14	4	5	2	6	0	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	167.1	167.1	50	8.1	6.3	1.6	100.1	1	0	0	
Eucalyptus piperita	30	20	TG		30								
Syncarpia glomulifera	5	6	TG		5								
Corymbia gummifera	5	5	TG		5								
Allocasuarina torulosa	5	5	TG		5								
Banksia serrata	5	5	TG		5								
Banksia marginata	5	5	SG			5							
Leucopogon lanceolatus	0.2	2	SG			0.2							
Persoonia levis	0.2	1	SG			0.2							
Persoonia linearis	0.5	1	SG			0.5							
Acrotriche divaricata	1	10	SG			1							
Lomatia silaifolia	0.2	2	SG			0.2							
Synoum glandulosum subsp. glan	0.1	1	SG			0.1							
Cryptocarya rigida	0.3	1	SG			0.3							
Elaeocarpus reticulatus	0.1	5	SG			0.1							
Leptospermum polygalifolium	0.1	2	SG			0.1							
Lissanthe spp.	0.1	1	SG			0.1							
Acacia ulicifolia	0.1	1	SG			0.1							
Epacris pulchella	0.1	1	SG			0.1							
Hibbertia scandens	0.1	5	OG							0.1			
Lomandra longifolia	1	50	GG				1						
Cassytha glabella	0.1	10	OG							0.1			
Patersonia spp.	1	100	FG					1					
Entolasia stricta	5	1000	GG				5						
Pteridium esculentum	100	100	EG						100				
Smilax australis	0.1	1	OG							0.1			
Polygalaceae indeterminate	0.1	10	FG					0.1					
Smilax glyciphylla	0.1	10	OG							0.1			
Dianella caerulea	0.3	30	FG					0.3					
Parsonsia straminea	0.5	10	OG							0.5			
Dampiera purpurea	0.1	10	FG					0.1					
Lindsaea linearis	0.1	50	EG						0.1				
Amperea xiphoclada	0.1	10	SG			0.1							
Logania pusilla	0.1	10	FG					0.1					
Hibbertia dentata	0.1	5	OG							0.1			
Caustis flexuosa	0.2	25	GG				0.2						
Lomandra cylindrica	0.1	10	GG				0.1						

Easting	344139
Northing	6339804
Orientation	150
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	26
BAM Attributes 1x1 plot (%)	85
Litter (%)	

LCSM-10

Date	21/09/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThrea	56
Plot Name	LCSM-10		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3621	Mod-good	39	38	5	17	2	4	2	8	0	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	113.4	112.4	50.2	23.4	35	0.9	0.3	2.6	0	1	
Eucalyptus piperita	20	3	TG		20								
Syncarpia glomulifera	20	20	TG		20								
Corymbia gummifera	10	4	TG		10								
Pinus spp. (P. contorta, P. elliotti	1	2	HT									1	
Persoonia linearis	1.5	3	SG			1.5							
Banksia marginata	7	20	SG			7							
Persoonia levis	0.5	3	SG			0.5							
Leptospermum polygalifolium	0.2	3	SG			0.2							
Acrotriche divaricata	12	50	SG			12							
Hakea dactyloides	0.1	1	SG			0.1							
Acacia ulicifolia	0.2	5	SG			0.2							
Pultenaea flexilis	1	2	SG			1							
Podolobium ilicifolium	0.1	2	SG			0.1							
Elaeocarpus reticulatus	0.1	2	SG			0.1							
Gompholobium grandiflorum	0.1	1	SG			0.1							
Synoum glandulosum subsp. glar	0.1	1	SG			0.1							
Leucopogon lanceolatus	0.1	1	SG			0.1							
Lomatia silaifolia	0.1	1	SG			0.1							
Epacris pulchella	0.1	1	SG			0.1							
Notelaea longifolia	0.1	1	TG		0.1								
Trochocarpa laurina	0.1	1	TG		0.1								
Pteridium esculentum	0.2	20	EG						0.2				
Amperea xiphoclada	0.1	1	SG			0.1							
Entolasia stricta	25	100	GG				25						
Comesperma volubile	0.1	4	OG							0.1			
Hibbertia dentata	1	100	OG							1			
Dianella caerulea	0.2	50	FG					0.2					
Dampiera purpurea	0.5	100	FG					0.5					
Hibbertia scandens	0.1	1	OG							0.1			
Cassytha glabella	0.1	10	OG							0.1			
Xanthorrhoea glauca	1	10	OG							1			
Pultenaea spp.	0.1	1	SG			0.1							
Viola silicestris	0.1	10	FG					0.1					
Smilax glyciphylla	0.1	2	OG							0.1			
Smilax glyciphylla	0.1	1	OG							0.1			
Lepyrodia scariosa	10	100	GG				10						
Parsonsia straminea	0.1	1	OG							0.1			
Lindsaea linearis	0.1	1	EG						0.1				
Caladenia alata	0.1	1	FG					0.1					

Easting	344713
Northing	6339241
Orientation	154
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	1
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	167
BAM Attributes 1x1 plot (%)	89
Litter (%)	

D1.40 3636 – Warkworth Sands Woodland (Disturbed_Grassland)

HTP-MS-33

Date	22/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	318188
Plot Name	HTP-MS-33		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6395970
PCT	3636	Disturbed Grassland	19	6	0	0	5	1	0	0	10	3		Orientation	92
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	63.9	55.2	0	0	55	0.2	0	0	5.3	3.4		BAM Attributes 20x50m plot	
Aristida calycina	15	100	GG				15							Stem classes	
Cymbopogon refractus	10	100	GG				10							80+	0
Cynodon dactylon	20	100	GG				20							50-79	0
Eragrostis curvula	2	20	HT									2		30-49	0
Lysimachia arvensis	0.4	20	EX								0.4			20-29	N
Verbena bonariensis	0.8	10	EX								0.8			10-19	N
Senecio madagascariensis	1	40	HT									1		5-9	N
Aristida ramosa	5	60	GG				5							<5	N
Bromus catharticus	1	30	EX								1			Regen	N
Modiola caroliniana	0.8	20	EX								0.8			Hollows	0
Cyclospermum leptophyllum	0.4	20	EX								0.4			Length logs (m)	0
Verbena officinalis	0.4	10	EX								0.4				
Conyza bonariensis	0.6	20	EX								0.6			BAM Attributes 1x1 plot (%)	0.4
Galenia pubescens	0.4	5	HT									0.4		Leaf Litter (%)	
Sida rhombifolia	0.4	10	EX								0.4				
Sporobolus creber	5	100	GG				5								
Pavonia hastata	0.1	5	EX								0.1				
Wahlenbergia communis	0.2	10	FG					0.2							
Petrorhagia nanteuilii	0.4	40	EX								0.4				

HTP-MS-36

Date	23/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	319845
Plot Name	HTP-MS-36		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6394924
PCT	3636	Disturbed Grassland	31	19	0	1	9	8	0	1	8	4		Orientation	320
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	52.7	49.2	0	0.1	47.7	1.2	0	0.2	2.4	1.1		BAM Attributes 20x50m plot	
Sporobolus creber	10	100	GG				10							Stem classes	
Cynodon dactylon	20	200	GG				20							80+	0
Chrysocephalum semipapposum	0.4	50	FG					0.4						50-79	0
Murdannia graminea	0.1	10	FG					0.1						30-49	0
Plantago lanceolata	1	80	EX								1			20-29	N
Lysimachia arvensis	0.2	30	EX								0.2			10-19	N
Verbena bonariensis	0.1	5	EX								0.1			5-9	N
Senecio madagascariensis	0.8	40	HT									0.8		<5	N
Opuntia aurantiaca	0.1	2	EX								0.1			Regen	N
Gomphrena celosioides	0.4	20	EX								0.4			Hollows	0
Chloris ventricosa	10	100	GG				10							Length logs (m)	0
Galenia pubescens	0.1	5	HT									0.1			
Maireana enchylaenoides	0.1	5	FG					0.1						BAM Attributes 1x1 plot (%)	0.6
Wahlenbergia gracilis	0.1	10	FG					0.1						Leaf Litter (%)	
Gamochaeta purpurea	0.4	20	EX								0.4				
Aristida ramosa	5	50	GG				5								
Enteropogon acicularis	0.8	20	GG				0.8								
Goodenia heterophylla	0.1	5	FG					0.1							
Glycine clandestina	0.2	20	OG							0.2					
Centaurea solstitialis	0.1	5	EX								0.1				
Lomandra confertifolia	0.1	10	GG				0.1								
Phyllanthus virgatus	0.1	5	FG					0.1							
Romulea rosea var. australis	0.1	10	HT									0.1			
Panicum queenslandicum	1	40	GG				1								
Eragrostis leptostachya	0.4	10	GG				0.4								
Carex inversa	0.4	30	GG				0.4								
Stackhousia viminea	0.1	1	FG					0.1							
Hypochaeris albiflora	0.1	5	EX								0.1				
Carthamus lanatus	0.1	2	HT									0.1			
Plantago varia	0.2	30	FG					0.2							
Maireana microphylla	0.1	1	SG			0.1									

HTP-MS-37

Date	23/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	319471
Plot Name	HTP-MS-37		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6395631
PCT	3636	Disturbed Grassland	12	4	0	0	4	0	0	0	5	3		Orientation	338
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	65.7	48.8	0	0	48.8	0	0	0	16.6	0.3		BAM Attributes 20x50m plot	
Sporobolus creber	25	300	GG				25							Stem classes	
Plantago lanceolata	15	100	EX								15			80+	0
Cynodon dactylon	20	200	GG				20							50-79	0
Lolium perenne	0.1	50	EX								0.1			30-49	0
Verbena bonariensis	1	20	EX								1			20-29	N
Senecio madagascariensis	0.1	40	HT									0.1		10-19	N
Lysimachia arvensis	0.4	20	EX								0.4			5-9	N
Carthamus lanatus	0.1	1	HT									0.1		<5	N
Lachnagrostis filiformis	3	80	GG				3							Regen	N
Enteropogon acicularis	0.8	20	GG				0.8							Hollows	0
Gamochaeta purpurea	0.1	1	EX								0.1			Length logs (m)	0
Romulea rosea var. australis	0.1	1	HT									0.1			
														BAM Attributes 1x1 plot (%)	0
														Leaf Litter (%)	

HTP-MS-38

Date	23/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	319145
Plot Name	HTP-MS-38		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6395977
PCT	3636	Disturbed Grassland	24	10	0	1	5	3	0	1	11	3		Orientation	292
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	46.8	39.8	0	1	38.1	0.6	0	0.1	4.8	2.2		BAM Attributes 20x50m plot	
Sporobolus creber	10	100	GG				10							Stem classes	
Cynodon dactylon	20	100	GG				20							80+	0
Enteropogon acicularis	5	80	GG				5							50-79	0
Chrysocephalum semipapposum	0.4	50	FG					0.4						30-49	0
Oxalis radicosa	0.1	3	FG					0.1						20-29	N
Senecio madagascariensis	1	50	HT									1		10-19	N
Maireana microphylla	1	5	SG			1								5-9	N
Paronychia brasiliana	0.4	30	EX								0.4			<5	N
Phyllanthus virgatus	0.1	5	FG					0.1						Regen	N
Hypochaeris albiflora	0.4	10	EX								0.4			Hollows	0
Axonopus fissifolius	0.8	10	HT									0.8		Length logs (m)	0
Centaurea solstitialis	0.1	5	EX								0.1				
Bromus catharticus	2	30	EX								2			BAM Attributes 1x1 plot (%)	1
Romulea rosea var. australis	0.4	50	HT									0.4		Leaf Litter (%)	
Verbena bonariensis	0.6	10	EX								0.6				
Lomandra glauca	0.1	5	GG				0.1								
Petrorhagia nanteuilii	0.1	5	EX								0.1				
Convolvulus erubescens	0.1	1	OG							0.1					
Conyza bonariensis	0.1	5	EX								0.1				
Cyclospermum leptophyllum	0.1	10	EX								0.1				
Sporobolus africanus	0.4	5	EX								0.4				
Eragrostis brownii	3	100	GG				3								
Gamochaeta purpurea	0.2	10	EX								0.2				
Verbena officinalis	0.4	10	EX								0.4				

D1.41 3636 – Warkworth Sands Woodland (Thinned)

HTP-MS-31

Date	22/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-31		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3636	Thinned	34	25	3	5	12	2	1	2	6	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	87.2	82.3	21.4	15.7	43.9	0.6	0.2	0.5	2.5	2.4	
Eucalyptus crebra	20	20	TG		20								
Acacia amblygona	15	40	SG			15							
Acacia salicina	1	1	TG		1								
Allocasuarina luehmannii	0.4	1	TG		0.4								
Cymbopogon refractus	15	200	GG				15						
Aristida ramosa	10	100	GG				10						
Senecio madagascariensis	0.8	40	HT									0.8	
Paspalidium distans	3	50	GG				3						
Einadia nutans subsp. linifolia	0.4	20	FG					0.4					
Enchylaena tomentosa	0.1	3	SG			0.1							
Galenia pubescens	0.6	10	HT									0.6	
Cynodon dactylon	2	50	GG				2						
Lomandra confertifolia	1	40	GG				1						
Sida rhombifolia	1	50	EX								1		
Conyza bonariensis	0.2	10	EX								0.2		
Gomphocarpus fruticosus	0.1	5	EX								0.1		
Acacia falcata	0.4	5	SG			0.4							
Verbena bonariensis	1	20	EX								1		
Lomandra glauca	0.1	5	GG				0.1						
Cheilanthes sieberi	0.2	30	EG						0.2				
Chloris truncata	3	50	GG				3						
Lycium ferocissimum	1	5	HT									1	
Glycine tabacina	0.4	20	OG							0.4			
Opuntia aurantiaca	0.1	1	EX								0.1		
Pomaderris spp.	0.1	5	SG			0.1							
Grona varians	0.1	5	OG							0.1			
Panicum queenslandicum	2	50	GG				2						
Lomandra multiflora subsp. multiflora	0.4	20	GG				0.4						
Sporobolus creber	5	80	GG				5						
Pavonia hastata	0.1	1	EX								0.1		
Eremophila debilis	0.1	5	SG			0.1							
Aristida calycina	0.4	10	GG				0.4						
Rytidosperma spp.	2	50	GG				2						
Wahlenbergia gracilis	0.2	5	FG					0.2					

Easting	318430
Northing	6396036
Orientation	101
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	Y
Hollows	0
Length logs (m)	17
BAM Attributes 1x1 plot (%)	18
Leaf Litter (%)	

HTP-TB-01

Date	1/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-TB-01		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3636	Thinned	35	27	4	2	12	5	2	2	4	4	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	73.4	72.2	24.2	0.2	46.5	0.5	0.6	0.2	0.4	0.8	
Eucalyptus crebra	20	40	TG		20								
Angophora floribunda	4	8	TG		4								
Allocasuarina luehmannii	0.1	1	TG		0.1								
Cassinia sifton	0.1	1	SG			0.1							
Brachychiton populneus subsp. populneus	0.1	1	TG		0.1								
Lantana camara	0.1	1	HT									0.1	
Cymbopogon refractus	20	500	GG				20						
Eragrostis leptostachya	3	100	GG				3						
Glycine clandestina	0.1	3	OG							0.1			
Aristida ramosa	4	100	GG				4						
Calotis lappulacea	0.1	1	FG					0.1					
Sporobolus creber	5	100	GG				5						
Laxmannia gracilis	0.1	3	FG					0.1					
Cheilanthes sieberi	0.5	100	EG						0.5				
Plantago lanceolata	0.1	1	EX								0.1		
Olea europaea subsp. cuspidata	0.2	10	HT									0.2	
Paspalidium spp.	0.2	30	GG				0.2						
Eragrostis brownii	0.2	30	GG				0.2						
Leiocarpa panaetioides	0.1	1	FG					0.1					
Aristida vagans	3	50	GG				3						
Sida rhombifolia	0.1	1	EX								0.1		
Cynodon dactylon	2	50	GG				2						
Microlaena stipoides var. stipoides	6	200	GG				6						
Cheilanthes distans	0.1	30	EG						0.1				
Richardia humistrata	0.1	5	EX								0.1		
Rytidosperma spp.	1	30	GG				1						
Austrostipa verticillata	2	20	GG				2						
Commelina cyanea	0.1	1	FG					0.1					
Opuntia aurantiaca	0.1	2	EX								0.1		
Galenia pubescens	0.3	20	HT									0.3	
Einadia hastata	0.1	2	FG					0.1					
Glycine tabacina	0.1	3	OG							0.1			
Breynia oblongifolia	0.1	1	SG			0.1							
Lomandra confertifolia	0.1	1	GG				0.1						
Senecio madagascariensis	0.2	30	HT									0.2	

Easting	318739
Northing	6395768
Orientation	337
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	2
50-79	0
30-49	0
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	3
Length logs (m)	37
BAM Attributes 1x1 plot (%)	28
Litter (%)	

HTP-TB-02

Date	1/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-TB-02		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3636	Thinned	48	40	4	6	13	14	1	2	6	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	72.5	71.7	31.1	5.7	32.9	1.5	0.3	0.2	0.6	0.2	
Eucalyptus crebra	22	20	TG		22								
Angophora floribunda	3	4	TG		3								
Allocasuarina luehmannii	6	30	TG		6								
Acacia falcata	2	20	SG			2							
Acacia amblygona	0.5	4	SG			0.5							
Breynia oblongifolia	2	8	SG			2							
Cymbopogon refractus	10	300	GG				10						
Hibbertia linearis	0.1	5	SG			0.1							
Brunoniella australis	0.1	5	FG					0.1					
Aristida ramosa	4	100	GG				4						
Senecio madagascariensis	0.1	20	HT									0.1	
Dianella longifolia	0.1	1	FG					0.1					
Aristida calycina var. calycina	1	40	GG				1						
Opuntia aurantiaca	0.1	10	EX								0.1		
Vernonia cinerea var. cinerea	0.1	2	FG					0.1					
Lomandra confertifolia	0.1	5	GG				0.1						
Lomandra multiflora subsp. multiflora	0.2	10	GG				0.2						
Glycine tabacina	0.1	10	OG							0.1			
Goodenia rotundifolia	0.1	8	FG					0.1					
Cheilanthes sieberi subsp. sieberi	0.3	100	EG						0.3				
Olea europaea subsp. cuspidata	0.1	2	HT									0.1	
Plantago lanceolata	0.1	4	EX								0.1		
Eragrostis brownii	1	50	GG				1						
Rytidosperma spp.	4	100	GG				4						
Veronica plebeia	0.2	30	FG					0.2					
Euchiton sphaericus	0.1	2	FG					0.1					
Calotis lappulacea	0.1	10	FG					0.1					
Richardia humistrata	0.1	5	EX								0.1		
Eragrostis leptostachya	4	100	GG				4						
Conyza bonariensis	0.1	1	EX								0.1		
Notelaea microcarpa	0.1	1	TG		0.1								
Opercularia diphylla	0.1	3	FG					0.1					
Verbascum virgatum	0.1	1	EX								0.1		
Austrostipa scabra	2	50	GG				2						
Dichondra sp. Inglewood	0.1	5	FG					0.1					
Lomandra glauca	0.1	4	GG				0.1						
Digitaria diffusa	0.5	30	GG				0.5						
Echinopogon caespitosus	5	100	GG				5						
Aristida vagans	1	40	GG				1						
Einadia nutans	0.1	6	FG					0.1					
Stackhousia muricata	0.1	2	FG					0.1					
Solanum cinereum	0.1	1	SG			0.1							
Goodenia heterophylla subsp. heterophylla	0.1	4	FG					0.1					
Glycine clandestina	0.1	2	OG							0.1			
Hibbertia diffusa	1	30	SG			1							
Dianella revoluta var. revoluta	0.1	1	FG					0.1					
Opuntia stricta var. stricta	0.1	2	EX								0.1		
Oxalis perennans	0.1	1	FG					0.1					

Easting	318924
Northing	6395241
Orientation	9
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	47
BAM Attributes 1x1 plot (%)	61
Litter (%)	

D1.42 4015 – Central Hunter Riparian Forest (Derived)

DL-50

Date	4/03/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_50		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4015	Derived	26	12	0	0	6	6	0	0	14	0	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	101.4	73.1	0	0	52.2	20.9	0	0	28.3	0	
Austrostipa verticillata	0.3	2	GG				0.3						
Bidens pilosa	2	20	EX								2		
Bidens subalternans	0.9	20	EX								0.9		
Carex inversa	0.5	50	GG				0.5						
Cirsium vulgare	0.3	10	EX								0.3		
Conyza bonariensis	5	100	EX								5		
Cynodon dactylon	1	50	GG				1						
Cyperus brevifolius	0.4	10	EX								0.4		
Cyperus gracilis	0.4	100	GG				0.4						
Einadia trigonos	0.3	20	FG					0.3					
Geranium homeanum	5	100	FG					5					
Juncus usitatus	10	20	GG				10						
Lobelia purpurascens	0.1	50	FG					0.1					
Microlaena stipoides	40	300	GG				40						
Modiola caroliniana	1	60	EX								1		
Oxalis chnoodes	0.4	100	FG					0.4					
Rapistrum rugosum	0.3	3	EX								0.3		
Red stemmed succulent	0.5	20	EX								0.5		
Rumex brownii	0.1	3	FG					0.1					
Senecio bipinnatisectus	15	100	FG					15					
Sida rhombifolia	0.7	5	EX								0.7		
Solanum nigrum	0.7	1	EX								0.7		
Stachys arvensis	0.1	15	EX								0.1		
Verbascum virgatum	1	50	EX								1		
Verbena officinalis	15	40	EX								15		
Verbena rigida var. rigida	0.4	15	EX								0.4		

Easting	329520
Northing	6373067
Orientation	231
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	No
20-29	No
10-19	No
5-9	No
<5	No
Regen	No
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	0

DL-79

Date	4/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-79		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4015	Derived	39	23	0	0	10	12	1	0	15	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	165.7	114.9	0	0	69.1	45.6	0.2	0	35.8	15	
Senecio madagascariensis	15	100	HT									15	
Austrostipa verticillata	20	100	GG				20						
Aristida ramosa	3	20	GG				3						
Sporobolus creber	30	100	GG				30						
Cotula australis	15	1000	FG					15					
Geranium solanderi var. solan	2	1000	FG					2					
Verbena bonariensis	20	1000	EX								20		
Cirsium vulgare	1	100	EX								1		
Stellaria media	5	500	EX								5		
Conyza bonariensis	0.5	100	EX								0.5		
Centaurea melitensis	0.8	20	EX								0.8		
Cheilanthes sieberi	0.2	1000	EG						0.2				
Trifolium tomentosum	0.3	200	EX								0.3		
Hypochaeris radicata	0.5	100	EX								0.5		
Chloris ventricosa	10	20	GG				10						
Hydrocotyle digitata	20	1000	FG					20					
Stylidium graminifolium	5	1000	FG					5					
Silver backed daisy rosette	1	100	FG					1					
Trifolium dubium	0.4	100	EX								0.4		
Briza maxima	3	100	EX								3		
Facelis retusa	0.6	100	EX								0.6		
Cymbopogon refractus	5	20	GG				5						
Oxalis radicosa	0.3	100	FG					0.3					
Lomandra filiformis subsp. fili	0.2	50	GG				0.2						
Cyperus gracilis	0.1	40	GG				0.1						
Lysimachia arvensis	2	100	EX								2		
Rumex brownii	0.2	3	FG					0.2					
Small opposite herb	0.1	10	FG					0.1					
Daucus carota	0.1	5	EX								0.1		
Austrostipa scabra	0.6	5	GG				0.6						
Arthropodium minus	0.1	5	FG					0.1					
Dichondra sp. Inglewood	0.2	100	FG					0.2					
Sonchus oleraceus	0.5	10	EX								0.5		
Opuntia aurantiaca	0.1	2	EX								0.1		
Carex inversa	0.1	5	GG				0.1						
Hydrocotyle laxiflora	1	100	FG					1					
Malva spp.	1	100	EX								1		
Eragrostis leptostachya	0.1	10	GG				0.1						
Calotis lappulacea	0.7	15	FG					0.7					

Easting	325983
Northing	6385367
Orientation	70
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	0

D1.43 4015 – Central Hunter Riparian Forest (Thinned)

DL-29

Date	13/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-29		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4015	Thinned	29	16	2	1	9	3	1	0	9	4	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	135.9	78	35	0.2	42.1	0.6	0.1	0	54.6	3.3	
Alternanthera denticulata	0.2	50	FG					0.2					
Angophora floribunda	5	2	TG		5								
Aristida ramosa	5	30	GG				5						
Austrostipa verticillata	1	10	GG				1						
Bidens subalternans	0.1	2	EX								0.1		
Carex inversa	0.5	50	GG				0.5						
Casuarina glauca	30	50	TG		30								
Cheilanthes sieberi	0.1	5	EG						0.1				
Chloris ventricosa	5	30	GG				5						
Cirsium vulgare	0.5	10	EX								0.5		
Commelina cyanea	0.1	5	FG					0.1					
Conyza bonariensis	0.1	3	EX								0.1		
Cynodon dactylon	20	100	GG				20						
Dichondra repens	0.3	100	FG					0.3					
Eragrostis leptostachya	0.1	3	GG				0.1						
Eremophila debilis	0.2	15	SG			0.2							
Gomphocarpus fruticosus	0.4	3	EX								0.4		
Heliotropium amplexicaule	0.2	10	HT									0.2	
Juncus acutus subsp. acutus	0.4	2	GG				0.4						
Juncus usitatus	0.1	3	GG				0.1						
Lantana camara	1	3	HT									1	
Microlaena stipoides	10	100	GG				10						
Oxalis corniculata	0.1	2	EX								0.1		
Paspalum dilatatum	2	30	HT									2	
Senecio madagascariensis	0.1	5	HT									0.1	
Setaria parviflora	50	200	EX								50		
Sida rhombifolia	0.2	5	EX								0.2		
Verbena officinalis	0.2	10	EX								0.2		
Verbena rigida var. rigida	3	5	EX								3		

Easting	325679
Northing	6385928
Orientation	346
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	1
50-79	0
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	7
BAM Attributes 1x1 plot (%)	35

DL-72

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-72		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4015	Thinned	32	19	2	1	7	7	0	2	10	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	129.7	123.9	61	0.5	59.2	2.9	0	0.3	4.8	1	
Austrostipa verticillata	5	25	GG				5						
Bidens subalternans	0.2	10	EX								0.2		
Carex appressa	30	100	GG				30						
Casuarina glauca	60	100	TG		60								
Cirsium vulgare	0.1	4	EX								0.1		
Conyza bonariensis	0.2	7	EX								0.2		
Dianella revoluta	0.1	3	FG					0.1					
Dichondra repens	0.4	1000	FG					0.4					
Einadia nutans subsp. nutans	0.8	30	FG					0.8					
Eragrostis elongata	0.3	5	GG				0.3						
Eremophila debilis	0.5	15	SG			0.5							
Gahnia aspera	0.5	3	GG				0.5						
Glycine microphylla	0.2	10	OG							0.2			
Glycine tabacina	0.1	5	OG							0.1			
Hypochaeris glabra	0.1	4	EX								0.1		
Hypochaeris radicata	0.1	2	EX								0.1		
Lantana camara	0.3	1	HT									0.3	
Lobelia purpurascens	0.4	50	FG					0.4					
Lythrum hyssopifolia	1	8	FG					1					
Melia azedarach	1	1	TG		1								
Microlaena stipoides	20	1000	GG				20						
Oplismenus aemulus	3	100	GG				3						
Oxalis perennans	0.1	10	FG					0.1					
Paspalum dilatatum	0.2	5	HT									0.2	
Rumex spp.	0.1	1	FG					0.1					
Senecio madagascariensis	0.5	30	HT									0.5	
Setaria parviflora	3	15	EX								3		
Sida rhombifolia	0.5	10	EX								0.5		
Solanum nigrum	0.2	15	EX								0.2		
Sonchus oleraceus	0.1	2	EX								0.1		
Sporobolus creber	0.4	4	GG				0.4						
Verbena bonariensis	0.3	10	EX								0.3		

Easting	327969
Northing	6376405
Orientation	33
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	2
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	0
Length logs (m)	14
BAM Attributes 1x1 plot (%)	47

MS-39

Date	12/06/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-39		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4015	Thinned	33	26	4	1	10	8	2	1	5	2	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	69.3	62.7	25	0.2	34.6	1.9	0.8	0.2	4.2	2.4	
Eucalyptus dawsonii	8	3	TG		8								
Angophora floribunda	6	3	TG		6								
Casuarina glauca	8	10	TG		8								
Acacia salicina	3	8	TG		3								
Heliotropium europaeum	0.1	5	EX								0.1		
Lomandra confertifolia	3	50	GG				3						
Verbena rigida var. rigida	2	50	EX							EG	2		
Sporobolus creber	15	200	GG				15						
Aristida ramosa	5	100	GG				5						
Senecio madagascariensis	0.4	30	HT									0.4	
Calotis lappulacea	0.4	20	FG					0.4					
Cheilanthes sieberi	0.6	40	EG						0.6				
Eremophila debilis	0.2	10	SG			0.2							
Cheilanthes distans	0.2	10	EG						0.2				
Conyza sumatrensis	1	50	EX								1		
Plantago lanceolata	1	50	EX								1		
Chrysocephalum semipapposum	0.4	50	FG					0.4					
Austrostipa scabra	1	40	GG				1						
Sida corrugata	0.6	30	FG					0.6					
Glycine clandestina	0.2	5	OG							0.2			
Microlaena stipoides var. stipoides	3	80	GG				3						
Panicum queenslandicum	1	30	GG				1						
Austrostipa verticillata	0.2	5	GG				0.2						
Lomandra longifolia	0.4	5	GG				0.4						
Verbena bonariensis	0.1	1	EX								0.1		
Sida spp.	0.1	2	FG					0.1					
Cymbopogon refractus	5	80	GG				5						
Chloris gayana	2	30	HT									2	
Cynodon dactylon	1	30	GG				1						
Solanum prinophyllum	0.1	1	FG					0.1					
Einadia nutans	0.1	5	FG					0.1					
Vittadinia cuneata var. cuneata	0.1	2	FG					0.1					
Dichondra sp. Inglewood	0.1	5	FG					0.1					

Easting	305104
Northing	6407322
Orientation	248
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	12
BAM Attributes 1x1 plot (%)	58
Leaf Litter (%)	

D1.44 4039 – Hunter Range Creekflat Apple-Red Gum Forest (Mod-good)

DL-41

Date	28/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_41		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4039	Mod-good	44	36	3	8	10	11	0	4	7	1	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	117.1	113.8	31	8	70.7	2.6	0	1.5	2.3	1	
Acacia implexa	2	6	SG			2							
Aristida ramosa	2	20	GG				2						
Arthropodium milleflorum	0.1	2	FG					0.1					
Bidens pilosa	0.1	3	EX								0.1		
Bidens subalternans	0.1	3	EX								0.1		
Breynia oblongifolia	1	15	SG			1							
Carex inversa	0.9	100	GG				0.9						
Cayratia clematidea	0.1	5	OG							0.1			
Commelina cyanea	0.2	50	FG					0.2					
Conyza bonariensis	0.1	2	EX								0.1		
Cymbopogon refractus	2	20	GG				2						
Cynodon dactylon	10	100	GG				10						
Cyperus gracilis	1	1000	GG				1						
Desmodium varians	0.6	100	OG							0.6			
Dianella caerulea var. cinerascens	0.1	2	FG					0.1					
Dianella tasmanica	0.3	5	FG					0.3					
Dichondra repens	0.3	1000	FG					0.3					
Eragrostis leptostachya	0.8	50	GG				0.8						
Eucalyptus punctata	10	15	TG		10								
Eucalyptus tereticornis	20	19	TG		20								
Exocarpos strictus	0.4	3	SG			0.4							
Gahnia aspera	30	35	GG				30						
Geranium homeanum	0.2	50	FG					0.2					
Glycine tabacina	0.2	50	OG							0.2			
Gomphocarpus fruticosus	0.5	10	EX								0.5		
Lantana camara	1	5	HT									1	
Lobelia purpurascens	0.5	500	FG					0.5					
Melia azedarach	1	3	TG		1								
Microlaena stipoides	2	200	GG				2						
Muehlenbeckia gracillima	0.6	20	OG							0.6			
Opercularia diphylla	0.1	3	FG					0.1					
Oplismenus aemulus	20	500	GG				20						
Phyllanthus gunnii	0.4	100	SG			0.4							
Pimelea spp.	0.4	8	SG			0.4							
Pseuderanthemum variabile	0.3	100	FG					0.3					
Richardia stellaris	0.4	100	EX								0.4		
Setaria parviflora	0.5	10	EX								0.5		
Sigesbeckia australiensis	0.1	5	FG					0.1					
Solanum cinereum	0.4	10	SG			0.4							
Solanum cinereum	0.4	10	SG			0.4							
Solanum prinophyllum	0.4	10	FG					0.4					
Sporobolus creber	2	15	GG				2						
Trema tomentosa var. aspera	3	5	SG			3							
Verbena rigida var. rigida	0.6	40	EX								0.6		

Easting	329838
Northing	6372686
Orientation	355
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	1
20-29	y
10-19	y
5-9	y
<5	y
Regen	y
Hollows	1
Length logs (m)	7
BAM Attributes 1x1 plot (%)	23

D1.45 4072 – Hunter River Oak Mesic Forest (Mod-good)

DL-68

Date	13/05/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL-68		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4072	Mod-good	35	18	2	4	2	8	0	2	14	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	160.5	58.1	43	11.2	1.2	2.1	0	0.6	87.9	14.5	
Acacia implexa	1	2	SG			1							
Anredera cordifolia	10	8	HT									10	
Austrostipa verticillata	1	15	GG				1						
Bidens pilosa	10	100	EX								10		
Bidens subalternans	0.1	5	EX								0.1		
Brachychiton populneus	3	2	TG		3								
Brassica spp.	0.4	4	EX								0.4		
Breynia oblongifolia	0.1	1	SG			0.1							
Casuarina cunninghamiana subsp. cunninghai	40	12	TG		40								
Cayratia clematidea	0.4	3	OG							0.4			
Citrus spp.	10	6	SG			10							
Conyza bonariensis	0.2	10	EX								0.2		
Datura spp.	0.1	1	EX								0.1		
Ehrharta erecta	0.5	10	HT									0.5	
Einadia hastata	0.6	4	FG					0.6					
Einadia trigonos	0.2	2	FG					0.2					
Fumaria muralis	0.3	10	EX								0.3		
Geranium solanderi	0.5	50	FG					0.5					
Ipomea spp.	0.1	1	EX								0.1		
Oplismenus aemulus	0.2	10	GG				0.2						
Oxalis perennans	0.1	3	FG					0.1					
Panicum maximum	60	1000	EX								60		
Plectranthus parviflorus	0.1	3	FG					0.1					
Rubus moluccanus var. moluccanus	0.1	2	SG			0.1							
Setaria parviflora	0.5	20	EX								0.5		
Sigesbeckia australiensis	0.2	5	FG					0.2					
Solanum nigrum	0.4	7	EX								0.4		
Solanum seaforthianum	4	20	HT									4	
Sonchus oleraceus	0.2	5	EX								0.2		
Stellaria media	0.1	40	EX								0.1		
Stephania japonica	0.2	3	OG							0.2			
Tagetes minuta	15	100	EX								15		
Urtica incisa	0.3	6	FG					0.3					
Verbena bonariensis	0.5	6	EX								0.5		
Viola sieberiana	0.1	3	FG					0.1					

Easting	328656
Northing	6374742
Orientation	81
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	4
30-49	10
20-29	yes
10-19	yes
5-9	yes
Regen	yes
Hollows	0
Length logs (m)	50
BAM Attributes 1x1 plot (%)	27

D1.46 4089 – Namoi-Upper Hunter River Red Gum Forest (Derived)

HTP-MS-69

Date	23/07/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-69		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4089	Derived	27	7	0	0	4	3	0	0	17	3	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	117	62.5	0	0	61	1.5	0	0	53	1.5	
Austrostipa verticillata	45	500	GG				45						
Aristida ramosa	10	200	GG				10						
Galenia pubescens	0.4	5	HT									0.4	
Vicia spp.	5	100	EX								5		
Lolium perenne	30	500	EX								30		
Silybum marianum	5	80	EX								5		
Sonchus oleraceus	2	40	EX								2		
Bidens pilosa	0.4	20	EX								0.4		
Hypochaeris radicata	2	100	EX								2		
Oxalis corniculata	3	100	EX								3		
Fumaria muralis subsp. muralis	1	50	EX								1		
Echium plantagineum	1	50	EX								1		
Rumex brownii	0.4	20	FG					0.4					
Commelina cyanea	0.1	5	FG					0.1					
Opuntia aurantiaca	0.1	1	EX								0.1		
Cirsium vulgare	0.1	5	EX								0.1		
Verbena bonariensis	0.4	20	EX								0.4		
Sisymbrium officinale	0.1	10	EX								0.1		
Trifolium glomeratum	0.8	30	EX								0.8		
Solanum nigrum	1	30	EX								1		
Taraxacum officinale	0.1	5	EX								0.1		
Paspalum dilatatum	1	20	HT									1	
Cynodon dactylon	5	100	GG				5						
Daucus spp.	1	50	FG					1					
Sporobolus creber	1	40	GG				1						
Sida rhombifolia	1	30	EX								1		
Senecio madagascariensis	0.1	5	HT									0.1	

Easting	312878
Northing	6401440
Orientation	229
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	N
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	1.4
	1
	0
	2
	1
	3

HTP-MS-70

Date	24/07/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-70		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	4089	Derived	33	6	1	1	1	3	0	0	22	5	
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	125.3	56.3	1	20	35	0.3	0	0	16.2	52.8	
Acacia salicina	20	30	SG			20							
Alternanthera sp. A	0.1	5	FG					0.1					
Aster subulatus	0.1	5	EX								0.1		
Bidens pilosa	0.4	20	EX								0.4		
Brassica napus	1	50	EX								1		
Cardiospermum grandiflorum	0.4	10	HT									0.4	
Casuarina cunninghamiana subsp. cunninghamiana	1	1	TG		1								
Cynodon dactylon	35	500	GG				35						
Echium plantagineum	1	50	EX								1		
Einadia nutans subsp. linifolia	0.1	3	FG					0.1					
Eragrostis cilianensis	0.8	40	EX								0.8		
Fumaria muralis subsp. muralis	0.4	50	EX								0.4		
Galenia pubescens	5	50	HT									5	
Galium aparine	1	30	EX								1		
Hypochaeris radicata	1	50	EX								1		
Lysimachia arvensis	2	100	EX								2		
Medicago polymorpha	3	100	EX								3		
Megathyrus maximus	45	500	HT									45	
Oenothera stricta subsp. stricta	0.1	5	EX								0.1		
Petunia axillaris	0.2	10	EX								0.2		
Plantago lanceolata	0.2	10	EX								0.2		
Ricinus communis	2	10	HT									2	
Rumex crispus	1	20	EX								1		
Senecio madagascariensis	0.4	20	HT									0.4	
Sida rhombifolia	0.4	10	EX								0.4		
Sisymbrium officinale	0.6	20	EX								0.6		
Solanum nigrum	0.4	10	EX								0.4		
Stellaria media	0.1	10	EX								0.1		
Tagetes minuta	1	40	EX								1		
Verbascum thapsus subsp. thapsus	0.1	5	EX								0.1		
Verbena officinalis	0.4	20	EX								0.4		
Vicia sativa	1	30	EX								1		
Wahlenbergia gracilis	0.1	5	FG					0.1					

Easting	308043
Northing	6400874
Orientation	292
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	32
BAM Attributes 1x1 plot (%)	7
	5
	10
	5
	10
	5

Q46 (Umwelt 2022)

Plot ID	COMPOSITION						STRUCTURE						FUNCTION										Area (ha)		Patch Size	Zone	Easting (MGA56) GDA94	Northing (MGA56) GDA94	Bearing
	Tr	Sh	Gr	Fb	Fn	Ot	Tr	Sh	Gr	Fb	Fn	Ot	Regen	Stem Classes (cm)					No. Large Trees	No. Hollow Trees	Litter (%)	Fallen Logs (m)	High Threat Weeds	HVO North	HVO South				
													>5	5-9	9-19	20-29	30-49	50-79											
Q46	1	1	2	2	0	0	1	0.3	40.2	0.2	0	0	0	1	0	0	0	0	0	0	3.2	0	2.5	0.9	0.0	101	56	310145	6400543	295

D1.47 4089 – Namoi-Upper Hunter River Red Gum Forest (Poor)

HTP-MS-68

Date	23/07/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-68		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	4089	Poor	22	3	1	0	0	2	0	0	11	8
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	129.1	25.8	25	0	0	0.8	0	0	11.3	92
Casuarina cunninghamiana subsp. cunninghamiana	25	20	TG		25							
Cardiospermum grandiflorum	25	50	HT									25
Megathyrus maximus	40	200	HT									40
Verbena bonariensis	2	50	EX								2	
Ricinus communis	20	50	HT									20
Cestrum parqui	1	10	HT									1
Sida rhombifolia	2	100	EX								2	
Ehrharta erecta	1	50	HT									1
Bidens pilosa	1	50	EX								1	
Galenia pubescens	1	20	HT									1
Galium aparine	1	50	EX								1	
Salix spp.	2	6	HT									2
Solanum nigrum	0.4	5	EX								0.4	
Einadia nutans subsp. linifolia	0.4	5	FG					0.4				
Cyperus eragrostis	2	80	HT									2
Brassica napus	1	40	EX								1	
Morus alba	2	5	EX								2	
Urtica incisa	0.4	10	FG					0.4				
Modiola caroliniana	1	50	EX								1	
Euphorbia peplus	0.4	20	EX								0.4	
Sonchus oleraceus	0.1	5	EX								0.1	
Tagetes minuta	0.4	20	EX								0.4	

Easting	310051
Northing	6400976
Orientation	304
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	125
BAM Attributes 1x1 plot (%)	51
	65
	50
	60
	35
	45

HTP-MS-73

Date	30/08/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-73		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	4089	Poor	14	3	1	0	1	1	0	0	10	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	100.5	25.1	20	0	5	0.1	0	0	74.4	1
Eucalyptus melliodora	20	5	TG		20							
Avena fatua	20	500	EX								20	
Malva parviflora	10	100	EX								10	
Cynodon dactylon	5	100	GG				5					
Rapistrum rugosum	20	500	EX								20	
Lycium ferocissimum	1	1	HT									1
Trifolium glomeratum	5	100	EX								5	
Cyclospermum leptophyllum	1	50	EX								1	
Urtica incisa	0.1	10	FG					0.1				
Lactuca serriola	1	50	EX								1	
Silybum marianum	10	100	EX								10	
Lolium perenne	5	100	EX								5	
Sida rhombifolia	2	80	EX								2	
Plantago lanceolata	0.4	20	EX								0.4	

Easting	316774
Northing	6396761
Orientation	246
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	2
50-79	7
30-49	0
20-29	N
10-19	N
5-9	N
<5	N
Regen	N
Hollows	7
Length logs (m)	0
BAM Attributes 1x1 plot (%)	5
	5
	10
	5
	0
	5

Appendix E

BAM-C credit reports

BAM Credit Summary Report

Proposal Details

Assessment Id
00048775/BAAS17046/24/00048776

Proposal Name
HTP BDAR - Wyong IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

BAM Case Status
Finalised

Date Finalised
21/08/2025

Assessment Revision
2

BOS entry trigger

Assessment Type
Major Projects

* 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.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Central Coast Escarpment Moist Forest												
2	3230_Mod-good	Not a TEC	79.6	69.1	43.5	PCT Cleared - 25%	High Sensitivity to Gain			1.50		1127

9	3230_Plantation	Not a TEC	67.5	61.5	11.6	PCT Cleared - 25%	High Sensitivity to Gain			1.50		268
											Subtotal	**1395**
Hunter Coast Foothills Apple Forest												
12	3581_Mod-good	Not a TEC	65	65.0	0.67	PCT Cleared - 26%	High Sensitivity to Gain			1.50		16
											Subtotal	**16**
Hunter Coast Ranges Turpentine Wet Forest												
1	3150_Mod-good	Not a TEC	75.3	53.9	34	PCT Cleared - 10%	High Sensitivity to Gain			1.50		686
8	3150_Plantation	Not a TEC	69.9	47.7	2	PCT Cleared - 10%	High Sensitivity to Gain			1.50		37
											Subtotal	**723**
Hunter Range Sheltered Grey Gum Forest												
3	3239_Mod-good	Not a TEC	60.3	54.5	4.9	PCT Cleared - 1%	High Sensitivity to Gain			1.50		100
											Subtotal	**100**

Lower North Ranges Turpentine Moist Forest											
4	3242_Mod-good	Not a TEC	87.3	64.2	25.9	PCT Cleared - 13%	High Sensitivity to Gain			1.50	624
										Subtotal	**624**
Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest											
13	3244_Mod-good	Not a TEC	68.4	65.1	1.3	PCT Cleared - 39%	High Sensitivity to Gain			1.50	32
										Subtotal	**32**
Lower North Wet Gully Palm Rainforest											
11	3029_Mod-good	Not a TEC	93.4	65.5	4.8	PCT Cleared - 6%	High Sensitivity to Gain			1.50	118
										Subtotal	**118**
Northern Foothills Blackbutt Grassy Forest											
10	3250_Mod-good	Not a TEC	62.6	62.6	2	PCT Cleared - 30%	High Sensitivity to Gain			1.50	47
										Subtotal	**47**

Sydney Hinterland Peppermint-Apple Forest											
6	3617_Mod-good	Not a TEC	76.1	71.1	33.6	PCT Cleared - 2%	High Sensitivity to Gain			1.50	897
										Subtotal	**897**
Sydney Hinterland Turpentine-Apple Gully Forest											
7	3621_Mod-good	Not a TEC	78.5	57.3	4.9	PCT Cleared - 3%	High Sensitivity to Gain			1.50	104
										Subtotal	**104**
Watagan Range Turpentine-Mahogany Grassy Forest											
5	3263_Mod-good	Not a TEC	77.1	67.3	39.1	PCT Cleared - 10%	High Sensitivity to Gain			1.50	987
										Subtotal	**987**
										Total	**5043**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Angophora inopina / Charmhaven Apple (Flora)									
3250_Mod-good	62.6	62.6	0.9	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	28
								Subtotal	**28**
Anthochaera phrygia / Regent Honeyeater (Fauna)									
3263_Mod-good	77.1	77.1	0.51	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	29
								Subtotal	**29**
Asperula asthenes / Trailing Woodruff (Flora)									
3242_Mod-good	64.2	64.2	1.1	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	35
3250_Mod-good	62.6	62.6	0.9	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	28
								Subtotal	**63**

Callistemon linearifolius / Netted Bottle Brush (Flora)									
3230_Mod-good	N/A	N/A	190	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	285
3230_Plantation	N/A	N/A	15	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	23
								Subtotal	**308**
Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)									
3150_Mod-good	75.3	75.3	7.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	298
3230_Mod-good	79.6	79.6	15.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	631
3242_Mod-good	87.3	87.3	9.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	420
3263_Mod-good	77.1	77.1	7.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	281

3617_Mod-good	76.1	76.1	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	41
3621_Mod-good	78.5	78.5	0.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	4
3150_Plantation	69.9	69.9	0.36	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	13
3230_Plantation	67.5	67.5	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	71
3029_Mod-good	93.4	93.4	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	76
3244_Mod-good	68.4	68.4	0.03	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1
								Subtotal	**1836**

Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo (Fauna)									
3150_Mod-good	75.3	75.3	3.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	140
3230_Mod-good	79.6	79.6	0.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	8
3242_Mod-good	87.3	87.3	5.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	246
3263_Mod-good	77.1	77.1	5.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	221
3029_Mod-good	93.4	93.4	0.89	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	42
								Subtotal	**657**
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
3150_Mod-good	53.9	53.9	30	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	808

3230_Mod-good	69.1	69.1	43.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1503
3242_Mod-good	64.2	64.2	10.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	329
3263_Mod-good	67.3	67.3	11.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	377
3617_Mod-good	71.1	71.1	33.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1196
3621_Mod-good	57.3	57.3	4.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	139
3150_Plantation	47.7	47.7	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	49

3230_Plantation	61.5	61.5	11.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	346
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	63
3029_Mod-good	65.5	65.5	4.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	142
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	22
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	43
								Subtotal	**5017**

Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
3150_Mod-good	53.9	53.9	34	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	1373
3230_Mod-good	69.1	69.1	43.5	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	2255
3239_Mod-good	54.5	54.5	4.9	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	200
3242_Mod-good	64.2	64.2	25.9	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	1248

3263_Mod-good	67.3	67.3	39.1	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	1974
3617_Mod-good	71.1	71.1	33.6	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	1793
3150_Plantation	47.7	47.7	2	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	73
3230_Plantation	61.5	61.5	11.6	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	536
3250_Mod-good	62.6	62.6	2	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	95

3581_Mod-good	65.0	65.0	0.67	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	33
3244_Mod-good	65.1	65.1	1.3	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	64
								Subtotal	**9644**
Corybas dowlingii / Red Helmet Orchid (Flora)									
3150_Mod-good	53.9	53.9	7.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	207
3150_Plantation	47.7	47.7	0.45	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	11
3250_Mod-good	62.6	62.6	0.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	28

3244_Mod-good	65.1	65.1	0.23	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	7
								Subtotal	**253**
Cynanchum elegans / White-flowered Wax Plant (Flora)									
3250_Mod-good	62.6	62.6	0.9	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	28
3029_Mod-good	93.4	93.4	0.92	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	43
								Subtotal	**71**
Grammitis stenophylla / Narrow-leaf Finger Fern (Flora)									
3150_Mod-good	53.9	53.9	1.3	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	35
3242_Mod-good	64.2	64.2	1.1	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	35

3150_Plantation	47.7	47.7	0.45	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	11
3029_Mod-good	65.5	65.5	0.37	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	12
								Subtotal	**93**
Heleioporus australiacus / Giant Burrowing Frog (Fauna)									
3150_Mod-good	53.9	53.9	2.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	55
3230_Mod-good	69.1	69.1	16.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	419
3617_Mod-good	71.1	71.1	3.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	104

3621_Mod-good	57.3	57.3	4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	85
								Subtotal	**663**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	63
								Subtotal	**63**
Hoplocephalus stephensii / Stephens' Banded Snake (Fauna)									
3150_Mod-good	53.9	53.9	30	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	808
3230_Mod-good	69.1	69.1	42.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1469
3242_Mod-good	64.2	64.2	12.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	394

3263_Mod-good	67.3	67.3	12.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	424
3617_Mod-good	71.1	71.1	33.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1196
3621_Mod-good	57.3	57.3	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	139
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	63
3029_Mod-good	65.5	65.5	4.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	158
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	43
								Subtotal	**4716**

Litoria littlejohni / Littlejohn's Tree Frog (Fauna)									
3150_Mod-good	75.3	75.3	9.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	347
3230_Mod-good	69.1	69.1	19	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	658
3617_Mod-good	71.1	71.1	28.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1013
3621_Mod-good	57.3	57.3	4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	113
3230_Plantation	61.5	61.5	2.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	86
								Subtotal	**2217**

Melaleuca biconvexa / Biconvex Paperbark (Flora)									
3150_Mod-good	75.3	75.3	3.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	144
3242_Mod-good	87.3	87.3	3.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	161
3250_Mod-good	62.6	62.6	0.92	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	29
3029_Mod-good	93.4	93.4	0.92	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	43
								Subtotal	**377**
Mixophyes balbus / Stuttering Frog (Fauna)									
3150_Mod-good	53.9	53.9	30.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	1248

3230_Mod-good	69.1	69.1	40	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	2069
3239_Mod-good	54.5	54.5	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	75
3242_Mod-good	64.2	64.2	21.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	1046
3263_Mod-good	67.3	67.3	28.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	1459
3617_Mod-good	71.1	71.1	33.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	1793
3621_Mod-good	57.3	57.3	4.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	209

3150_Plantation	47.7	47.7	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	73
3230_Plantation	61.5	61.5	10.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	464
3029_Mod-good	65.5	65.5	4.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	236
3581_Mod-good	65.0	65.0	0.03	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	1
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	True	64
								Subtotal	**8737**

Mixophyes iteratus / Giant Barred Frog (Fauna)									
3150_Mod-good	53.9	53.9	0.51	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	10
3230_Mod-good	69.1	69.1	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	27
3242_Mod-good	64.2	64.2	0.75	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	18
3263_Mod-good	67.3	67.3	0.02	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1
3617_Mod-good	71.1	71.1	0.37	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	10

3621_Mod-good	57.3	57.3	0.36	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	8
3029_Mod-good	65.5	65.5	0.76	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	19
								Subtotal	**93**
Ninox connivens / Barking Owl (Fauna)									
3150_Mod-good	75.3	75.3	2.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	103
3239_Mod-good	60.3	60.3	0.46	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	14
3242_Mod-good	87.3	87.3	3.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	146
3263_Mod-good	77.1	77.1	9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	348
								Subtotal	**611**

Ninox strenua / Powerful Owl (Fauna)									
3150_Mod-good	75.3	75.3	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	51
3239_Mod-good	60.3	60.3	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	148
3242_Mod-good	87.3	87.3	11.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	488
3263_Mod-good	77.1	77.1	12.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	482
								Subtotal	**1169**
Notamacropus parma / Parma Wallaby (Fauna)									
3150_Mod-good	53.9	53.9	34	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	915
3230_Mod-good	69.1	69.1	43.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1503

3239_Mod-good	54.5	54.5	4.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	134
3242_Mod-good	64.2	64.2	25.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	832
3263_Mod-good	67.3	67.3	39.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1316
3617_Mod-good	71.1	71.1	33.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1196
3621_Mod-good	57.3	57.3	4.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	139
3150_Plantation	47.7	47.7	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	49

3230_Plantation	61.5	61.5	11.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	357
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	63
3029_Mod-good	65.5	65.5	4.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	158
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	22
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	43
								Subtotal	**6727**

Petauroides volans / Southern Greater Glider (Fauna)									
3150_Mod-good	75.3	75.3	34	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1279
3230_Mod-good	79.6	79.6	43.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1732
3239_Mod-good	60.3	60.3	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	148
3242_Mod-good	87.3	87.3	25.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1132
3263_Mod-good	77.1	77.1	39.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1507
3617_Mod-good	76.1	76.1	33.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1281
3621_Mod-good	78.5	78.5	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	191

3150_Plantation	69.9	69.9	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	72
3230_Plantation	67.5	67.5	11.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	392
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	63
3029_Mod-good	93.4	93.4	4.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	225
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	22
3244_Mod-good	68.4	68.4	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	45
								Subtotal	**8089**

Petaurus norfolcensis / Squirrel Glider (Fauna)									
3150_Mod-good	75.3	75.3	34	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1279
3230_Mod-good	79.6	79.6	43.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1732
3239_Mod-good	60.3	60.3	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	148
3242_Mod-good	87.3	87.3	25.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1132
3263_Mod-good	77.1	77.1	39.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1507
3617_Mod-good	76.1	76.1	33.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1281
3621_Mod-good	78.5	78.5	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	191

3150_Plantation	69.9	69.9	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	72
3230_Plantation	67.5	67.5	11.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	392
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	63
3029_Mod-good	93.4	93.4	4.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	225
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
3244_Mod-good	68.4	68.4	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	45
								Subtotal	**8089**

Petrogale penicillata / Brush-tailed Rock-wallaby (Fauna)									
3150_Mod-good	53.9	53.9	4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	161
3230_Mod-good	69.1	69.1	0.34	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	18
3239_Mod-good	54.5	54.5	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	200
3242_Mod-good	64.2	64.2	24.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1169
3263_Mod-good	67.3	67.3	33.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1690
3250_Mod-good	62.6	62.6	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	68
3029_Mod-good	65.5	65.5	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	24

3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	33
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	64
								Subtotal	**3427**
Phascolarctos cinereus / Koala (Fauna)									
3150_Mod-good	75.3	75.3	4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	150
3239_Mod-good	60.3	60.3	4.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	148
3242_Mod-good	87.3	87.3	15.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	684

3263_Mod-good	77.1	77.1	27.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1073
3029_Mod-good	93.4	93.4	0.49	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	23
								Subtotal	**2078**
Potorous tridactylus / Long-nosed Potoroo (Fauna)									
3150_Mod-good	53.9	53.9	30	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	808
3230_Mod-good	69.1	69.1	43.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1503
3242_Mod-good	64.2	64.2	10.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	329

3617_Mod-good	71.1	71.1	33.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1196
3150_Plantation	47.7	47.7	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	49
3230_Plantation	61.5	61.5	11.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	357
3250_Mod-good	62.6	62.6	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	63
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	22
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	43

								Subtotal	4370
Pseudophryne australis / Red-crowned Toadlet (Fauna)									
3230_Mod-good	69.1	69.1	12.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	315
3239_Mod-good	54.5	54.5	0.01	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
3242_Mod-good	64.2	64.2	1.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	30
3263_Mod-good	67.3	67.3	0.41	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	10
3617_Mod-good	71.1	71.1	9.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	260

3621_Mod-good	57.3	57.3	2.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	53
3230_Plantation	61.5	61.5	2.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	61
3029_Mod-good	65.5	65.5	0.96	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	24
								Subtotal	**754**
Rhizanthella slateri / Eastern Australian Underground Orchid (Flora)									
3150_Mod-good	53.9	53.9	1.3	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	53
3230_Mod-good	69.1	69.1	2.6	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	136

3242_Mod-good	64.2	64.2	1.1	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	52
3263_Mod-good	67.3	67.3	0.63	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	32
3150_Plantation	47.7	47.7	0.45	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	16
3230_Plantation	61.5	61.5	0.3	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	14
3250_Mod-good	62.6	62.6	0.9	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	42
3029_Mod-good	65.5	65.5	0.37	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	18

								Subtotal	**363**
Rhodamnia rubescens / Scrub Turpentine (Flora)									
3150_Mod-good	N/A	N/A	303	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	909
3230_Mod-good	N/A	N/A	225	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	675
3239_Mod-good	N/A	N/A	19	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	57
3242_Mod-good	N/A	N/A	359	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	1077
3263_Mod-good	N/A	N/A	170	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	510

3150_Plantation	N/A	N/A	36	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	108
3230_Plantation	N/A	N/A	155	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	465
3029_Mod-good	N/A	N/A	87	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	261
								Subtotal	**4062**
Rhodomyrtus psidioides / Native Guava (Flora)									
3150_Mod-good	75.3	75.3	6.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	350
3242_Mod-good	87.3	87.3	7.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	515

3263_Mod-good	77.1	77.1	1.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	98
3150_Plantation	69.9	69.9	0.92	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	48
3029_Mod-good	93.4	93.4	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	126
								Subtotal	**1137**
Rutidosis heterogama / Heath Wrinklewort (Flora)									
3250_Mod-good	62.6	62.6	0.9	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	28
								Subtotal	**28**
Senna acclinis / Rainforest Cassia (Flora)									
3150_Mod-good	53.9	53.9	2.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	57

3242_Mod-good	64.2	64.2	2.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	88
3150_Plantation	47.7	47.7	0.45	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	11
3029_Mod-good	65.5	65.5	0.63	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	21
								Subtotal	**177**
Syzygium paniculatum / Magenta Lilly Pilly (Flora)									
3150_Mod-good	N/A	N/A	192	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	384
3242_Mod-good	N/A	N/A	184	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	368

3150_Plantation	N/A	N/A	46	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	92
3029_Mod-good	N/A	N/A	46	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	92
								Subtotal	**936**
Tetratheca juncea / Black-eyed Susan (Flora)									
3242_Mod-good	64.2	64.2	2	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	63
3250_Mod-good	62.6	62.6	0.9	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	28
								Subtotal	**91**
Tyto novaehollandiae / Masked Owl (Fauna)									
3150_Mod-good	75.3	75.3	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	80

3230_Mod-good	79.6	79.6	0.55	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
3263_Mod-good	77.1	77.1	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	80
								Subtotal	**182**
Tyto tenebricosa / Sooty Owl (Fauna)									
3150_Mod-good	75.3	75.3	14	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	793
3230_Mod-good	79.6	79.6	12.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	733
3239_Mod-good	60.3	60.3	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	221
3242_Mod-good	87.3	87.3	15.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1028

3263_Mod-good	77.1	77.1	25.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1472
3029_Mod-good	93.4	93.4	1.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	126
3244_Mod-good	68.4	68.4	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	67
								Subtotal	**4440**
Vespadelus troughtoni / Eastern Cave Bat (Fauna)									
3150_Mod-good	53.9	53.9	34	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1373
3230_Mod-good	69.1	69.1	0.41	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	21
3239_Mod-good	54.5	54.5	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	200

3242_Mod-good	64.2	64.2	25.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1248
3617_Mod-good	71.1	71.1	33.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1793
3621_Mod-good	57.3	57.3	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	209
3150_Plantation	47.7	47.7	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	73
3581_Mod-good	65.0	65.0	0.67	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	33
3244_Mod-good	65.1	65.1	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	64
								Subtotal	**5014**

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00048775/BAAS17046/24/00048776

Assessment name
HTP BDAR - Wyong IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
2

BOS entry trigger

Date Finalised
21/08/2025

* 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.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3150_Mod-good	3150-Hunter Coast Ranges Turpentine Wet Forest	Mod-good	33.98	4	Area A (16.56 ha) Area B (16.87 ha) HZ (0.55 ha)

2	3230_Mod-good	3230-Central Coast Escarpment Moist Forest	Mod-good	43.53	4	Area A (31.61 ha) Area B (11.89 ha) HZ (0.03 ha)
3	3239_Mod-good	3239-Hunter Range Sheltered Grey Gum Forest	Mod-good	4.9	2	Area A (3.93 ha) Area B (0.96 ha) HZ (0.01 ha)
4	3242_Mod-good	3242-Lower North Ranges Turpentine Moist Forest	Mod-good	25.93	4	Area A (12.31 ha) Area B (13.44 ha) HZ (0.18 ha)
5	3263_Mod-good	3263-Watagan Range Turpentine-Mahogany Grassy Forest	Mod-good	39.1	4	Area A (29.72 ha) Area B (9.14 ha) HZ (0.24 ha)
6	3617_Mod-good	3617-Sydney Hinterland Peppermint-Apple Forest	Mod-good	33.65	4	Area A (27.92 ha) Area B (5.52 ha) HZ (0.21 ha)
7	3621_Mod-good	3621-Sydney Hinterland Turpentine-Apple Gully Forest	Mod-good	4.86	2	Area A (2.02 ha) Area B (2.84 ha) HZ (0 ha)
8	3150_Plantation	3150-Hunter Coast Ranges Turpentine Wet Forest	Plantation	2.05	2	Area A (0.92 ha) Area B (1.12 ha) HZ (0.01 ha)
9	3230_Plantation	3230-Central Coast Escarpment Moist Forest	Plantation	11.63	3	Area A (9.79 ha) Area B (1.83 ha) HZ (0.01 ha)

10	3250_Mod-good	3250-Northern Foothills Blackbutt Grassy Forest	Mod-good	2.02	2	Area A (2.02 ha)
11	3029_Mod-good	3029-Lower North Wet Gully Palm Rainforest	Mod-good	4.81	2	Area A (1.61 ha) Area B (3.2 ha)
12	3581_Mod-good	3581-Hunter Coast Foothills Apple Forest	Mod-good	0.67	1	Area A (0.67 ha)
13	3244_Mod-good	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	Mod-good	1.31	1	Area A (1.18 ha) Area B (0.13 ha)

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048775/BAAS17046/24/00048776	HTP BDAR - Wyong IBRA subregion	05/08/2025
Assessor Name	**Report Created**	**BAM Data version ***
	21/08/2025	Current classification (live - default) (82)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17020	Major Projects	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
2		21/08/2025

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Bittern	Ixobrychus flavicollis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest

Black-chinned Honeyeater (eastern	Melithreptus gularis gularis	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Black-necked Stork	Ephippiorhynchus asiaticus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Broad-billed Sandpiper	Limicola falcinellus	3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
Broad-headed Snake	Hoplocephalus bungaroides	3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Diamond Firetail	Stagonopleura guttata	3239-Hunter Range Sheltered Grey Gum Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest

Dusky Woodswallow	Artamus cyanopterus cyanopterus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest

Eastern Osprey	Pandion cristatus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Flame Robin	Petroica phoenicea	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Golden-tipped Bat	Phoniscus papuensis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest

Golden-tipped Bat	Phoniscus papuensis	3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest

Grey-headed Flying-fox	Pteropus poliocephalus	3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Little Bent-winged Bat	Miniopterus australis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Little Eagle	Hieraaetus morphnoides	3150-Hunter Coast Ranges Turpentine Wet Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest

Little Eagle	Hieraaetus morphnoides	3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Little Lorikeet	Glossopsitta pusilla	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
New Holland Mouse	Pseudomys novaehollandiae	3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Pilotbird	Pycnoptilus floccosus	3239-Hunter Range Sheltered Grey Gum Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
Red-legged Pademelon	Thylogale stigmatica	3242-Lower North Ranges Turpentine Moist Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Regent Honeyeater	Anthochaera phrygia	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest

Rose-crowned Fruit-Dove	Ptilinopus regina	3150-Hunter Coast Ranges Turpentine Wet Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Rosenberg's Goanna	Varanus rosenbergi	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
Scarlet Robin	Petroica boodang	3150-Hunter Coast Ranges Turpentine Wet Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Speckled Warbler	Chthonicola sagittata	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest

Speckled Warbler	Chthonicola sagittata	3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Spotted-tailed Quoll	Dasyurus maculatus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Square-tailed Kite	Lophoictinia isura	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Superb Fruit-Dove	Ptilinopus superbus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
Swift Parrot	Lathamus discolor	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest

Swift Parrot	Lathamus discolor	3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Turquoise Parrot	Neophema pulchella	3239-Hunter Range Sheltered Grey Gum Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3581-Hunter Coast Foothills Apple Forest
Varied Sittella	Daphoenositta chrysoptera	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest

White-bellied Sea-Eagle	Haliaeetus leucogaster	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
White-throated Needletail	Hirundapus caudacutus	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Wompoo Fruit-Dove	Ptilinopus magnificus	3242-Lower North Ranges Turpentine Moist Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3029-Lower North Wet Gully Palm Rainforest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Yellow-bellied Glider	Petaurus australis	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3263-Watagan Range Turpentine-Mahogany Grassy Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3621-Sydney Hinterland Turpentine-Apple Gully Forest
		3250-Northern Foothills Blackbutt Grassy Forest
		3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3150-Hunter Coast Ranges Turpentine Wet Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3250-Northern Foothills Blackbutt Grassy Forest

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3581-Hunter Coast Foothills Apple Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Candidate Species Report

Proposal Details

Assessment Id 00048775/BAAS17046/24/00048776	Proposal Name HTP BDAR - Wyong IBRA subregion	BAM data last updated * 05/08/2025
Assessor Name	Report Created 21/08/2025	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS17020	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 2	BOS entry trigger	Date Finalised 21/08/2025

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Angophora inopina Charmhaven Apple	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Anthochaera phrygia Regent Honeyeater	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Asperula asthenes Trailing Woodruff	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callistemon linearifolius Netted Bottle Brush	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Chalinolobus dwyeri Large-eared Pied Bat	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Corunastylis sp. Charmhaven (NSW896673) Corunastylis sp. Charmhaven (NSW896673)	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Corybas dowlingii Red Helmet Orchid	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cryptostylis hunteriana Leafless Tongue Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Cynanchum elegans White-flowered Wax Plant	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dendrobium melaleucaphilum Spider orchid	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☑ Survey month outside the specified months?

Epacris purpurascens var. purpurascens Epacris purpurascens var. purpurascens	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Eucalyptus camfieldii Camfield's Stringybark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus glaucina Slaty Red Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Eucalyptus parramattensis subsp. decadens Eucalyptus parramattensis subsp. decadens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Genoplesium insigne Variable Midge Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Grammitis stenophylla Narrow-leaf Finger Fern	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Grevillea parviflora subsp. parviflora Small-flower Grevillea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Heleioporus australiacus Giant Burrowing Frog	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hoplocephalus bitorquatus Pale-headed Snake	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hoplocephalus bungaroides Broad-headed Snake	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Hoplocephalus stephensii Stephens' Banded Snake	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Limicola falcinellus Broad-billed Sandpiper	No (expert report)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria aurea Green and Golden Bell Frog	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Litoria brevipalmata Green-thighed Frog	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Litoria littlejohni Littlejohn's Tree Frog	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Melaleuca biconvexa Biconvex Paperbark	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Melaleuca groveana Grove's Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Miniopterus australis Little Bent-winged Bat	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Miniopterus orianae oceanensis Large Bent-winged Bat	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Mixophyes balbus Stuttering Frog	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Mixophyes iteratus Giant Barred Frog	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Myotis macropus Southern Myotis	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Nettapus coromandelianus Cotton Pygmy-Goose	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Notamacropus parma Parma Wallaby	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pandion cristatus Eastern Osprey	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Petauroides volans Southern Greater Glider	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Phascolarctos cinereus Koala	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Planigale maculata Common Planigale	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Potorous tridactylus Long-nosed Potoroo	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pseudophryne australis Red-crowned Toadlet	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhizanthella slateri Eastern Australian Underground Orchid	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodomyrtus psidioides Native Guava	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Rutidosis heterogama Heath Wrinklewort	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Senna acclinis Rainforest Cassia	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Syzygium paniculatum Magenta Lilly Pilly	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tetratheca glandulosa Tetratheca glandulosa	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tetratheca juncea Black-eyed Susan	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Thelymitra adorata Wyong Sun Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Tyto tenebricosa Sooty Owl	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Darwinia glaucophylla	Darwinia glaucophylla	Habitat constraints
Eucalyptus oblonga population at Bateau Bay, Forresters Beach and Tumbi Umbi in the Wyong local government area	Eucalyptus oblonga - endangered population	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Hunter Valley Delma	Delma vescolineata	Refer to BAR
Mahony's Toadlet	Uperoleia mahonyi	Refer to BAR
Maundia triglochinoides	Maundia triglochinoides	Habitat constraints
Red-backed Button-quail	Turnix maculosus	Refer to BAR
Rough Doubletail	Diuris praecox	Refer to BAR
Somersby Mintbush	Prostanthera junonis	Refer to BAR
Spreading Guinea Flower	Hibbertia procumbens	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints
Thick-leaf Star-hair	Astrotricha crassifolia	Refer to BAR

Tranquility Mintbush	Prostanthera askania	Refer to BAR
Wallum Froglet	Crinia tinnula	Refer to BAR

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00048775/BAAS17046/24/00048776

Proposal Name
HTP BDAR - Wyong IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Assessor Number
BAAS17020

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

Proponent Names
Stevie Kay

Report Created
21/08/2025

BAM Case Status
Finalised

Assessment Revision
2

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
21/08/2025

* 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
Chalinolobus dwyeri / Large-eared Pied Bat
Mixophyes balbus / Stuttering Frog

Petrogale penicillata / Brush-tailed Rock-wallaby
Tyto tenebricosa / Sooty Owl
Vespadelus troughtoni / Eastern Cave Bat
Anthochaera phrygia / Regent Honeyeater
Rhodamnia rubescens / Scrub Turpentine
Rhodomyrtus psidioides / Native Guava
Rhizanthella slateri / Eastern Australian Underground Orchid

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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
3150-Hunter Coast Ranges Turpentine Wet Forest	Not a TEC	36.0	686	37	723
3230-Central Coast Escarpment Moist Forest	Not a TEC	55.2	1127	268	1395
3239-Hunter Range Sheltered Grey Gum Forest	Not a TEC	4.9	100	0	100
3242-Lower North Ranges Turpentine Moist Forest	Not a TEC	25.9	624	0	624
3263-Watagan Range Turpentine-Mahogany Grassy Forest	Not a TEC	39.1	987	0	987
3617-Sydney Hinterland Peppermint-Apple Forest	Not a TEC	33.7	897	0	897
3621-Sydney Hinterland Turpentine-Apple Gully Forest	Not a TEC	4.9	0	104	104
3250-Northern Foothills Blackbutt Grassy Forest	Not a TEC	2.0	0	47	47
3029-Lower North Wet Gully Palm Rainforest	Not a TEC	4.8	118	0	118
3581-Hunter Coast Foothills Apple Forest	Not a TEC	0.7	0	16	16
3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	Not a TEC	1.3	32	0	32

3029-Lower North Wet Gully Palm Rainforest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Warm Temperate Rainforests This includes PCT's: 615, 1523, 1529, 1531, 1532, 2101, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 4107	Northern Warm Temperate Rainforests <50%	3029_Mod-good	Yes	118	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3150-Hunter Coast Ranges Turpentine Wet Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North Coast Wet Sclerophyll Forests This includes PCT's: 487, 613, 1563, 1575, 3058, 3060, 3067, 3073, 3078, 3084, 3087, 3088, 3102, 3125, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3145, 3147, 3148, 3149, 3150, 3153, 3154, 3156, 3157, 3158, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3168, 3169, 3171, 3172, 3173, 3174, 3176, 3177, 3178, 3180, 4043, 4115	North Coast Wet Sclerophyll Forests <50%	3150_Mod-good	Yes	686	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	North Coast Wet Sclerophyll Forests This includes PCT's: 487, 613, 1563, 1575, 3058, 3060, 3067, 3073, 3078, 3084, 3087, 3088, 3102, 3125, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3145, 3147, 3148, 3149, 3150, 3153, 3154, 3156, 3157, 3158, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3168, 3169, 3171, 3172, 3173, 3174, 3176, 3177, 3178, 3180, 4043, 4115	North Coast Wet Sclerophyll Forests <50%	3150_Plantation	No	37	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3230-Central Coast Escarpment Moist Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3230_Mod-good	Yes	1127	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3230_Plantation	No	268	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3239-Hunter Range Sheltered Grey Gum Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3239_Mod-good	Yes	100	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3242-Lower North Ranges Turpentine Moist Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3242_Mod-good	Yes	624	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3244_Mod-good	Yes	32	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3250-Northern Foothills Blackbutt Grassy Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3250_Mod-good	No	47	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3263-Watagan Range Turpentine-Mahogany Grassy Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3263_Mod-good	Yes	987	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3581-Hunter Coast Foothills Apple Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Sydney Coastal Dry Sclerophyll Forests This includes PCT's: 1681, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598	Sydney Coastal Dry Sclerophyll Forests <50%	3581_Mod-good	No	16	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3617-Sydney Hinterland Peppermint-Apple Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Sydney Hinterland Dry Sclerophyll Forests This includes PCT's: 612, 621, 624, 1614, 1631, 1666, 1667, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3625, 3626, 3627	Sydney Hinterland Dry Sclerophyll Forests <50%	3617_Mod-good	Yes	897	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3621-Sydney Hinterland Turpentine-Apple Gully Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Sydney Hinterland Dry Sclerophyll Forests This includes PCT's: 612, 621, 624, 1614, 1631, 1666, 1667, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3625, 3626, 3627	Sydney Hinterland Dry Sclerophyll Forests <50%	3621_Mod-good	No	104	Wyong, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Angophora inopina / Charmhaven Apple	**3250_Mod-good**	0.9	28.00
Anthochaera phrygia / Regent Honeyeater	**3263_Mod-good**	0.5	29.00
Asperula asthenes / Trailing Woodruff	**3242_Mod-good, 3250_Mod-good**	2.0	63.00
Callistemon linearifolius / Netted Bottle Brush	**3230_Mod-good, 3230_Plantation**	205.0	308.00

Callocephalon fimbriatum / Gang-gang Cockatoo	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3230_Plantation, 3029_Mod-good, 3244_Mod-good**	46.0	1836.00
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3263_Mod-good, 3029_Mod-good**	16.2	657.00
Cercartetus nanus / Eastern Pygmy-possum	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	155.1	5017.00

Chalinolobus dwyeri / Large-eared Pied Bat	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3581_Mod-good, 3244_Mod-good**	198.8	9644.00
Corybas dowlingii / Red Helmet Orchid	**3150_Mod-good, 3150_Plantation, 3250_Mod-good, 3244_Mod-good**	9.3	253.00
Cynanchum elegans / White-flowered Wax Plant	**3250_Mod-good, 3029_Mod-good**	1.8	71.00
Grammitis stenophylla / Narrow-leaf Finger Fern	**3150_Mod-good, 3242_Mod-good, 3150_Plantation, 3029_Mod-good**	3.2	93.00
Heleioporus australiacus / Giant Burrowing Frog	**3150_Mod-good, 3230_Mod-good, 3617_Mod-good, 3621_Mod-good**	26.8	663.00
Hoplocephalus bitorquatus / Pale-headed Snake	**3250_Mod-good**	2.0	63.00

Hoplocephalus stephensii / Stephens' Banded Snake	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3250_Mod-good, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	144.7	4716.00
Litoria littlejohni / Littlejohn's Tree Frog	**3150_Mod-good, 3230_Mod-good, 3617_Mod-good, 3621_Mod-good, 3230_Plantation**	63.5	2217.00
Melaleuca biconvexa / Biconvex Paperbark	**3150_Mod-good, 3242_Mod-good, 3250_Mod-good, 3029_Mod-good**	9.4	377.00
Mixophyes balbus / Stuttering Frog	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3230_Plantation, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	180.1	8737.00

Mixophyes iteratus / Giant Barred Frog	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3029_Mod-good**	3.8	93.00
Ninox connivens / Barking Owl	**3150_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good**	15.6	611.00
Ninox strenua / Powerful Owl	**3150_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good**	29.9	1169.00
Notamacropus parma / Parma Wallaby	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	208.4	6727.00

Petauroides volans / Southern Greater Glider	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	208.4	8089.00
Petaurus norfolcensis / Squirrel Glider	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	208.4	8089.00
Petrogale penicillata / Brush-tailed Rock-wallaby	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3250_Mod-good, 3029_Mod-good, 3581_Mod-good, 3244_Mod-good**	70.9	3427.00

Phascolarctos cinereus / Koala	**3150_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3029_Mod-good**	52.9	2078.00
Potorous tridactylus / Long-nosed Potoroo	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3617_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3581_Mod-good, 3244_Mod-good**	135.1	4370.00
Pseudophryne australis / Red-crowned Toadlet	**3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3617_Mod-good, 3621_Mod-good, 3230_Plantation, 3029_Mod-good**	29.7	754.00
Rhizanthella slateri / Eastern Australian Underground Orchid	**3150_Mod-good, 3230_Mod-good, 3242_Mod-good, 3263_Mod-good, 3150_Plantation, 3230_Plantation, 3250_Mod-good, 3029_Mod-good**	7.7	363.00

Rhodamnia rubescens / Scrub Turpentine	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3150_Plantation, 3230_Plantation, 3029_Mod-good**	1354.0	4062.00
Rhodomyrtus psidioides / Native Guava	**3150_Mod-good, 3242_Mod-good, 3263_Mod-good, 3150_Plantation, 3029_Mod-good**	18.5	1137.00
Rutidosis heterogama / Heath Wrinklewort	**3250_Mod-good**	0.9	28.00
Senna acclinis / Rainforest Cassia	**3150_Mod-good, 3242_Mod-good, 3150_Plantation, 3029_Mod-good**	6.0	177.00
Syzygium paniculatum / Magenta Lilly Pilly	**3150_Mod-good, 3242_Mod-good, 3150_Plantation, 3029_Mod-good**	468.0	936.00
Tetratheca juncea / Black-eyed Susan	**3242_Mod-good, 3250_Mod-good**	2.9	91.00
Tyto novaehollandiae / Masked Owl	**3150_Mod-good, 3230_Mod-good, 3263_Mod-good**	4.8	182.00

Tyto tenebricosa / Sooty Owl	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3263_Mod-good, 3029_Mod-good, 3244_Mod-good**	75.5	4440.00
Vespadelus troughtoni / Eastern Cave Bat	**3150_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3617_Mod-good, 3621_Mod-good, 3150_Plantation, 3581_Mod-good, 3244_Mod-good**	107.8	5014.00

Credit Retirement Options

Like-for-like credit retirement options

Angophora inopina / Charmhaven Apple	Spp	IBRA subregion
	Angophora inopina / Charmhaven Apple	Any in NSW
Anthochaera phrygia / Regent Honeyeater	Spp	IBRA subregion
	Anthochaera phrygia / Regent Honeyeater	Any in NSW
Asperula asthenes / Trailing Woodruff	Spp	IBRA subregion
	Asperula asthenes / Trailing Woodruff	Any in NSW

Callistemon linearifolius / Netted Bottle Brush	Spp	IBRA subregion
	Callistemon linearifolius / Netted Bottle Brush	Any in NSW
Callocephalon fimbriatum / Gang-gang Cockatoo	Spp	IBRA subregion
	Callocephalon fimbriatum / Gang-gang Cockatoo	Any in NSW
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Any in NSW
Cercartetus nanus / Eastern Pygmy-possum	Spp	IBRA subregion
	Cercartetus nanus / Eastern Pygmy-possum	Any in NSW
Chalinolobus dwyeri / Large-eared Pied Bat	Spp	IBRA subregion
	Chalinolobus dwyeri / Large-eared Pied Bat	Any in NSW
Corybas dowlingii / Red Helmet Orchid	Spp	IBRA subregion
	Corybas dowlingii / Red Helmet Orchid	Any in NSW

Cynanchum elegans / White-flowered Wax Plant	Spp	IBRA subregion
	Cynanchum elegans / White-flowered Wax Plant	Any in NSW
Grammitis stenophylla / Narrow-leaf Finger Fern	Spp	IBRA subregion
	Grammitis stenophylla / Narrow-leaf Finger Fern	Any in NSW
Heleioporus australiacus / Giant Burrowing Frog	Spp	IBRA subregion
	Heleioporus australiacus / Giant Burrowing Frog	Any in NSW
Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Hoplocephalus stephensii / Stephens' Banded Snake	Spp	IBRA subregion
	Hoplocephalus stephensii / Stephens' Banded Snake	Any in NSW
Litoria littlejohni / Littlejohn's Tree Frog	Spp	IBRA subregion
	Litoria littlejohni / Littlejohn's Tree Frog	Any in NSW
Melaleuca biconvexa / Biconvex Paperbark	Spp	IBRA subregion

	Melaleuca biconvexa / Biconvex Paperbark	Any in NSW
Mixophyes balbus / Stuttering Frog	Spp	IBRA subregion
	Mixophyes balbus / Stuttering Frog	Any in NSW
Mixophyes iteratus / Giant Barred Frog	Spp	IBRA subregion
	Mixophyes iteratus / Giant Barred Frog	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Notamacropus parma / Parma Wallaby	Spp	IBRA subregion
	Notamacropus parma / Parma Wallaby	Any in NSW
Petauroides volans / Southern Greater Glider	Spp	IBRA subregion
	Petauroides volans / Southern Greater Glider	Any in NSW

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Petrogale penicillata / Brush-tailed Rock-wallaby	Spp	IBRA subregion
	Petrogale penicillata / Brush-tailed Rock-wallaby	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW
Potorous tridactylus / Long-nosed Potoroo	Spp	IBRA subregion
	Potorous tridactylus / Long-nosed Potoroo	Any in NSW
Pseudophryne australis / Red-crowned Toadlet	Spp	IBRA subregion
	Pseudophryne australis / Red-crowned Toadlet	Any in NSW
Rhizanthella slateri / Eastern Australian Underground Orchid	Spp	IBRA subregion
	Rhizanthella slateri / Eastern Australian Underground Orchid	Any in NSW
Rhodamnia rubescens / Scrub Turpentine	Spp	IBRA subregion

	Rhodamnia rubescens / Scrub Turpentine	Any in NSW
Rhodomyrtus psidioides / Native Guava	Spp	IBRA subregion
	Rhodomyrtus psidioides / Native Guava	Any in NSW
Rutidosis heterogama / Heath Wrinklewort	Spp	IBRA subregion
	Rutidosis heterogama / Heath Wrinklewort	Any in NSW
Senna acclinis / Rainforest Cassia	Spp	IBRA subregion
	Senna acclinis / Rainforest Cassia	Any in NSW
Syzygium paniculatum / Magenta Lilly Pilly	Spp	IBRA subregion
	Syzygium paniculatum / Magenta Lilly Pilly	Any in NSW
Tetratheca juncea / Black-eyed Susan	Spp	IBRA subregion
	Tetratheca juncea / Black-eyed Susan	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

Tyto tenebricosa / Sooty Owl	Spp	IBRA subregion
	Tyto tenebricosa / Sooty Owl	Any in NSW
Vespadelus troughtoni / Eastern Cave Bat	Spp	IBRA subregion
	Vespadelus troughtoni / Eastern Cave Bat	Any in NSW

BAM Credit Summary Report

Proposal Details

Assessment Id
00048830/BAAS17046/24/00048832

Proposal Name
HTP BDAR - Yengo IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

BAM Case Status
Finalised

Date Finalised
21/08/2025

Assessment Revision
3

BOS entry trigger

Assessment Type
Major Projects

* 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.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Blue Mountains Peppermint Shrub Forest												
11	3599_Mod-good	Not a TEC	68.1	68.1	7.2	PCT Cleared - 0%	High Sensitivity to Gain			1.50		185
											Subtotal	**185**
Central Coast Escarpment Moist Forest												
3	3230_Mod-good	Not a TEC	78.1	67.9	15.3	PCT Cleared - 25%	High Sensitivity to Gain			1.50		390
											Subtotal	**390**
Hunter Escarpment Footslopes Ironbark Forest												
8	3438_Mod-good	Not a TEC	78.4	69.0	2	PCT Cleared - 24%	High Sensitivity to Gain			1.50		51
											Subtotal	**51**
Hunter Escarpment Grey Box Forest												
10	3489_Mod-good	Not a TEC	88.9	79.1	5.7	PCT Cleared - 2%	High Sensitivity to Gain			1.50		168
											Subtotal	**168**

Hunter Escarpment Grey Gum Sheltered Forest											
9	3439_Mod-good	Not a TEC	100	59.3	1.6	PCT Cleared - 58%	High Sensitivity to Gain			1.75		42
											Subtotal	**42**
Hunter Range Blue Gum Gully Forest											
4	3237_Mod-good	Not a TEC	80.8	56.7	5.5	PCT Cleared - 2%	High Sensitivity to Gain			1.50		116
											Subtotal	**116**
Hunter Range Colluvial Apple-Gum Forest											
14	3238_Mod-good	Not a TEC	100	57.5	0.05	PCT Cleared - 4%	High Sensitivity to Gain			1.50		1
											Subtotal	**1**

Hunter Range Creekflat Apple-Red Gum Forest												
20	4039_Mod-good	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	100	100.0	0.07	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		4
											Subtotal	**4**
Hunter Range Ironbark Forest												
12	3605_Mod-good	Not a TEC	68.4	60.2	57.1	PCT Cleared - 2%	High Sensitivity to Gain			1.50		1288
											Subtotal	**1288**
Hunter Range Sheltered Grey Gum Forest												
5	3239_Mod-good	Not a TEC	74.4	65.4	96.4	PCT Cleared - 1%	High Sensitivity to Gain			1.50		2363
22	3239_Plantation	Not a TEC	48.1	47.8	2.8	PCT Cleared - 1%	High Sensitivity to Gain			1.50		51

											Subtotal	**2414**
Hunter Range Turpentine-Grey Myrtle Gully Forest												
2	3152_Mod-good	Not a TEC	100	61.3	0.92	PCT Cleared - 1%	High Sensitivity to Gain			1.50		21
											Subtotal	**21**
Hunter River Oak Mesic Forest												
21	4072_Mod-good	Not a TEC	100	100.0	0.07	PCT Cleared - 66%	High Sensitivity to Gain			1.75		3
											Subtotal	**3**
Lower Hunter Red Gum-Paperbark Riverflat Forest												
15	3328_Mod-good	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	32.6	30.4	0.45	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		7
											Subtotal	**7**

Lower Hunter Spotted Gum-Ironbark Forest												
16	3444_Mod-good	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	100	100.0	0.92	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		46
23	3444_Derived	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	100	100.0	0.29	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		15
											Subtotal	**61**
Lower North Foothills Ironbark-Box-Gum Grassy Forest												
17	3446_Mod-good	Central Hunter Valley eucalypt forest and woodland	71.2	47.5	1.4	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		40
											Subtotal	**40**

Lower North Hinterland Riparian Dry Rainforest											
24	3086_Mod-good	Not a TEC	82.7	56.9	1.9	PCT Cleared - 46%	High Sensitivity to Gain			1.50	41
										Subtotal	**41**
Lower North Ranges Riparian Turpentine Forest											
1	3087_Mod-good	Not a TEC	84.6	60.4	2.8	PCT Cleared - 27%	High Sensitivity to Gain			1.50	64
										Subtotal	**64**
Lower North Ranges Turpentine Moist Forest											
6	3242_Mod-good	Not a TEC	70.7	53.4	10.6	PCT Cleared - 13%	High Sensitivity to Gain			1.50	212
										Subtotal	**212**
Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest											
7	3244_Mod-good	Not a TEC	89.3	64.0	0.31	PCT Cleared - 39%	High Sensitivity to Gain			1.50	7
										Subtotal	**7**

Lower North White Mahogany-Spotted Gum Moist Forest											
19	3241_Mod-good	Not a TEC	82.6	82.6	10.2	PCT Cleared - 31%	High Sensitivity to Gain			1.50	316
										Subtotal	**316**
Northwest Sydney Sandstone Grey Myrtle Dry Rainforest											
18	3151_Mod-good	Not a TEC	61.3	48.9	1.8	PCT Cleared - 2%	High Sensitivity to Gain			1.50	34
										Subtotal	**34**
Sydney Hinterland Peppermint-Apple Forest											
13	3617_Mod-good	Not a TEC	70.2	70.2	1.9	PCT Cleared - 2%	High Sensitivity to Gain			1.50	50
										Subtotal	**50**
										Total	**5515**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Anthochaera phrygia / Regent Honeyeater (Fauna)									
3087_Mod-good	84.6	84.6	0.04	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	3
3152_Mod-good	100.0	100.0	0.16	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	12
3230_Mod-good	78.1	78.1	0.04	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	2
3239_Mod-good	74.4	74.4	16.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	919
3489_Mod-good	88.9	88.9	4.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	325

3605_Mod-good	68.4	68.4	17.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	889
3444_Mod-good	100.0	100.0	0.27	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	20
3241_Mod-good	82.6	82.6	2.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	153
3328_Mod-good	32.6	32.6	0.31	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	8
3151_Mod-good	61.3	61.3	0.32	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	15
3238_Mod-good	100.0	100.0	0.05	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	4

3086_Mod-good	82.7	82.7	0.21	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	13
								Subtotal	**2363**
Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)									
3087_Mod-good	84.6	84.6	0.23	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	10
3152_Mod-good	100.0	100.0	0.39	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	20
3239_Mod-good	74.4	74.4	12.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	473
3242_Mod-good	70.7	70.7	0.85	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	30
3439_Mod-good	100.0	100.0	0.77	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	39

3489_Mod-good	88.9	88.9	0.45	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	20
3605_Mod-good	68.4	68.4	24.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	836
3238_Mod-good	100.0	100.0	0.05	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	3
3151_Mod-good	61.3	61.3	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	49
3086_Mod-good	82.7	82.7	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	20
								Subtotal	**1500**
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo (Fauna)									
3152_Mod-good	100.0	100.0	0.39	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	20

3237_Mod-good	80.8	80.8	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	42
3239_Mod-good	74.4	74.4	20.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	778
3489_Mod-good	88.9	88.9	0.45	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	20
3605_Mod-good	68.4	68.4	21.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	734
3238_Mod-good	100.0	100.0	0.05	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	3
3151_Mod-good	61.3	61.3	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	49
3086_Mod-good	82.7	82.7	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	20
								Subtotal	**1666**

Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
3152_Mod-good	61.3	61.3	0.92	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	42
3230_Mod-good	67.9	67.9	15.3	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	779
3237_Mod-good	56.7	56.7	5.5	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	232
3239_Mod-good	65.4	65.4	96.4	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	4727

3242_Mod-good	53.4	53.4	10.6	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	423
3244_Mod-good	64.0	64.0	0.31	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	15
3438_Mod-good	69.0	69.0	2	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	102
3439_Mod-good	59.3	59.3	1.6	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	72
3489_Mod-good	79.1	79.1	5.7	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	336

3599_Mod-good	68.1	68.1	7.2	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	370
3605_Mod-good	60.2	60.2	57.1	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	2576
3617_Mod-good	70.2	70.2	1.9	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	101
3238_Mod-good	57.5	57.5	0.05	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	2
3328_Mod-good	30.4	30.4	0.45	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	10

3444_Mod-good	100.0	100.0	0.92	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	69
3446_Mod-good	47.5	47.5	1.4	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	48
3151_Mod-good	48.9	48.9	1.8	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	68
3241_Mod-good	82.6	82.6	10.2	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	632
3239_Plantation	47.8	47.8	2.8	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	101

3444_Derived	100.0	100.0	0.29	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	22
3086_Mod-good	56.9	56.9	1.9	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	81
								Subtotal	**10808**
Cynanchum elegans / White-flowered Wax Plant (Flora)									
3087_Mod-good	84.6	84.6	0.59	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	25
3152_Mod-good	100.0	100.0	0.08	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	4
3239_Mod-good	74.4	74.4	3.6	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	134

3489_Mod-good	88.9	88.9	0.29	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	13
								Subtotal	**176**
Dillwynia tenuifolia / Dillwynia tenuifolia (Flora)									
3605_Mod-good	60.2	60.2	1.5	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	44
								Subtotal	**44**
Eucalyptus fracta / Broken Back Ironbark (Flora)									
3489_Mod-good	88.9	88.9	0.73	Geographic Distribution	Seedbank Persistence	Endangered	Not Listed	True	49
3605_Mod-good	68.4	68.4	20	Geographic Distribution	Seedbank Persistence	Endangered	Not Listed	True	1023
								Subtotal	**1072**
Eucalyptus glaucina / Slaty Red Gum (Flora)									
3152_Mod-good	N/A	N/A	4	Biodiversity Conservation Act listing status	Seedbank Persistence	Vulnerable	Vulnerable	False	8
3239_Mod-good	N/A	N/A	179	Biodiversity Conservation Act listing status	Seedbank Persistence	Vulnerable	Vulnerable	False	358

3605_Mod-good	N/A	N/A	105	Biodiversity Conservation Act listing status	Seedbank Persistence	Vulnerable	Vulnerable	False	210
								Subtotal	**576**
Eucalyptus pumila / Pokolbin Mallee (Flora)									
3152_Mod-good	100.0	100.0	0.08	Geographic Distribution	Ability to colonise improved habitat	Vulnerable	Vulnerable	True	6
3239_Mod-good	74.4	74.4	3.6	Geographic Distribution	Ability to colonise improved habitat	Vulnerable	Vulnerable	True	200
3605_Mod-good	68.4	68.4	2.1	Geographic Distribution	Ability to colonise improved habitat	Vulnerable	Vulnerable	True	108
								Subtotal	**314**
Grammitis stenophylla / Narrow-leaf Finger Fern (Flora)									
3239_Mod-good	65.4	65.4	2.6	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	83
								Subtotal	**83**

Lathamus discolor / Swift Parrot (Fauna)									
3239_Mod-good	74.4	74.4	0.63	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	35
3489_Mod-good	88.9	88.9	0.61	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	41
3605_Mod-good	68.4	68.4	0.16	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	8
3444_Mod-good	100.0	100.0	0.27	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	20
								Subtotal	**104**

Melaleuca groveana / Grove's Paperbark (Flora)									
3087_Mod-good	N/A	N/A	8	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Not Listed	False	16
3239_Mod-good	N/A	N/A	823	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Not Listed	False	1646
3605_Mod-good	N/A	N/A	2092	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Not Listed	False	4184
								Subtotal	**5846**
Myotis macropus / Southern Myotis (Fauna)									
3239_Mod-good	65.4	65.4	0.47	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	15
3605_Mod-good	60.2	60.2	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	31
3238_Mod-good	57.5	57.5	0.05	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1

3328_Mod-good	30.4	30.4	0.32	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
3444_Mod-good	100.0	100.0	0.33	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
3151_Mod-good	48.9	48.9	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
3444_Derived	100.0	100.0	0.29	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	15
								Subtotal	**85**
Ninox connivens / Barking Owl (Fauna)									
3239_Mod-good	74.4	74.4	0.44	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	16
3605_Mod-good	68.4	68.4	6.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	236
								Subtotal	**252**

Ninox strenua / Powerful Owl (Fauna)									
3087_Mod-good	84.6	84.6	0.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	34
3152_Mod-good	100.0	100.0	0.08	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	4
3230_Mod-good	78.1	78.1	5.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	225
3237_Mod-good	80.8	80.8	4.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	189
3239_Mod-good	74.4	74.4	38.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1435
3242_Mod-good	70.7	70.7	0.87	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	31
3244_Mod-good	89.3	89.3	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	14

3438_Mod-good	78.4	78.4	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	77
3439_Mod-good	100.0	100.0	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	81
3605_Mod-good	68.4	68.4	12.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	435
3444_Mod-good	100.0	100.0	0.11	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	6
3446_Mod-good	71.2	71.2	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	48
								Subtotal	**2579**
Notamacropus parma / Parma Wallaby (Fauna)									
3087_Mod-good	60.4	60.4	2.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	73

3152_Mod-good	61.3	61.3	0.37	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	11
3230_Mod-good	67.9	67.9	15.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	519
3239_Mod-good	65.4	65.4	24.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	810
3242_Mod-good	53.4	53.4	10.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	282
3605_Mod-good	60.2	60.2	39	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1173
3617_Mod-good	70.2	70.2	1.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	67

3151_Mod-good	48.9	48.9	1.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	39
3086_Mod-good	56.9	56.9	0.58	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	17
								Subtotal	**2991**
Olearia cordata / Olearia cordata (Flora)									
3152_Mod-good	61.3	61.3	0.01	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1
3239_Mod-good	65.4	65.4	2.6	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	83
3605_Mod-good	60.2	60.2	1.5	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	44

3151_Mod-good	48.9	48.9	0.01	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1
								Subtotal	**129**
Persoonia hirsuta / Hairy Geebung (Flora)									
3605_Mod-good	60.2	60.2	1.5	Population size	Ecology or response to management is poorly known	Endangered	Endangered	True	66
								Subtotal	**66**
Petauroides volans / Southern Greater Glider (Fauna)									
3087_Mod-good	60.4	60.4	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	85
3152_Mod-good	61.3	61.3	0.92	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	28
3230_Mod-good	78.1	78.1	15.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	597

3237_Mod-good	80.8	80.8	5.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	221
3239_Mod-good	74.4	74.4	96.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	3589
3242_Mod-good	70.7	70.7	10.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	374
3244_Mod-good	89.3	89.3	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	14
3438_Mod-good	78.4	78.4	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	77
3439_Mod-good	100.0	100.0	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	81
3489_Mod-good	88.9	88.9	5.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	252

3599_Mod-good	68.1	68.1	7.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	247
3605_Mod-good	68.4	68.4	57.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1952
3617_Mod-good	70.2	70.2	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	67
3238_Mod-good	100.0	100.0	0.05	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	3
3328_Mod-good	32.6	32.6	0.45	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	7
3444_Mod-good	100.0	100.0	0.92	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	46
3446_Mod-good	71.2	71.2	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	48

3151_Mod-good	61.3	61.3	1.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	57
3241_Mod-good	82.6	82.6	10.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	421
4039_Mod-good	100.0	100.0	0.07	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	4
4072_Mod-good	100.0	100.0	0.07	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	4
3239_Plantation	48.1	48.1	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	68
3086_Mod-good	82.7	82.7	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	79
								Subtotal	**8321**

Petaurus norfolcensis / Squirrel Glider (Fauna)									
3087_Mod-good	84.6	84.6	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	119
3152_Mod-good	100.0	100.0	0.92	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	46
3230_Mod-good	78.1	78.1	15.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	597
3237_Mod-good	80.8	80.8	5.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	221
3239_Mod-good	74.4	74.4	96.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3589
3242_Mod-good	70.7	70.7	10.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	374
3244_Mod-good	89.3	89.3	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	14

3438_Mod-good	78.4	78.4	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	77
3439_Mod-good	100.0	100.0	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	81
3599_Mod-good	68.1	68.1	7.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	247
3605_Mod-good	68.4	68.4	57.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1952
3617_Mod-good	70.2	70.2	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	67
3328_Mod-good	32.6	32.6	0.45	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
3444_Mod-good	100.0	100.0	0.92	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	46

3446_Mod-good	71.2	71.2	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	48
3151_Mod-good	61.3	61.3	1.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	57
3241_Mod-good	82.6	82.6	10.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	421
4039_Mod-good	100.0	100.0	0.07	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	4
4072_Mod-good	100.0	100.0	0.07	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	4
3239_Plantation	48.1	48.1	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	68
3086_Mod-good	82.7	82.7	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	79
								Subtotal	**8118**

Petrogale penicillata / Brush-tailed Rock-wallaby (Fauna)									
3087_Mod-good	60.4	60.4	0.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	36
3152_Mod-good	61.3	61.3	0.39	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	18
3230_Mod-good	67.9	67.9	14.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	744
3237_Mod-good	56.7	56.7	0.09	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	4
3239_Mod-good	65.4	65.4	25.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1241
3242_Mod-good	53.4	53.4	7.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	307
3244_Mod-good	64.0	64.0	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	15

3438_Mod-good	69.0	69.0	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	102
3439_Mod-good	59.3	59.3	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	72
3605_Mod-good	60.2	60.2	13.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	594
3444_Mod-good	100.0	100.0	0.24	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	18
3446_Mod-good	47.5	47.5	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	48
3241_Mod-good	82.6	82.6	5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	308
								Subtotal	**3507**

Phascolarctos cinereus / Koala (Fauna)									
3087_Mod-good	84.6	84.6	2.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	119
3152_Mod-good	100.0	100.0	0.92	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	46
3230_Mod-good	78.1	78.1	15.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	597
3237_Mod-good	80.8	80.8	5.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	221
3239_Mod-good	74.4	74.4	96.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	3589

3242_Mod-good	70.7	70.7	10.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	374
3244_Mod-good	89.3	89.3	0.31	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	14
3438_Mod-good	78.4	78.4	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	77
3439_Mod-good	100.0	100.0	1.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	81
3489_Mod-good	88.9	88.9	5.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	252
3599_Mod-good	68.1	68.1	7.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	247

3605_Mod-good	68.4	68.4	57.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1952
3617_Mod-good	70.2	70.2	1.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	67
3238_Mod-good	100.0	100.0	0.05	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	3
3446_Mod-good	71.2	71.2	1.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	48
3151_Mod-good	61.3	61.3	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	57
3241_Mod-good	82.6	82.6	10.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	421

3239_Plantation	48.1	48.1	2.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	68
								Subtotal	**8233**
Prostanthera cineolifera / Singleton Mint Bush (Flora)									
3237_Mod-good	56.7	56.7	0.64	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	18
3239_Mod-good	65.4	65.4	23.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	774
3605_Mod-good	60.2	60.2	15.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	455
								Subtotal	**1247**

Pseudophryne australis / Red-crowned Toadlet (Fauna)									
3152_Mod-good	61.3	61.3	0.08	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	2
3230_Mod-good	67.9	67.9	0.85	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	22
3237_Mod-good	56.7	56.7	2.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	47
3239_Mod-good	65.4	65.4	7.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	191
3242_Mod-good	53.4	53.4	2.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	45

3605_Mod-good	60.2	60.2	0.04	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
3239_Plantation	47.8	47.8	0.63	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	11
								Subtotal	**319**
Rhizanthella slateri / Eastern Australian Underground Orchid (Flora)									
3087_Mod-good	60.4	60.4	0.35	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	16
3237_Mod-good	56.7	56.7	0.8	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	34
3599_Mod-good	68.1	68.1	0.64	Population size	Ecology or response to management is poorly known	Vulnerable	Endangered	True	33
								Subtotal	**83**

Rhodamnia rubescens / Scrub Turpentine (Flora)									
3087_Mod-good	N/A	N/A	77	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	231
3152_Mod-good	N/A	N/A	16	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	48
3230_Mod-good	N/A	N/A	23	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	69
3237_Mod-good	N/A	N/A	85	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	255
3239_Mod-good	N/A	N/A	369	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	1107

3242_Mod-good	N/A	N/A	38	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	114
3605_Mod-good	N/A	N/A	105	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	315
3151_Mod-good	N/A	N/A	3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	9
3241_Mod-good	N/A	N/A	120	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	360
3086_Mod-good	N/A	N/A	16	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	48
								Subtotal	**2556**

Rhodomyrtus psidioides / Native Guava (Flora)									
3087_Mod-good	84.6	84.6	0.59	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	37
3152_Mod-good	100.0	100.0	0.47	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	35
3151_Mod-good	61.3	61.3	0.15	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	7
								Subtotal	**79**
Rutidosis heterogama / Heath Wrinklewort (Flora)									
3605_Mod-good	60.2	60.2	1.5	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	44
								Subtotal	**44**

Syzygium paniculatum / Magenta Lilly Pilly (Flora)									
3087_Mod-good	N/A	N/A	30	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	60
								Subtotal	**60**
Tyto novaehollandiae / Masked Owl (Fauna)									
3152_Mod-good	100.0	100.0	0.08	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	4
3237_Mod-good	80.8	80.8	3.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	132
3239_Mod-good	74.4	74.4	8.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	324
3244_Mod-good	89.3	89.3	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	14
3438_Mod-good	78.4	78.4	0.02	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1

3439_Mod-good	100.0	100.0	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	75
3605_Mod-good	68.4	68.4	11.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	379
								Subtotal	**929**
Tyto tenebricosa / Sooty Owl (Fauna)									
3087_Mod-good	84.6	84.6	2.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	148
3230_Mod-good	78.1	78.1	15	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	876
3237_Mod-good	80.8	80.8	4.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	273
3239_Mod-good	74.4	74.4	53.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	2988

3242_Mod-good	70.7	70.7	9.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	501
3605_Mod-good	68.4	68.4	41	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	2102
3617_Mod-good	70.2	70.2	1.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	62
								Subtotal	**6950**
Velleia perfoliata / Velleia perfoliata (Flora)									
3152_Mod-good	61.3	61.3	0.01	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	1
3239_Mod-good	65.4	65.4	2.6	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	83
3605_Mod-good	60.2	60.2	1.5	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	44
								Subtotal	**128**

Vespadelus troughtoni / Eastern Cave Bat (Fauna)									
3237_Mod-good	56.7	56.7	5.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	232
3239_Mod-good	65.4	65.4	96.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	4727
3242_Mod-good	53.4	53.4	10.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	423
3244_Mod-good	64.0	64.0	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	15
3438_Mod-good	69.0	69.0	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	102
3439_Mod-good	59.3	59.3	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	72
3599_Mod-good	68.1	68.1	7.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	370

3605_Mod-good	60.2	60.2	57.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	2576
3617_Mod-good	70.2	70.2	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	101
3444_Mod-good	100.0	100.0	0.92	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	69
3241_Mod-good	82.6	82.6	10.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	632
4039_Mod-good	100.0	100.0	0.07	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	5
3239_Plantation	47.8	47.8	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	101
3444_Derived	100.0	100.0	0.29	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	22
								Subtotal	**9447**

Zieria involucrata / Zieria involucrata (Flora)									
3152_Mod-good	61.3	61.3	0.01	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Vulnerable	False	1
3239_Mod-good	65.4	65.4	2.6	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Vulnerable	False	83
3605_Mod-good	60.2	60.2	1.5	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Vulnerable	False	44
3151_Mod-good	48.9	48.9	0.01	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Vulnerable	False	1
								Subtotal	**129**

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00048830/BAAS17046/24/00048832

Assessment name
HTP BDAR - Yengo IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger

Date Finalised
21/08/2025

* 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.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3087_Mod-good	3087-Lower North Ranges Riparian Turpentine Forest	Mod-good	2.82	2	Area A (1.33 ha) Area B (1.49 ha)
2	3152_Mod-good	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest	Mod-good	0.92	1	Area A (0.25 ha) Area B (0.67 ha)

3	3230_Mod-good	3230-Central Coast Escarpment Moist Forest	Mod-good	15.3	3	Area A (11.2 ha) Area B (4.05 ha) HZ (0.05 ha)
4	3237_Mod-good	3237-Hunter Range Blue Gum Gully Forest	Mod-good	5.46	3	Area A (2.43 ha) Area B (3.03 ha)
5	3239_Mod-good	3239-Hunter Range Sheltered Grey Gum Forest	Mod-good	96.43	5	Area A (73.36 ha) Area B (22.95 ha) HZ (0.12 ha)
6	3242_Mod-good	3242-Lower North Ranges Turpentine Moist Forest	Mod-good	10.57	3	Area A (5.36 ha) Area B (5.19 ha) HZ (0.02 ha)
7	3244_Mod-good	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	Mod-good	0.31	1	Area A (0.13 ha) Area B (0.18 ha)
8	3438_Mod-good	3438-Hunter Escarpment Footslopes Ironbark Forest	Mod-good	1.97	1	Area A (1.42 ha) Area B (0.54 ha) HTZ (0.01 ha)
9	3439_Mod-good	3439-Hunter Escarpment Grey Gum Sheltered Forest	Mod-good	1.62	1	Area A (0.4 ha) Area B (1.01 ha) HTZ (0.21 ha)
10	3489_Mod-good	3489-Hunter Escarpment Grey Box Forest	Mod-good	5.67	3	Area A (4.45 ha) Area B (1.21 ha) HTZ (0.01 ha)
11	3599_Mod-good	3599-Blue Mountains Peppermint Shrub Forest	Mod-good	7.24	3	Area A (7.23 ha) Area B (0.01 ha)

12	3605_Mod-good	3605-Hunter Range Ironbark Forest	Mod-good	57.1	5	Area A (43.47 ha) Area B (13.45 ha) HZ (0.18 ha)
13	3617_Mod-good	3617-Sydney Hinterland Peppermint-Apple Forest	Mod-good	1.91	1	Area A (1.91 ha)
14	3238_Mod-good	3238-Hunter Range Colluvial Apple-Gum Forest	Mod-good	0.05	1	Area A (0.01 ha) Area B (0.04 ha)
15	3328_Mod-good	3328-Lower Hunter Red Gum-Paperbark Riverflat Forest	Mod-good	0.45	1	Area A (0.34 ha) Area B (0.11 ha)
16	3444_Mod-good	3444-Lower Hunter Spotted Gum-Ironbark Forest	Mod-good	0.92	1	Area A (0.92 ha)
17	3446_Mod-good	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Mod-good	1.35	1	Area A (0.46 ha) Area B (0.89 ha)
18	3151_Mod-good	3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest	Mod-good	1.85	1	Area A (0.87 ha) Area B (0.98 ha)
19	3241_Mod-good	3241-Lower North White Mahogany-Spotted Gum Moist Forest	Mod-good	10.21	3	Area A (10.21 ha)
20	4039_Mod-good	4039-Hunter Range Creekflat Apple-Red Gum Forest	Mod-good	0.07	1	Area A (0.07 ha)
21	4072_Mod-good	4072-Hunter River Oak Mesic Forest	Mod-good	0.07	1	Area A (0.07 ha)
22	3239_Plantation	3239-Hunter Range Sheltered Grey Gum Forest	Plantation	2.83	2	Area A (2.76 ha) Area B (0.07 ha)
23	3444_Derived	3444-Lower Hunter Spotted Gum-Ironbark Forest	Derived	0.29	1	Area A (0.29 ha)

24	3086_Mod-good	3086-Lower North Hinterland Riparian Dry Rainforest	Mod-good	1.9	1	Area A (0.78 ha) Area B (1.12 ha)

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048830/BAAS17046/24/00048832	HTP BDAR - Yengo IBRA subregion	05/08/2025
Assessor Name	**Report Created**	**BAM Data version ***
	21/08/2025	Current classification (live - default) (82)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17020	Major Projects	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
3		21/08/2025

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Black Bittern	Ixobrychus flavicollis	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest

Black Bittern	Ixobrychus flavicollis	3241-Lower North White Mahogany-Spotted Gum Moist Forest
Black Falcon	Falco subniger	3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4072-Hunter River Oak Mesic Forest
Black-necked Stork	Ephippiorhynchus asiaticus	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest

Black-necked Stork	Ephippiorhynchus asiaticus	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Broad-headed Snake	Hoplocephalus bungaroides	3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest

Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Diamond Firetail	Stagonopleura guttata	3239-Hunter Range Sheltered Grey Gum Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest

Dusky Woodswallow	Artamus cyanopterus cyanopterus	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3087-Lower North Ranges Riparian Turpentine Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3086-Lower North Hinterland Riparian Dry Rainforest

Eastern Osprey	Pandion cristatus	3087-Lower North Ranges Riparian Turpentine Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Flame Robin	Petroica phoenicea	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest

Flame Robin	Petroica phoenicea	3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Gang-gang Cockatoo	Callocephalon fimbriatum	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Golden-tipped Bat	Phoniscus papuensis	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest

Golden-tipped Bat	Phoniscus papuensis	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Greater Broad-nosed Bat	Scoteanax rueppellii	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest

Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest

Large Bent-winged Bat	Miniopterus orianae oceanensis	3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Little Bent-winged Bat	Miniopterus australis	3087-Lower North Ranges Riparian Turpentine Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Little Eagle	Hieraaetus morphnoides	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest

Little Eagle	Hieraaetus morphnoides	3489-Hunter Escarpment Grey Box Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Little Lorikeet	Glossopsitta pusilla	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest

New Holland Mouse	Pseudomys novaehollandiae	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Olive Whistler	Pachycephala olivacea	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Painted Honeyeater	Grantiella picta	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
Pilotbird	Pycnoptilus floccosus	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
Red-legged Pademelon	Thylogale stigmatica	3242-Lower North Ranges Turpentine Moist Forest

Red-legged Pademelon	Thylogale stigmatica	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
Regent Honeyeater	Anthochaera phrygia	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Rosenberg's Goanna	Varanus rosenbergi	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
Scarlet Robin	Petroica boodang	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest

Scarlet Robin	Petroica boodang	3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4072-Hunter River Oak Mesic Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
South-eastern Hooded Robin	Melanodryas cucullata cucullata	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest

South-eastern Hooded Robin	Melanodryas cucullata cucullata	3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
Speckled Warbler	Chthonicola sagittata	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Spotted Harrier	Circus assimilis	3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest

Spotted Harrier	Circus assimilis	4072-Hunter River Oak Mesic Forest
Spotted-tailed Quoll	Dasyurus maculatus	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Square-tailed Kite	Lophoictinia isura	3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest

Square-tailed Kite	Lophoictinia isura	3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
Swift Parrot	Lathamus discolor	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Turquoise Parrot	Neophema pulchella	3239-Hunter Range Sheltered Grey Gum Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest

Turquoise Parrot	Neophema pulchella	3489-Hunter Escarpment Grey Box Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Varied Sittella	Daphoenositta chrysoptera	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest

White-bellied Sea-Eagle	Haliaeetus leucogaster	3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
White-throated Needletail	Hirundapus caudacutus	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3439-Hunter Escarpment Grey Gum Sheltered Forest
		3489-Hunter Escarpment Grey Box Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3328-Lower Hunter Red Gum-Paperbark Riverflat Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest

White-throated Needletail	Hirundapus caudacutus	3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Yellow-bellied Glider	Petaurus australis	3087-Lower North Ranges Riparian Turpentine Forest
		3152-Hunter Range Turpentine-Grey Myrtle Gully Forest
		3230-Central Coast Escarpment Moist Forest
		3237-Hunter Range Blue Gum Gully Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3599-Blue Mountains Peppermint Shrub Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3230-Central Coast Escarpment Moist Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3242-Lower North Ranges Turpentine Moist Forest
		3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3605-Hunter Range Ironbark Forest
		3617-Sydney Hinterland Peppermint-Apple Forest
		3238-Hunter Range Colluvial Apple-Gum Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Candidate Species Report

Proposal Details

Assessment Id 00048830/BAAS17046/24/00048832	Proposal Name HTP BDAR - Yengo IBRA subregion	BAM data last updated * 05/08/2025
Assessor Name	Report Created 21/08/2025	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS17020	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 3	BOS entry trigger	Date Finalised 21/08/2025

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Acacia pendula - endangered population Acacia pendula population in the Hunter catchment	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Anthochaera phrygia Regent Honeyeater	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☑ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callistemon linearifolius Netted Bottle Brush	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☑ Survey month outside the specified months?

Commersonia rosea Commersonia rosea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cymbidium canaliculatum - endangered population Cymbidium canaliculatum population in the Hunter Catchment	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cynanchum elegans White-flowered Wax Plant	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dillwynia tenuifolia Dillwynia tenuifolia	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus camaldulensis - endangered population Eucalyptus camaldulensis population in the Hunter catchment	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus fracta Broken Back Ironbark	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Eucalyptus glaucina Slaty Red Gum	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus pumila Pokolbin Mallee	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grammitis stenophylla Narrow-leaf Finger Fern	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea parviflora subsp. parviflora Small-flower Grevillea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Heleioporus australiacus Giant Burrowing Frog	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Hibbertia puberula Hibbertia puberula	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Hoplocephalus bungaroides Broad-headed Snake	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Hoplocephalus stephensii Stephens' Banded Snake	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Lathamus discolor Swift Parrot	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Leionema lamprophyllum subsp. fractum Leionema lamprophyllum subsp. fractum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Litoria aurea Green and Golden Bell Frog	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria booroolongensis Booroolong Frog	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☑ Survey month outside the specified months?
Litoria littlejohni Littlejohn's Tree Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Melaleuca biconvexa Biconvex Paperbark	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Melaleuca groveana Grove's Paperbark	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Miniopterus australis Little Bent-winged Bat	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Miniopterus orianae oceanensis Large Bent-winged Bat	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Mixophyes balbus Stuttering Frog	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Mixophyes iteratus Giant Barred Frog	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Notamacropus parma Parma Wallaby	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Olearia cordata Olearia cordata	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pandion cristatus Eastern Osprey	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Persoonia hirsuta Hairy Geebung	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petauroides volans Southern Greater Glider	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☑ Survey month outside the specified months?
Phascolarctos cinereus Koala	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prostanthera cineolifera Singleton Mint Bush	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pseudophryne australis Red-crowned Toadlet	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Pteropus poliocephalus Grey-headed Flying-fox	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Pterostylis gibbosa Illawarra Greenhood	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhizanthella slateri Eastern Australian Underground Orchid	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodomyrtus psidioides Native Guava	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rutidosis heterogama Heath Wrinklewort	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Senna acclinis Rainforest Cassia	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Syzygium paniculatum Magenta Lilly Pilly	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tetratheca glandulosa Tetratheca glandulosa	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto tenebricosa Sooty Owl	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Velleia perfoliata Velleia perfoliata	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Vespadelus troughtoni Eastern Cave Bat	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Zieria involucrata Zieria involucrata	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Acacia gordonii	Acacia gordonii	Habitat constraints
Asterolasia elegans	Asterolasia elegans	Refer to BAR
Brown Pomaderris	Pomaderris brunnea	Refer to BAR
Darwinia biflora	Darwinia biflora	Refer to BAR
Darwinia peduncularis	Darwinia peduncularis	Habitat constraints
Downy Wattle	Acacia pubescens	Refer to BAR
Dural Land Snail	Pommerhelix duralensis	Refer to BAR
Epacris purpurascens var. purpurascens	Epacris purpurascens var. purpurascens	Refer to BAR
Eucalyptus sp. Cattai	Eucalyptus sp. Cattai	Refer to BAR
Grevillea parviflora subsp. supplicans	Grevillea parviflora subsp. supplicans	Refer to BAR
Gyrostemon thesioides	Gyrostemon thesioides	Refer to BAR
Hibbertia superans	Hibbertia superans	Refer to BAR
Kunzea rupestris	Kunzea rupestris	Habitat constraints

Lasiopetalum joyceae	Lasiopetalum joyceae	Refer to BAR
Leptospermum deanei	Leptospermum deanei	Refer to BAR
Leucopogon fletcheri subsp. fletcheri	Leucopogon fletcheri subsp. fletcheri	Refer to BAR
Micromyrtus blakelyi	Micromyrtus blakelyi	Refer to BAR
Pimelea curviflora var. curviflora	Pimelea curviflora var. curviflora	Refer to BAR
Seringia denticulata in the Hawkesbury local government area	Seringia denticulata - endangered population	Refer to BAR
Spreading Guinea Flower	Hibbertia procumbens	Refer to BAR

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00048830/BAAS17046/24/00048832

Proposal Name
HTP BDAR - Yengo IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Assessor Number
BAAS17020

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

Proponent Names

Report Created
21/08/2025

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
21/08/2025

* 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
Chalinolobus dwyeri / Large-eared Pied Bat
Eucalyptus fracta / Broken Back Ironbark

Eucalyptus pumila / Pokolbin Mallee
Lathamus discolor / Swift Parrot
Persoonia hirsuta / Hairy Geebung
Tyto tenebricosa / Sooty Owl
Vespadelus troughtoni / Eastern Cave Bat
Anthochaera phrygia / Regent Honeyeater
Petrogale penicillata / Brush-tailed Rock-wallaby
Rhizanthella slateri / Eastern Australian Underground Orchid
Rhodamnia rubescens / Scrub Turpentine
Rhodomyrtus psidioides / Native Guava

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

BAM Biodiversity Credit Report (Like for like)

Name
No Changes

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
3087-Lower North Ranges Riparian Turpentine Forest	Not a TEC	2.8	64	0	64
3152-Hunter Range Turpentine-Grey Myrtle Gully Forest	Not a TEC	0.9	21	0	21
3230-Central Coast Escarpment Moist Forest	Not a TEC	15.3	0	390	390
3237-Hunter Range Blue Gum Gully Forest	Not a TEC	5.5	116	0	116
3239-Hunter Range Sheltered Grey Gum Forest	Not a TEC	99.3	2363	51	2414
3242-Lower North Ranges Turpentine Moist Forest	Not a TEC	10.6	0	212	212
3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	Not a TEC	0.3	7	0	7
3438-Hunter Escarpment Footslopes Ironbark Forest	Not a TEC	2.0	51	0	51
3439-Hunter Escarpment Grey Gum Sheltered Forest	Not a TEC	1.6	42	0	42
3489-Hunter Escarpment Grey Box Forest	Not a TEC	5.7	168	0	168
3599-Blue Mountains Peppermint Shrub Forest	Not a TEC	7.2	185	0	185
3605-Hunter Range Ironbark Forest	Not a TEC	57.1	1288	0	1288
3617-Sydney Hinterland Peppermint-Apple Forest	Not a TEC	1.9	0	50	50
3238-Hunter Range Colluvial Apple-Gum Forest	Not a TEC	0.1	1	0	1

3328-Lower Hunter Red Gum-Paperbark Riverflat Forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.5	0	7	7
3444-Lower Hunter Spotted Gum-Ironbark Forest	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	1.2	46	15	61
3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Central Hunter Valley eucalypt forest and woodland	1.4	0	40	40
3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest	Not a TEC	1.9	0	34	34
3241-Lower North White Mahogany-Spotted Gum Moist Forest	Not a TEC	10.2	316	0	316
4039-Hunter Range Creekflat Apple-Red Gum Forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.1	4	0	4
4072-Hunter River Oak Mesic Forest	Not a TEC	0.1	3	0	3
3086-Lower North Hinterland Riparian Dry Rainforest	Not a TEC	1.9	0	41	41

3086-Lower North Hinterland Riparian Dry Rainforest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Dry Rainforests This includes PCT's: 388, 547, 616, 627, 1124, 1539, 1540, 1543, 2068, 2079, 3010, 3014, 3055, 3056, 3057, 3059, 3061, 3062, 3064, 3065, 3066, 3068, 3070, 3072, 3074, 3075, 3076, 3077, 3079, 3080, 3082, 3083, 3086, 3089, 3091, 3092, 3093, 3095, 3096, 3097, 3098, 3099, 3101, 3103, 3104, 3105, 3106, 3109, 3110, 3111, 3112, 3113, 3114, 3116, 3117, 3118, 3120, 3151, 3469, 4110, 4111, 4112, 4143, 4144	Dry Rainforests <50%	3086_Mod-good	No	41	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3087-Lower North Ranges Riparian Turpentine Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North Coast Wet Sclerophyll Forests This includes PCT's: 487, 613, 1563, 1575, 3058, 3060, 3067, 3073, 3078, 3084, 3087, 3088, 3102, 3125, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3145, 3147, 3148, 3149, 3150, 3153, 3154, 3156, 3157, 3158, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3168, 3169, 3171, 3172, 3173, 3174, 3176, 3177, 3178, 3180, 4043, 4115	North Coast Wet Sclerophyll Forests <50%	3087_Mod-good	Yes	64	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3151-Northwest Sydney Sandstone Grey Myrtle Dry Rainforest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Dry Rainforests This includes PCT's: 388, 547, 616, 627, 1124, 1539, 1540, 1543, 2068, 2079, 3010, 3014, 3055, 3056, 3057, 3059, 3061, 3062, 3064, 3065, 3066, 3068, 3070, 3072, 3074, 3075, 3076, 3077, 3079, 3080, 3082, 3083, 3086, 3089, 3091, 3092, 3093, 3095, 3096, 3097, 3098, 3099, 3101, 3103, 3104, 3105, 3106, 3109, 3110, 3111, 3112, 3113, 3114, 3116, 3117, 3118, 3120, 3151, 3469, 4110, 4111, 4112, 4143, 4144	Dry Rainforests <50%	3151_Mod-good	No	34	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3152-Hunter Range Turpentine-Grey Myrtle Gully Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3152_Mod-good	Yes	21	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3230-Central Coast Escarpment Moist Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3230_Mod-good	No	390	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3237-Hunter Range Blue Gum Gully Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3237_Mod-good	Yes	116	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3238-Hunter Range Colluvial Apple-Gum Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3238_Mod-good	Yes	1	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3239-Hunter Range Sheltered Grey Gum Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3239_Mod-good	Yes	2363	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3239_Plantation	No	51	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3241-Lower North White Mahogany-Spotted Gum Moist Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3241_Mod-good	Yes	316	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3242-Lower North Ranges Turpentine Moist Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3242_Mod-good	No	212	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3244-Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3244_Mod-good	Yes	7	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3328-Lower Hunter Red Gum-Paperbark Riverflat Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138	-	3328_Mod-good	No	7	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3438-Hunter Escarpment Footslopes Ironbark Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3438_Mod-good	Yes	51	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3438-Hunter Escarpment Footslopes Ironbark Forest

3439-Hunter Escarpment Grey Gum Sheltered Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 3431, 3433, 3436, 3437, 3439, 3442, 3444, 3446	Hunter-Macleay Dry Sclerophyll Forests >=50% and <70%	3439_Mod-good	Yes	42	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3444-Lower Hunter Spotted Gum-Ironbark Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions This includes PCT's: 3433, 3442, 3443, 3444, 4158	-	3444_Mod-good	Yes	46	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions This includes PCT's: 3433, 3442, 3443, 3444, 4158	-	3444_Derived	No	15	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Central Hunter Valley eucalypt forest and woodland This includes PCT's: 1176, 3314, 3315, 3431, 3438, 3446, 3485, 3490, 3497	-	3446_Mod-good	No	40	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3489-Hunter Escarpment Grey Box Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Central Gorge Dry Sclerophyll Forests This includes PCT's: 3081, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3486, 3487, 3488, 3489, 3490, 3491, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3509	Central Gorge Dry Sclerophyll Forests <50%	3489_Mod-good	Yes	168	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3599-Blue Mountains Peppermint Shrub Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Sydney Hinterland Dry Sclerophyll Forests This includes PCT's: 612, 621, 624, 1614, 1631, 1666, 1667, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3625, 3626, 3627	Sydney Hinterland Dry Sclerophyll Forests <50%	3599_Mod-good	Yes	185	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3605-Hunter Range Ironbark Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Sydney Hinterland Dry Sclerophyll Forests This includes PCT's: 612, 621, 624, 1614, 1631, 1666, 1667, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3625, 3626, 3627	Sydney Hinterland Dry Sclerophyll Forests <50%	3605_Mod-good	Yes	1288	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3617-Sydney Hinterland Peppermint-Apple Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Sydney Hinterland Dry Sclerophyll Forests This includes PCT's: 612, 621, 624, 1614, 1631, 1666, 1667, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3625, 3626, 3627	Sydney Hinterland Dry Sclerophyll Forests <50%	3617_Mod-good	No	50	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
4039-Hunter Range Creekflat Apple-Red Gum Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138	-	4039_Mod-good	Yes	4	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
4072-Hunter River Oak Mesic Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Eastern Riverine Forests This includes PCT's: 42, 85, 485, 1714, 3020, 4061, 4063, 4066, 4070, 4072, 4073, 4075, 4077, 4080, 4081, 4085	Eastern Riverine Forests >=50% and <70%	4072_Mod-good	Yes	3	Yengo, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4072-Hunter River Oak Mesic Forest

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Anthochaera phrygia / Regent Honeyeater	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3239_Mod-good, 3489_Mod-good, 3605_Mod-good, 3444_Mod-good, 3241_Mod-good, 3328_Mod-good, 3151_Mod-good, 3238_Mod-good, 3086_Mod-good**	42.6	2363.00
Callocephalon fimbriatum / Gang-gang Cockatoo	**3087_Mod-good, 3152_Mod-good, 3239_Mod-good, 3242_Mod-good, 3439_Mod-good, 3489_Mod-good, 3605_Mod-good, 3238_Mod-good, 3151_Mod-good, 3086_Mod-good**	42.0	1500.00

Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	**3152_Mod-good, 3237_Mod-good, 3239_Mod-good, 3489_Mod-good, 3605_Mod-good, 3238_Mod-good, 3151_Mod-good, 3086_Mod-good**	46.4	1666.00
Chalinolobus dwyeri / Large-eared Pied Bat	**3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3489_Mod-good, 3599_Mod-good, 3605_Mod-good, 3617_Mod-good, 3238_Mod-good, 3328_Mod-good, 3444_Mod-good, 3446_Mod-good, 3151_Mod-good, 3241_Mod-good, 3239_Plantation, 3444_Derived, 3086_Mod-good**	224.4	10808.00
Cynanchum elegans / White-flowered Wax Plant	**3087_Mod-good, 3152_Mod-good, 3239_Mod-good, 3489_Mod-good**	4.6	176.00
Dillwynia tenuifolia / Dillwynia tenuifolia	**3605_Mod-good**	1.5	44.00

Eucalyptus fracta / Broken Back Ironbark	**3489_Mod-good, 3605_Mod-good**	20.7	1072.00
Eucalyptus glaucina / Slaty Red Gum	**3152_Mod-good, 3239_Mod-good, 3605_Mod-good**	288.0	576.00
Eucalyptus pumila / Pokolbin Mallee	**3152_Mod-good, 3239_Mod-good, 3605_Mod-good**	5.8	314.00
Grammitis stenophylla / Narrow-leaf Finger Fern	**3239_Mod-good**	2.6	83.00
Lathamus discolor / Swift Parrot	**3239_Mod-good, 3489_Mod-good, 3605_Mod-good, 3444_Mod-good**	1.7	104.00
Melaleuca groveana / Grove's Paperbark	**3087_Mod-good, 3239_Mod-good, 3605_Mod-good**	2923.0	5846.00
Myotis macropus / Southern Myotis	**3239_Mod-good, 3605_Mod-good, 3238_Mod-good, 3328_Mod-good, 3444_Mod-good, 3151_Mod-good, 3444_Derived**	2.6	85.00
Ninox connivens / Barking Owl	**3239_Mod-good, 3605_Mod-good**	7.3	252.00

Ninox strenua / Powerful Owl	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3605_Mod-good, 3444_Mod-good, 3446_Mod-good**	68.8	2579.00
Notamacropus parma / Parma Wallaby	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3239_Mod-good, 3242_Mod-good, 3605_Mod-good, 3617_Mod-good, 3151_Mod-good, 3086_Mod-good**	96.5	2991.00
Olearia cordata / Olearia cordata	**3152_Mod-good, 3239_Mod-good, 3605_Mod-good, 3151_Mod-good**	4.0	129.00
Persoonia hirsuta / Hairy Geebung	**3605_Mod-good**	1.5	66.00

Petauroides volans / Southern Greater Glider	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3489_Mod-good, 3599_Mod-good, 3605_Mod-good, 3617_Mod-good, 3238_Mod-good, 3328_Mod-good, 3444_Mod-good, 3446_Mod-good, 3151_Mod-good, 3241_Mod-good, 4039_Mod-good, 4072_Mod-good, 3239_Plantation, 3086_Mod-good**	227.0	8321.00

Petaurus norfolcensis / Squirrel Glider	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3599_Mod-good, 3605_Mod-good, 3617_Mod-good, 3328_Mod-good, 3444_Mod-good, 3446_Mod-good, 3151_Mod-good, 3241_Mod-good, 4039_Mod-good, 4072_Mod-good, 3239_Plantation, 3086_Mod-good**	221.3	8118.00
Petrogale penicillata / Brush-tailed Rock-wallaby	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3605_Mod-good, 3444_Mod-good, 3446_Mod-good, 3241_Mod-good**	72.5	3507.00

Phascolarctos cinereus / Koala	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3489_Mod-good, 3599_Mod-good, 3605_Mod-good, 3617_Mod-good, 3238_Mod-good, 3446_Mod-good, 3151_Mod-good, 3241_Mod-good, 3239_Plantation**	223.6	8233.00
Prostanthera cineolifera / Singleton Mint Bush	**3237_Mod-good, 3239_Mod-good, 3605_Mod-good**	39.5	1247.00
Pseudophryne australis / Red-crowned Toadlet	**3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3605_Mod-good, 3239_Plantation**	13.9	319.00
Rhizanthella slateri / Eastern Australian Underground Orchid	**3087_Mod-good, 3237_Mod-good, 3599_Mod-good**	1.8	83.00

Rhodamnia rubescens / Scrub Turpentine	**3087_Mod-good, 3152_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3605_Mod-good, 3151_Mod-good, 3241_Mod-good, 3086_Mod-good**	852.0	2556.00
Rhodomyrtus psidioides / Native Guava	**3087_Mod-good, 3152_Mod-good, 3151_Mod-good**	1.2	79.00
Rutidosis heterogama / Heath Wrinklewort	**3605_Mod-good**	1.5	44.00
Syzygium paniculatum / Magenta Lilly Pilly	**3087_Mod-good**	30.0	60.00
Tyto novaehollandiae / Masked Owl	**3152_Mod-good, 3237_Mod-good, 3239_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3605_Mod-good**	25.0	929.00
Tyto tenebricosa / Sooty Owl	**3087_Mod-good, 3230_Mod-good, 3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3605_Mod-good, 3617_Mod-good**	126.9	6950.00
Velleia perfoliata / Velleia perfoliata	**3152_Mod-good, 3239_Mod-good, 3605_Mod-good**	4.0	128.00

Vespadelus troughtoni / Eastern Cave Bat	**3237_Mod-good, 3239_Mod-good, 3242_Mod-good, 3244_Mod-good, 3438_Mod-good, 3439_Mod-good, 3599_Mod-good, 3605_Mod-good, 3617_Mod-good, 3444_Mod-good, 3241_Mod-good, 4039_Mod-good, 3239_Plantation, 3444_Derived**	196.9	9447.00
Zieria involucrata / Zieria involucrata	**3152_Mod-good, 3239_Mod-good, 3605_Mod-good, 3151_Mod-good**	4.0	129.00

Credit Retirement Options

Like-for-like credit retirement options

Anthochaera phrygia / Regent Honeyeater	Spp	IBRA subregion
	Anthochaera phrygia / Regent Honeyeater	Any in NSW
Callocephalon fimbriatum / Gang-gang Cockatoo	Spp	IBRA subregion
	Callocephalon fimbriatum / Gang-gang Cockatoo	Any in NSW
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Spp	IBRA subregion

	Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Any in NSW
Chalinolobus dwyeri / Large-eared Pied Bat	Spp	IBRA subregion
	Chalinolobus dwyeri / Large-eared Pied Bat	Any in NSW
Cynanchum elegans / White-flowered Wax Plant	Spp	IBRA subregion
	Cynanchum elegans / White-flowered Wax Plant	Any in NSW
Dillwynia tenuifolia / Dillwynia tenuifolia	Spp	IBRA subregion
	Dillwynia tenuifolia / Dillwynia tenuifolia	Any in NSW
Eucalyptus fracta / Broken Back Ironbark	Spp	IBRA subregion
	Eucalyptus fracta / Broken Back Ironbark	Any in NSW
Eucalyptus glaucina / Slaty Red Gum	Spp	IBRA subregion
	Eucalyptus glaucina / Slaty Red Gum	Any in NSW
Eucalyptus pumila / Pokolbin Mallee	Spp	IBRA subregion
	Eucalyptus pumila / Pokolbin Mallee	Any in NSW

Grammitis stenophylla / Narrow-leaf Finger Fern	Spp	IBRA subregion
	Grammitis stenophylla / Narrow-leaf Finger Fern	Any in NSW
Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW
Melaleuca groveana / Grove's Paperbark	Spp	IBRA subregion
	Melaleuca groveana / Grove's Paperbark	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Notamacropus parma / Parma Wallaby	Spp	IBRA subregion

	Notamacropus parma / Parma Wallaby	Any in NSW
Olearia cordata / Olearia cordata	Spp	IBRA subregion
	Olearia cordata / Olearia cordata	Any in NSW
Persoonia hirsuta / Hairy Geebung	Spp	IBRA subregion
	Persoonia hirsuta / Hairy Geebung	Any in NSW
Petauroides volans / Southern Greater Glider	Spp	IBRA subregion
	Petauroides volans / Southern Greater Glider	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Petrogale penicillata / Brush-tailed Rock-wallaby	Spp	IBRA subregion
	Petrogale penicillata / Brush-tailed Rock-wallaby	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW

Prostanthera cineolifera / Singleton Mint Bush	Spp	IBRA subregion
	Prostanthera cineolifera / Singleton Mint Bush	Any in NSW
Pseudophryne australis / Red-crowned Toadlet	Spp	IBRA subregion
	Pseudophryne australis / Red-crowned Toadlet	Any in NSW
Rhizanthella slateri / Eastern Australian Underground Orchid	Spp	IBRA subregion
	Rhizanthella slateri / Eastern Australian Underground Orchid	Any in NSW
Rhodamnia rubescens / Scrub Turpentine	Spp	IBRA subregion
	Rhodamnia rubescens / Scrub Turpentine	Any in NSW
Rhodomyrtus psidioides / Native Guava	Spp	IBRA subregion
	Rhodomyrtus psidioides / Native Guava	Any in NSW
Rutidosis heterogama / Heath Wrinklewort	Spp	IBRA subregion
	Rutidosis heterogama / Heath Wrinklewort	Any in NSW
Syzygium paniculatum / Magenta Lilly Pilly	Spp	IBRA subregion

	Syzygium paniculatum / Magenta Lilly Pilly	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW
Tyto tenebricosa / Sooty Owl	Spp	IBRA subregion
	Tyto tenebricosa / Sooty Owl	Any in NSW
Velleia perfoliata / Velleia perfoliata	Spp	IBRA subregion
	Velleia perfoliata / Velleia perfoliata	Any in NSW
Vespadelus troughtoni / Eastern Cave Bat	Spp	IBRA subregion
	Vespadelus troughtoni / Eastern Cave Bat	Any in NSW
Zieria involucrata / Zieria involucrata	Spp	IBRA subregion
	Zieria involucrata / Zieria involucrata	Any in NSW

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048830/BAAS18097/25/00055858	HTP - Yengo IBRA subregion	05/08/2025
Assessor Name	Report Created	BAM Data version *
	21/08/2025	Current classification (live - default) (82)
Assessor Number	BAM Case Status	Date Finalised
BAAS17020	Finalised	21/08/2025
Assessment Revision	BOS entry trigger	Assessment Type
0	Major Project	Scattered Trees

* 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.

Scattered Trees Credit Requirement

Class	Contains hollows	Number of trees	Ecosystem credits
3489-Hunter Escarpment Grey Box Forest			
2	False	4.0	2
			2
			2

Species credits for threatened species

The scattered tree module is not applicable. This species much be assessed using chapter 5 of the BAM and BAM-C development module

Lathamus discolor Swift Parrot
Anthochaera phrygia Regent Honeyeater

BAM Predicted Species Report

Proposal Details

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00048830/BAAS18097/25/00055858	HTP - Yengo IBRA subregion	05/08/2025
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0	Major Project	Scattered Trees

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Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name
Black Falcon	Falco subniger
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis
Black-necked Stork	Ephippiorhynchus asiaticus
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae
Dusky Woodswallow	Artamus cyanopterus cyanopterus
Flame Robin	Petroica phoenicea
Little Eagle	Hieraaetus morphnoides
Little Lorikeet	Glossopsitta pusilla
Painted Honeyeater	Grantiella picta
Regent Honeyeater	Anthochaera phrygia
Scarlet Robin	Petroica boodang
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami
South-eastern Hooded Robin	Melanodryas cucullata cucullata
Speckled Warbler	Chthonicola sagittata
Swift Parrot	Lathamus discolor
Varied Sittella	Daphoenositta chrysoptera
White-bellied Sea-Eagle	Haliaeetus leucogaster

White-throated Needletail	Hirundapus caudacutus

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

Scattered Tree Report

Proposal Details

Assessment Id
00048830/BAAS18097/25/00055858

Assessment name
HTP - Yengo IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

BAM Case Status
Finalised

Date Finalised
21/08/2025

Assessment Revision
0

Assessment Type
Scattered Trees

BOS entry trigger
Major Project

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Scattered Trees

PCT code	PCT name	No. of trees	Species	DBHOB Category	Contain hollows	Class	Assessment required
3489	Hunter Escarpment Grey Box Forest	4	Eucalyptus sparsifolia	>= 20cm and <50cm	False	2	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00048830/BAAS18097/25/00055858

Proposal Name
HTP - Yengo IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Assessor Number
BAAS17020

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

Proponent Names

Report Created
21/08/2025

Date Finalised
21/08/2025

Assessment Revision
0

BOS entry trigger
Major Project

Assessment Type
Scattered Trees

BAM Case Status
Finalised

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Potential Serious and Irreversible Impacts

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

Ecosystem Credit Summary

BAM Biodiversity Credit Report (Like for like)

PCT	TEC	HBT Cr	No HBT Cr	Credits
3489-Hunter Escarpment Grey Box Forest	Not a TEC	0	2	2

Credit classes for 3489

Like-for-like options

Class	Trading group	HBT	Credits	IBRA region
Central Gorge Dry Sclerophyll Forests	Central Gorge Dry Sclerophyll Forests <50%	No	2	Yengo, Cumberland, Hunter, Kerrabee, Pittwater, Wollemi and Wyong. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Credit Summary Report

Proposal Details

Assessment Id
00048860/BAAS17046/24/00048861

Proposal Name
HTP BDAR - Hunter IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

BAM Case Status
Finalised

Date Finalised
21/08/2025

Assessment Revision
5

BOS entry trigger

Assessment Type
Major Projects

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Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Central Hunter Ironbark Grassy Woodland												
6	3431_Thinned	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	70	59.6	63.4	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		1888
7	3431_Plantation	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	44.9	38.9	14.9	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		290
9	3431_Poor	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	48.5	41.7	5.2	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		108
											Subtotal	**2286**

Central Hunter Ironbark Grassy Woodland												
15	3431_Disturbed_Grassland	Not a TEC	10.9	10.9	35.3	PCT Cleared - 86%	High Sensitivity to Gain			2.00		0
											Subtotal	**0**
Central Hunter Ironbark-Spotted Gum Forest												
4	3315_Thinned	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	74.5	54.7	8.9	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		242
											Subtotal	**242**
Central Hunter Ironbark-Spotted Gum Forest												
5	3315_Derived	Not a TEC	18.1	18.1	17.4	PCT Cleared - 78%	High Sensitivity to Gain			2.00		157
											Subtotal	**157**

Central Hunter Riparian Forest											
13	4015_Thinned	Not a TEC	73.7	58.9	7.6	PCT Cleared - 88%	High Sensitivity to Gain			2.00	224
14	4015_Derived	Not a TEC	29.6	29.6	2.2	PCT Cleared - 88%	High Sensitivity to Gain			2.00	33
										Subtotal	**257**
Central Hunter Slopes Grey Box Forest											
1	3314_Thinned	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	73.9	59.5	38.5	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	1145
2	3314_Poor	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	36.4	34.5	19.4	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	335

										Subtotal	**1480**
Central Hunter Slopes Grey Box Forest											
3	3314_Disturbed_Grassland	Not a TEC	9.5	9.5	20	PCT Cleared - 71%	High Sensitivity to Gain			2.00	0
										Subtotal	**0**
Hunter Escarpment Footslopes Ironbark Forest											
8	3438_Mod-good	Not a TEC	98.5	71.5	10.2	PCT Cleared - 24%	High Sensitivity to Gain			1.50	274
										Subtotal	**274**
Hunter Range Creekflat Apple-Red Gum Forest											
16	4039_Mod-good	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	90.4	74.4	0.84	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	31
										Subtotal	**31**

Hunter Range Sheltered Grey Gum Forest												
22	3239_Mod-good	Not a TEC	100	100.0	5.8	PCT Cleared - 1%	High Sensitivity to Gain			1.50		218
											Subtotal	**218**
Hunter River Oak Mesic Forest												
17	4072_Mod-good	Not a TEC	65.3	65.3	0.14	PCT Cleared - 66%	High Sensitivity to Gain			1.75		4
											Subtotal	**4**
Lower Hunter Spotted Gum-Ironbark Forest												
10	3444_Mod-good	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	76	58.8	36.6	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		1077
24	3444_Derived	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	39.2	39.2	0.02	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		1

											Subtotal	**1078**
Lower North Foothills Ironbark-Box-Gum Grassy Forest												
18	3446_Mod-good	Central Hunter Valley eucalypt forest and woodland	100	46.0	0.02	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		1
											Subtotal	**1**
Lower North Hinterland Riparian Dry Rainforest												
20	3086_Mod-good	Not a TEC	100	100.0	4.1	PCT Cleared - 46%	High Sensitivity to Gain			1.50		152
											Subtotal	**152**
Lower North Ranges Riparian Turpentine Forest												
21	3087_Mod-good	Not a TEC	100	100.0	0.31	PCT Cleared - 27%	High Sensitivity to Gain			1.50		12
											Subtotal	**12**

Lower North White Mahogany-Spotted Gum Moist Forest												
23	3241_Mod-good	Not a TEC	70.5	70.5	2.1	PCT Cleared - 31%	High Sensitivity to Gain			1.50		55
											Subtotal	**55**
Namoi-Upper Hunter River Red Gum Forest												
19	4089_Poor	Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	18.2	16.0	4.2	Population size	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	34
25	4089_Derived	Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	23.8	23.8	6.9	Population size	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	82
											Subtotal	**116**

Warkworth Sands Woodland											
11	3636_Thinned	Warkworth Sands Woodland in the Sydney Basin Bioregion	57	44.2	7.5	Geographic Distribution	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	166
											Subtotal	**166**
Warkworth Sands Woodland											
12	3636_Disturbed_Grassland	Not a TEC	8.7	8.7	14.6	PCT Cleared - 61%	High Sensitivity to Gain			1.75		0
											Subtotal	**0**
											Total	**6529**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Acacia bynoeana / Bynoe's Wattle (Flora)									
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Vulnerable	False	23

3315_Derived	18.1	18.1	8.9	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Vulnerable	False	80
								Subtotal	**103**
Acacia pendula - endangered population / Acacia pendula population in the Hunter catchment (Flora)									
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Reproductive Strategy	Endangered Population	Not Listed	True	34
3431_Thinned	59.6	59.6	0.78	Biodiversity Conservation Act listing status	Reproductive Strategy	Endangered Population	Not Listed	True	35
3431_Poor	41.7	41.7	3.2	Biodiversity Conservation Act listing status	Reproductive Strategy	Endangered Population	Not Listed	True	99
								Subtotal	**168**
Angophora inopina / Charmhaven Apple (Flora)									
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	23
								Subtotal	**23**

Anthochaera phrygia / Regent Honeyeater (Fauna)									
3444_Mod-good	76.0	76.0	29.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	1659
4039_Mod-good	90.4	90.4	0.13	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	9
3431_Disturbed_Grassland	10.9	10.9	0.34	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	3
3239_Mod-good	100.0	100.0	5.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	422
3444_Derived	39.2	39.2	0.01	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	1

3315_Thinned	74.5	74.5	0.18	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	10
3431_Thinned	70.0	70.0	14.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	753
3241_Mod-good	70.5	70.5	0.08	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	4
3314_Thinned	73.9	73.9	0.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	6
3086_Mod-good	100.0	100.0	0.67	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	50
3087_Mod-good	100.0	100.0	0.09	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	7

								Subtotal	**2924**
Asperula asthenes / Trailing Woodruff (Flora)									
3087_Mod-good	100.0	100.0	0.31	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	16
								Subtotal	**16**
Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)									
3315_Thinned	74.5	74.5	0.01	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1
3438_Mod-good	98.5	98.5	0.09	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	4
3444_Mod-good	76.0	76.0	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	106
4039_Mod-good	90.4	90.4	0.23	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	10
								Subtotal	**121**

Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo (Fauna)									
3315_Thinned	74.5	74.5	0.01	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	1
3438_Mod-good	71.5	71.5	0.09	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	3
3444_Mod-good	76.0	76.0	2.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	106
4039_Mod-good	90.4	90.4	0.23	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	10
								Subtotal	**120**
Commersonia rosea / Commersonia rosea (Flora)									
3431_Thinned	59.6	59.6	0.7	Population size	Effectiveness of management in controlling threats	Endangered	Endangered	True	31
3431_Poor	41.7	41.7	1.2	Population size	Effectiveness of management in controlling threats	Endangered	Endangered	True	39

								Subtotal	**70**
Cymbidium canaliculatum - endangered population / Cymbidium canaliculatum population in the Hunter Catchment (Flora)									
3314_Thinned	N/A	N/A	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered Population	Not Listed	False	2
								Subtotal	**2**
Cynanchum elegans / White-flowered Wax Plant (Flora)									
3087_Mod-good	100.0	100.0	0.31	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Endangered	Endangered	False	16
								Subtotal	**16**
Delma vescolineata / Hunter Valley Delma (Fauna)									
3314_Thinned	59.5	59.5	38.5	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	1145
3314_Poor	34.5	34.5	19.4	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	335

3314_Disturbed_Grassland	9.5	9.5	20	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	95
3315_Thinned	54.7	54.7	8.8	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	242
3315_Derived	18.1	18.1	17.4	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	157
3431_Thinned	59.6	59.6	63.4	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	1888
3431_Plantation	38.9	38.9	14.9	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	290
3431_Poor	41.7	41.7	5.2	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	108

3431_Disturbed_Grassland	10.9	10.9	35.3	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Endangered	False	192
								Subtotal	**4452**
Diuris tricolor / Pine Donkey Orchid (Flora)									
3314_Thinned	59.5	59.5	0.44	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	10
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	17
3315_Derived	18.1	18.1	8.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	60
3431_Thinned	59.6	59.6	8.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	184

3431_Plantation	38.9	38.9	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	27
								Subtotal	**298**
Eucalyptus camaldulensis - endangered population / Eucalyptus camaldulensis population in the Hunter catchment (Flora)									
4089_Poor	18.2	18.2	1.5	Biodiversity Conservation Act listing status	Seedbank Persistence	Endangered Population	Not Listed	False	14
								Subtotal	**14**
Eucalyptus pumila / Pokolbin Mallee (Flora)									
3315_Thinned	54.7	54.7	0.83	Geographic Distribution	Ability to colonise improved habitat	Vulnerable	Vulnerable	True	34
3444_Mod-good	58.8	58.8	1.6	Geographic Distribution	Ability to colonise improved habitat	Vulnerable	Vulnerable	True	70
3239_Mod-good	100.0	100.0	5.1	Geographic Distribution	Ability to colonise improved habitat	Vulnerable	Vulnerable	True	383
								Subtotal	**487**

Grevillea parviflora subsp. parviflora / Small-flower Grevillea (Flora)									
3444_Mod-good	58.8	58.8	5.8	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	170
								Subtotal	**170**
Lathamus discolor / Swift Parrot (Fauna)									
3444_Mod-good	76.0	76.0	26.7	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	1520
3431_Disturbed_Grassland	10.9	10.9	0.28	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	2
3444_Derived	39.2	39.2	0.01	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	1

3315_Thinned	74.5	74.5	0.18	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	10
3431_Thinned	70.0	70.0	13.8	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	726
3314_Thinned	73.9	73.9	0.1	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	6
								Subtotal	**2265**
Myotis macropus / Southern Myotis (Fauna)									
3314_Thinned	59.5	59.5	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	241
3314_Poor	34.5	34.5	6.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	116

3315_Thinned	54.7	54.7	3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	83
3431_Thinned	59.6	59.6	27.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	817
3431_Plantation	38.9	38.9	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	95
3438_Mod-good	71.5	71.5	1.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	66
3431_Poor	41.7	41.7	3.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	64
3444_Mod-good	58.8	58.8	7.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	213
3636_Thinned	44.2	44.2	4.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	105

4015_Thinned	58.9	58.9	3.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	110
4039_Mod-good	74.4	74.4	0.43	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	16
4072_Mod-good	65.3	65.3	0.07	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
3239_Mod-good	100.0	100.0	1.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	90
3241_Mod-good	70.5	70.5	0.54	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19
								Subtotal	**2037**
Ninox strenua / Powerful Owl (Fauna)									
3315_Thinned	74.5	74.5	5.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	213

3431_Thinned	70.0	70.0	0.13	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
3438_Mod-good	98.5	98.5	5.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	278
3444_Mod-good	76.0	76.0	2.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	111
4039_Mod-good	90.4	90.4	0.12	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
4072_Mod-good	65.3	65.3	0.08	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3
3239_Mod-good	100.0	100.0	5.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	256
3087_Mod-good	100.0	100.0	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	16
								Subtotal	**887**

Ozothamnus tesselatus / Ozothamnus tesselatus (Flora)									
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	17
3431_Thinned	59.6	59.6	8.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	184
3431_Plantation	38.9	38.9	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	27
3431_Poor	41.7	41.7	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	21
								Subtotal	**249**
Petauroides volans / Southern Greater Glider (Fauna)									
3315_Thinned	74.5	74.5	8.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	323

3431_Thinned	70.0	70.0	0.13	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	5
3438_Mod-good	98.5	98.5	9.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	489
3444_Mod-good	76.0	76.0	9.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	367
4039_Mod-good	90.4	90.4	0.84	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	38
4072_Mod-good	65.3	65.3	0.14	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	5
3241_Mod-good	70.5	70.5	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	74
								Subtotal	**1301**

Petaurus norfolcensis / Squirrel Glider (Fauna)									
3314_Poor	36.4	36.4	19.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	353
3431_Plantation	44.9	44.9	14.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	335
3438_Mod-good	98.5	98.5	10.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	503
3431_Poor	48.5	48.5	5.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	126
3444_Mod-good	76.0	76.0	36.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1392
4039_Mod-good	90.4	90.4	0.84	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	38
3239_Mod-good	100.0	100.0	5.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	291

3315_Thinned	74.5	74.5	8.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	329
3431_Thinned	70.0	70.0	63.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2219
3241_Mod-good	70.5	70.5	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	74
3314_Thinned	73.9	73.9	38.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1420
								Subtotal	**7080**
Petrogale penicillata / Brush-tailed Rock-wallaby (Fauna)									
3315_Thinned	54.7	54.7	5.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	212
3315_Derived	18.1	18.1	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	15

3431_Plantation	38.9	38.9	0.02	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1
3438_Mod-good	71.5	71.5	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	76
3444_Mod-good	58.8	58.8	1.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	82
4039_Mod-good	74.4	74.4	0.44	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	25
3241_Mod-good	70.5	70.5	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	79
								Subtotal	**490**
Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)									
3314_Poor	34.5	34.5	19.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	335

3431_Plantation	38.9	38.9	11	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	213
3438_Mod-good	71.5	71.5	0.22	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
3431_Poor	41.7	41.7	0.36	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
3431_Thinned	59.6	59.6	13	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	387
3636_Thinned	44.2	44.2	2.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	48
4015_Thinned	58.9	58.9	2.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	65
3314_Thinned	59.5	59.5	38.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1141
								Subtotal	**2205**

Phascolarctos cinereus / Koala (Fauna)									
3239_Mod-good	100.0	100.0	5.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	291
3241_Mod-good	70.5	70.5	2.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	74
3087_Mod-good	100.0	100.0	0.31	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	16
								Subtotal	**381**
Planigale maculata / Common Planigale (Fauna)									
3314_Thinned	59.5	59.5	3.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	96
3315_Thinned	54.7	54.7	4.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	117

3431_Thinned	59.6	59.6	0.13	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	4
3438_Mod-good	71.5	71.5	8.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	300
								Subtotal	**517**
Pomaderris queenslandica / Scant Pomaderris (Flora)									
3431_Thinned	59.6	59.6	0.7	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	21
3431_Poor	41.7	41.7	1.2	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	26
								Subtotal	**47**
Prasophyllum petilum / Tarengo Leek Orchid (Flora)									
3314_Thinned	59.5	59.5	0.44	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	13

3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	23
3315_Derived	18.1	18.1	8.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	81
3431_Thinned	59.6	59.6	8.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	245
3431_Plantation	38.9	38.9	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	35
								Subtotal	**397**
Prasophyllum sp. Wybong / Prasophyllum sp. Wybong (Flora)									
3314_Thinned	59.5	59.5	0.44	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	20

3315_Thinned	54.7	54.7	0.83	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	34
3315_Derived	18.1	18.1	8.9	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	121
3431_Thinned	59.6	59.6	8.2	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	368
3431_Plantation	38.9	38.9	1.8	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	53
3438_Mod-good	71.5	71.5	0.3	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	16

3444_Mod-good	58.8	58.8	5.8	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	256
								Subtotal	**868**
Prostanthera cineolifera / Singleton Mint Bush (Flora)									
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	23
3438_Mod-good	71.5	71.5	4.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	173
3444_Mod-good	58.8	58.8	7.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	222
								Subtotal	**418**

Pterostylis chaetophora / Pterostylis chaetophora (Flora)									
3314_Thinned	59.5	59.5	0.44	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	13
3315_Thinned	54.7	54.7	0.83	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	23
3315_Derived	18.1	18.1	8.9	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	81
3431_Thinned	59.6	59.6	8.2	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	245
3431_Plantation	38.9	38.9	1.8	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	35

3438_Mod-good	71.5	71.5	0.3	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	11
3444_Mod-good	58.8	58.8	5.8	Geographic Distribution	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	170
								Subtotal	**578**
Pterostylis gibbosa / Illawarra Greenhood (Flora)									
3431_Thinned	59.6	59.6	9.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	286
3431_Plantation	38.9	38.9	1.8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	35
3438_Mod-good	71.5	71.5	0.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	11
								Subtotal	**332**

Rhodamnia rubescens / Scrub Turpentine (Flora)									
3241_Mod-good	N/A	N/A	10	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	30
								Subtotal	**30**
Rhodomyrtus psidioides / Native Guava (Flora)									
3087_Mod-good	100.0	100.0	0.31	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Critically Endangered	Critically Endangered	True	23
								Subtotal	**23**
Rutidosis heterogama / Heath Wrinklewort (Flora)									
3315_Thinned	54.7	54.7	0.83	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	23
3315_Derived	18.1	18.1	8.9	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	80
3444_Mod-good	58.8	58.8	1.6	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	46

								Subtotal	**149**
Tyto novaehollandiae / Masked Owl (Fauna)									
3444_Mod-good	58.8	58.8	2.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	68
3239_Mod-good	100.0	100.0	5.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	256
								Subtotal	**324**
Tyto tenebricosa / Sooty Owl (Fauna)									
3239_Mod-good	100.0	100.0	5.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	384
3087_Mod-good	100.0	100.0	0.31	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	23
								Subtotal	**407**
Vespadelus troughtoni / Eastern Cave Bat (Fauna)									
3314_Thinned	59.5	59.5	0.13	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	6

3315_Thinned	54.7	54.7	8.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	364
3431_Thinned	59.6	59.6	5.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	256
3431_Plantation	38.9	38.9	0.18	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	5
3438_Mod-good	71.5	71.5	9.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	532
3444_Mod-good	58.8	58.8	22.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1007
4015_Thinned	58.9	58.9	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	31
4039_Mod-good	74.4	74.4	0.56	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	31

3239_Mod-good	100.0	100.0	5.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	436
3241_Mod-good	70.5	70.5	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	111
								Subtotal	**2779**

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00048860/BAAS17046/24/00048861

Assessment name
HTP BDAR - Hunter IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
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Assessment Type
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BAM Case Status
Finalised

Assessment Revision
5

BOS entry trigger

Date Finalised
21/08/2025

* 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.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3314_Thinned	3314-Central Hunter Slopes Grey Box Forest	Thinned	38.46	4	Area A (26.42 ha) Area B (12.04 ha)
2	3314_Poor	3314-Central Hunter Slopes Grey Box Forest	Poor	19.4	3	Area A (17.57 ha) Area B (1.83 ha)

3	3314_Disturbed_Grassland	3314-Central Hunter Slopes Grey Box Forest	Disturbed_Grassland	20.02	3	Area A (20.02 ha)
4	3315_Thinned	3315-Central Hunter Ironbark-Spotted Gum Forest	Thinned	8.86	3	Area A (4.76 ha) Area B (4.1 ha)
5	3315_Derived	3315-Central Hunter Ironbark-Spotted Gum Forest	Derived	17.44	3	Area A (17.44 ha)
6	3431_Thinned	3431-Central Hunter Ironbark Grassy Woodland	Thinned	63.42	5	Area A (33.09 ha) Area B (30.33 ha)
7	3431_Plantation	3431-Central Hunter Ironbark Grassy Woodland	Plantation	14.9	3	Area A (7.4 ha) Area B (7.5 ha)
8	3438_Mod-good	3438-Hunter Escarpment Footslopes Ironbark Forest	Mod-good	10.22	3	Area A (4.86 ha) Area B (5.36 ha)
9	3431_Poor	3431-Central Hunter Ironbark Grassy Woodland	Poor	5.2	3	Area A (2.15 ha) Area B (3.05 ha)
10	3444_Mod-good	3444-Lower Hunter Spotted Gum-Ironbark Forest	Mod-good	36.64	4	Area A (20.08 ha) Area B (16.56 ha)
11	3636_Thinned	3636-Warkworth Sands Woodland	Thinned	7.51	3	Area A (4.4 ha) Area B (3.11 ha)
12	3636_Disturbed_Grassland	3636-Warkworth Sands Woodland	Disturbed_Grassland	14.57	3	Area A (14.57 ha)
13	4015_Thinned	4015-Central Hunter Riparian Forest	Thinned	7.61	3	Area A (4.88 ha) Area B (2.73 ha)
14	4015_Derived	4015-Central Hunter Riparian Forest	Derived	2.21	2	Area A (2.21 ha)

15	3431_Disturbed_Grassland	3431-Central Hunter Ironbark Grassy Woodland	Disturbed_Grassland	35.34	4	Area A (35.34 ha)
16	4039_Mod-good	4039-Hunter Range Creekflat Apple-Red Gum Forest	Mod-good	0.84	1	Area A (0.53 ha) Area B (0.31 ha)
17	4072_Mod-good	4072-Hunter River Oak Mesic Forest	Mod-good	0.14	1	Area A (0.14 ha)
18	3446_Mod-good	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Mod-good	0.02	1	Area B (0.02 ha)
19	4089_Poor	4089-Namoi-Upper Hunter River Red Gum Forest	Poor	4.22	2	Area A (1.18 ha) Area B (3.04 ha)
20	3086_Mod-good	3086-Lower North Hinterland Riparian Dry Rainforest	Mod-good	4.06	2	Area A (4.06 ha)
21	3087_Mod-good	3087-Lower North Ranges Riparian Turpentine Forest	Mod-good	0.31	1	Area A (0.31 ha)
22	3239_Mod-good	3239-Hunter Range Sheltered Grey Gum Forest	Mod-good	5.81	3	Area A (5.81 ha)
23	3241_Mod-good	3241-Lower North White Mahogany-Spotted Gum Moist Forest	Mod-good	2.09	2	Area A (2.09 ha)
24	3444_Derived	3444-Lower Hunter Spotted Gum-Ironbark Forest	Derived	0.02	1	Area A (0.02 ha)
25	4089_Derived	4089-Namoi-Upper Hunter River Red Gum Forest	Derived	6.92	3	Area A (6.92 ha)

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048860/BAAS17046/24/00048861	HTP BDAR - Hunter IBRA subregion	05/08/2025
Assessor Name	**Report Created**	**BAM Data version ***
	21/08/2025	Current classification (live - default) (82)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17020	Major Projects	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
5		21/08/2025

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
Australian Painted Snipe	Rostratula australis	4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
Black Bittern	Ixobrychus flavicollis	3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		4015-Central Hunter Riparian Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest

Black Falcon	Falco subniger	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Black-necked Stork	Ephippiorhynchus asiaticus	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest

Black-necked Stork	Ephippiorhynchus asiaticus	3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Broad-billed Sandpiper	Limicola falcinellus	3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Corben's Long-eared Bat	Nyctophilus corbeni	3315-Central Hunter Ironbark-Spotted Gum Forest
		3438-Hunter Escarpment Footslopes Ironbark Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
Diamond Firetail	Stagonopleura guttata	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland

Dusky Woodswallow	Artamus cyanopterus cyanopterus	3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3431-Central Hunter Ironbark Grassy Woodland
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Eastern Grass Owl	Tyto longimembris	4015-Central Hunter Riparian Forest
Eastern Osprey	Pandion cristatus	3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest

Eastern Osprey	Pandion cristatus	4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Flame Robin	Petroica phoenicea	3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest

Greater Broad-nosed Bat	Scoteanax rueppellii	3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest

Large Bent-winged Bat	Miniopterus orianae oceanensis	3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Little Bent-winged Bat	Miniopterus australis	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Little Eagle	Hieraaetus morphnoides	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3087-Lower North Ranges Riparian Turpentine Forest

Little Eagle	Hieraaetus morphnoides	3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Little Lorikeet	Glossopsitta pusilla	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
New Holland Mouse	Pseudomys novaehollandiae	3315-Central Hunter Ironbark-Spotted Gum Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Painted Honeyeater	Grantiella picta	3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
Regent Honeyeater	Anthochaera phrygia	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest

Rose-crowned Fruit-Dove	Ptilinopus regina	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Scarlet Robin	Petroica boodang	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
South-eastern Hooded Robin	Melanodryas cucullata cucullata	3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
Speckled Warbler	Chthonicola sagittata	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest

Speckled Warbler	Chthonicola sagittata	3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Spotted Harrier	Circus assimilis	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
Spotted-tailed Quoll	Dasyurus maculatus	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest

Square-tailed Kite	Lophoictinia isura	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Swift Parrot	Lathamus discolor	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Turquoise Parrot	Neophema pulchella	3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3239-Hunter Range Sheltered Grey Gum Forest

Varied Sittella	Daphoenositta chrysoptera	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
White-throated Needletail	Hirundapus caudacutus	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland

White-throated Needletail	Hirundapus caudacutus	3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3636-Warkworth Sands Woodland
		4015-Central Hunter Riparian Forest
		4039-Hunter Range Creekflat Apple-Red Gum Forest
		4072-Hunter River Oak Mesic Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		4089-Namoi-Upper Hunter River Red Gum Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Wompoo Fruit-Dove	Ptilinopus magnificus	3241-Lower North White Mahogany-Spotted Gum Moist Forest
Yellow-bellied Glider	Petaurus australis	3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3086-Lower North Hinterland Riparian Dry Rainforest
		3087-Lower North Ranges Riparian Turpentine Forest
		3239-Hunter Range Sheltered Grey Gum Forest
		3241-Lower North White Mahogany-Spotted Gum Moist Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3314-Central Hunter Slopes Grey Box Forest
		3315-Central Hunter Ironbark-Spotted Gum Forest
		3431-Central Hunter Ironbark Grassy Woodland
		3438-Hunter Escarpment Footslopes Ironbark Forest
		3444-Lower Hunter Spotted Gum-Ironbark Forest
		3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3239-Hunter Range Sheltered Grey Gum Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Candidate Species Report

Proposal Details

Assessment Id 00048860/BAAS17046/24/00048861	Proposal Name HTP BDAR - Hunter IBRA subregion	BAM data last updated * 05/08/2025
Assessor Name	Report Created 21/08/2025	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS17020	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 5	BOS entry trigger	Date Finalised 21/08/2025

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Acacia pendula - endangered population Acacia pendula population in the Hunter catchment	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Angophora inopina Charmhaven Apple	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Anthochaera phrygia Regent Honeyeater	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☑ Survey month outside the specified months?
Asperula asthenes Trailing Woodruff	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callistemon linearifolius Netted Bottle Brush	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☑ Survey month outside the specified months?

Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☑ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Commersonia rosea Commersonia rosea	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Corybas dowlingii Red Helmet Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Crinia tinnula Wallum Froglet	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Cymbidium canaliculatum - endangered population Cymbidium canaliculatum population in the Hunter Catchment	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Cynanchum elegans White-flowered Wax Plant	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Delma vescolineata Hunter Valley Delma	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Diuris tricolor Pine Donkey Orchid	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Diuris tricolor - endangered population Pine Donkey Orchid population in the Muswellbrook local government area	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus camaldulensis - endangered population Eucalyptus camaldulensis population in the Hunter catchment	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?

Eucalyptus castrensis Singleton Mallee	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus glaucina Slaty Red Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Eucalyptus parramattensis subsp. decadens Eucalyptus parramattensis subsp. decadens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus pumila Pokolbin Mallee	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea parviflora subsp. parviflora Small-flower Grevillea	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☑ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☑ Survey month outside the specified months?

Hieraaetus morphnoides Little Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Hoplocephalus stephensii Stephens' Banded Snake	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☑ Survey month outside the specified months?
Lathamus discolor Swift Parrot	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria aurea Green and Golden Bell Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria brevipalmata Green-thighed Frog	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☑ Survey month outside the specified months?

Melaleuca biconvexa Biconvex Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Melaleuca groveana Grove's Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Miniopterus australis Little Bent-winged Bat	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Miniopterus orianae oceanensis Large Bent-winged Bat	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ozothamnus tesselatus Ozothamnus tesselatus	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pandion cristatus Eastern Osprey	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☑ Survey month outside the specified months?
Petauroides volans Southern Greater Glider	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Phascogale tapoatafa Brush-tailed Phascogale	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☑ Survey month outside the specified months?
Phascolarctos cinereus Koala	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Planigale maculata Common Planigale	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Pomaderris queenslandica Scant Pomaderris	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum petilum Tarengo Leek Orchid	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Prostanthera cineolifera Singleton Mint Bush	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pseudophryne australis Red-crowned Toadlet	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pterostylis chaetophora Pterostylis chaetophora	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pterostylis gibbosa Illawarra Greenhood	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodomyrtus psidioides Native Guava	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Rutidosis heterogama Heath Wrinklewort	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Syzygium paniculatum Magenta Lilly Pilly	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Tetratheca juncea Black-eyed Susan	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto tenebricosa Sooty Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Commersonia rosea	Commersonia rosea

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Broad-billed Sandpiper	Limicola falcinellus	Habitat constraints
Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	Dromaius novaehollandiae - endangered population	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
North Rothbury Persoonia	Persoonia pauciflora	Refer to BAR

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00048860/BAAS17046/24/00048861

Proposal Name
HTP BDAR - Hunter IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Assessor Number
BAAS17020

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

Proponent Names

Report Created
21/08/2025

BAM Case Status
Finalised

Assessment Revision
5

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
21/08/2025

* 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
Warkworth Sands Woodland in the Sydney Basin Bioregion	Endangered Ecological Community	3636-Warkworth Sands Woodland
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	Endangered Ecological Community	4089-Namoi-Upper Hunter River Red Gum Forest

Species
Eucalyptus pumila / Pokolbin Mallee
Lathamus discolor / Swift Parrot
Petrogale penicillata / Brush-tailed Rock-wallaby
Vespadelus troughtoni / Eastern Cave Bat
Anthochaera phrygia / Regent Honeyeater
Acacia pendula - endangered population / Acacia pendula population in the Hunter catchment
Rhodamnia rubescens / Scrub Turpentine
Rhodomyrtus psidioides / Native Guava
Prasophyllum sp. Wybong / Prasophyllum sp. Wybong
Tyto tenebricosa / Sooty Owl
Commersonia rosea / Commersonia rosea

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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
3314-Central Hunter Slopes Grey Box Forest	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	57.9	0	1480	1480
3314-Central Hunter Slopes Grey Box Forest	Not a TEC	20.0	0	0	0
3315-Central Hunter Ironbark-Spotted Gum Forest	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	8.9	0	242	242
3315-Central Hunter Ironbark-Spotted Gum Forest	Not a TEC	17.4	0	157	157
3431-Central Hunter Ironbark Grassy Woodland	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	83.5	1888	398	2286
3438-Hunter Escarpment Footslopes Ironbark Forest	Not a TEC	10.2	274	0	274
3444-Lower Hunter Spotted Gum-Ironbark Forest	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	36.7	0	1078	1078

3636-Warkworth Sands Woodland	Warkworth Sands Woodland in the Sydney Basin Bioregion	7.5	166	0	166
3636-Warkworth Sands Woodland	Not a TEC	14.6	0	0	0
4015-Central Hunter Riparian Forest	Not a TEC	9.8	224	33	257
3431-Central Hunter Ironbark Grassy Woodland	Not a TEC	35.3	0	0	0
4039-Hunter Range Creekflat Apple-Red Gum Forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.8	31	0	31
4072-Hunter River Oak Mesic Forest	Not a TEC	0.1	0	4	4
3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Central Hunter Valley eucalypt forest and woodland	0.0	1	0	1
4089-Namoi-Upper Hunter River Red Gum Forest	Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	11.1	34	82	116
3086-Lower North Hinterland Riparian Dry Rainforest	Not a TEC	4.1	152	0	152
3087-Lower North Ranges Riparian Turpentine Forest	Not a TEC	0.3	12	0	12
3239-Hunter Range Sheltered Grey Gum Forest	Not a TEC	5.8	218	0	218
3241-Lower North White Mahogany-Spotted Gum Moist Forest	Not a TEC	2.1	55	0	55

3086-Lower North Hinterland Riparian Dry Rainforest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Dry Rainforests This includes PCT's: 388, 547, 616, 627, 1124, 1539, 1540, 1543, 2068, 2079, 3010, 3014, 3055, 3056, 3057, 3059, 3061, 3062, 3064, 3065, 3066, 3068, 3070, 3072, 3074, 3075, 3076, 3077, 3079, 3080, 3082, 3083, 3086, 3089, 3091, 3092, 3093, 3095, 3096, 3097, 3098, 3099, 3101, 3103, 3104, 3105, 3106, 3109, 3110, 3111, 3112, 3113, 3114, 3116, 3117, 3118, 3120, 3151, 3469, 4110, 4111, 4112, 4143, 4144	Dry Rainforests <50%	3086_Mod-good	Yes	152	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3087-Lower North Ranges Riparian Turpentine Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North Coast Wet Sclerophyll Forests This includes PCT's: 487, 613, 1563, 1575, 3058, 3060, 3067, 3073, 3078, 3084, 3087, 3088, 3102, 3125, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3145, 3147, 3148, 3149, 3150, 3153, 3154, 3156, 3157, 3158, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3168, 3169, 3171, 3172, 3173, 3174, 3176, 3177, 3178, 3180, 4043, 4115	North Coast Wet Sclerophyll Forests <50%	3087_Mod-good	Yes	12	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3239-Hunter Range Sheltered Grey Gum Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3239_Mod-good	Yes	218	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3241-Lower North White Mahogany-Spotted Gum Moist Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3241_Mod-good	Yes	55	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3314-Central Hunter Slopes Grey Box Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions This includes PCT's: 1603, 1605, 1691, 1692, 3314, 3431, 3485	-	3314_Thinned	No	1145	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions This includes PCT's: 1603, 1605, 1691, 1692, 3314, 3431, 3485	-	3314_Poor	No	335	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3314-Central Hunter Slopes Grey Box Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Coastal Valley Grassy Woodlands This includes PCT's: 618, 1603, 1604, 1691, 3312, 3314, 3315, 3318, 3319, 3320, 3323, 3325, 3327, 3328, 3329, 3330, 3332, 4052	Coastal Valley Grassy Woodlands >=70% and <90%	3314_Disturbed_Grassland	No	0	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3315-Central Hunter Ironbark-Spotted Gum Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions This includes PCT's: 1604, 3315	-	3315_Thinned	No	242	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3315-Central Hunter Ironbark-Spotted Gum Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Coastal Valley Grassy Woodlands This includes PCT's: 618, 1603, 1604, 1691, 3312, 3314, 3315, 3318, 3319, 3320, 3323, 3325, 3327, 3328, 3329, 3330, 3332, 4052	Coastal Valley Grassy Woodlands >=70% and <90%	3315_Derived	No	157	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3431-Central Hunter Ironbark Grassy Woodland

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions This includes PCT's: 1603, 1605, 1691, 1692, 3314, 3431, 3485	-	3431_Thinned	Yes	1888	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions This includes PCT's: 1603, 1605, 1691, 1692, 3314, 3431, 3485	-	3431_Plantation	No	290	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions This includes PCT's: 1603, 1605, 1691, 1692, 3314, 3431, 3485	-	3431_Poor	No	108	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3431-Central Hunter Ironbark Grassy Woodland	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 3431, 3442, 3446	Hunter-Macleay Dry Sclerophyll Forests >=70% and <90%	3431_Disturbed_Grassland	No	0	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3438-Hunter Escarpment Footslopes Ironbark Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3438_Mod-good	Yes	274	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3444-Lower Hunter Spotted Gum-Ironbark Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions This includes PCT's: 3433, 3442, 3443, 3444, 4158	-	3444_Mod-good	No	1077	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions This includes PCT's: 3433, 3442, 3443, 3444, 4158	-	3444_Derived	No	1	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Central Hunter Valley eucalypt forest and woodland This includes PCT's: 1176, 3314, 3315, 3431, 3438, 3446, 3485, 3490, 3497	-	3446_Mod-good	Yes	1	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3636-Warkworth Sands Woodland	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Warkworth Sands Woodland in the Sydney Basin Bioregion This includes PCT's: 3636	-	3636_Thinned	Yes	166	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3636-Warkworth Sands Woodland	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Sydney Sand Flats Dry Sclerophyll Forests This includes PCT's: 3628, 3629, 3630, 3631, 3634, 3636, 4122, 4162	Sydney Sand Flats Dry Sclerophyll Forests >=50% and <70%	3636_Disturbed_Grassland	No	0	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4015-Central Hunter Riparian Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Coastal Floodplain Wetlands This includes PCT's: 4015, 4023, 4024, 4025, 4026, 4027, 4029, 4034, 4035, 4036, 4037, 4041, 4042, 4044, 4046, 4049, 4050, 4051, 4055, 4059	Coastal Floodplain Wetlands >=70% and <90%	4015_Thinned	Yes	224	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Coastal Floodplain Wetlands This includes PCT's: 4015, 4023, 4024, 4025, 4026, 4027, 4029, 4034, 4035, 4036, 4037, 4041, 4042, 4044, 4046, 4049, 4050, 4051, 4055, 4059	Coastal Floodplain Wetlands >=70% and <90%	4015_Derived	No	33	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4039-Hunter Range Creekflat Apple-Red Gum Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138	-	4039_Mod-good	Yes	31	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4072-Hunter River Oak Mesic Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Eastern Riverine Forests This includes PCT's: 42, 85, 485, 1714, 3020, 4061, 4063, 4066, 4070, 4072, 4073, 4075, 4077, 4080, 4081, 4085	Eastern Riverine Forests >=50% and <70%	4072_Mod-good	No	4	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4072-Hunter River Oak Mesic Forest

4089-Namoi-Upper Hunter River Red Gum Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions This includes PCT's: 42, 1698, 4089	-	4089_Poor	Yes	34	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions This includes PCT's: 42, 1698, 4089	-	4089_Derived	No	82	Hunter, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Acacia bynoeana / Bynoe's Wattle	**3315_Thinned, 3315_Derived**	9.7	103.00

Acacia pendula - endangered population / Acacia pendula population in the Hunter catchment	**3315_Thinned, 3431_Thinned, 3431_Poor**	4.8	168.00
Angophora inopina / Charmhaven Apple	**3315_Thinned**	0.8	23.00
Anthochaera phrygia / Regent Honeyeater	**3444_Mod-good, 4039_Mod-good, 3431_Disturbed_Grassland, 3239_Mod-good, 3444_Derived, 3315_Thinned, 3431_Thinned, 3241_Mod-good, 3314_Thinned, 3086_Mod-good, 3087_Mod-good**	50.7	2924.00
Asperula asthenes / Trailing Woodruff	**3087_Mod-good**	0.3	16.00
Callocephalon fimbriatum / Gang-gang Cockatoo	**3315_Thinned, 3438_Mod-good, 3444_Mod-good, 4039_Mod-good**	3.1	121.00
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	**3315_Thinned, 3438_Mod-good, 3444_Mod-good, 4039_Mod-good**	3.1	120.00
Commersonia rosea / Commersonia rosea	**3431_Thinned, 3431_Poor**	2.0	70.00
Cymbidium canaliculatum - endangered population / Cymbidium canaliculatum population in the Hunter Catchment	**3314_Thinned**	1.0	2.00
Cynanchum elegans / White-flowered Wax Plant	**3087_Mod-good**	0.3	16.00

Delma vescolineata / Hunter Valley Delma	**3314_Thinned, 3314_Poor, 3314_Disturbed_Grassland, 3315_Thinned, 3315_Derived, 3431_Thinned, 3431_Plantation, 3431_Poor, 3431_Disturbed_Grassland**	223.0	4452.00
Diuris tricolor / Pine Donkey Orchid	**3314_Thinned, 3315_Thinned, 3315_Derived, 3431_Thinned, 3431_Plantation**	20.3	298.00
Eucalyptus camaldulensis - endangered population / Eucalyptus camaldulensis population in the Hunter catchment	**4089_Poor**	1.5	14.00
Eucalyptus pumila / Pokolbin Mallee	**3315_Thinned, 3444_Mod-good, 3239_Mod-good**	7.5	487.00
Grevillea parviflora subsp. parviflora / Small-flower Grevillea	**3444_Mod-good**	5.8	170.00
Lathamus discolor / Swift Parrot	**3444_Mod-good, 3431_Disturbed_Grassland, 3444_Derived, 3315_Thinned, 3431_Thinned, 3314_Thinned**	41.1	2265.00

Myotis macropus / Southern Myotis	**3314_Thinned, 3314_Poor, 3315_Thinned, 3431_Thinned, 3431_Plantation, 3438_Mod-good, 3431_Poor, 3444_Mod-good, 3636_Thinned, 4015_Thinned, 4039_Mod-good, 4072_Mod-good, 3239_Mod-good, 3241_Mod-good**	73.7	2037.00
Ninox strenua / Powerful Owl	**3315_Thinned, 3431_Thinned, 3438_Mod-good, 3444_Mod-good, 4039_Mod-good, 4072_Mod-good, 3239_Mod-good, 3087_Mod-good**	20.0	887.00
Ozothamnus tesselatus / Ozothamnus tesselatus	**3315_Thinned, 3431_Thinned, 3431_Plantation, 3431_Poor**	12.2	249.00
Petauroides volans / Southern Greater Glider	**3315_Thinned, 3431_Thinned, 3438_Mod-good, 3444_Mod-good, 4039_Mod-good, 4072_Mod-good, 3241_Mod-good**	31.4	1301.00

Petaurus norfolcensis / Squirrel Glider	**3314_Poor, 3431_Plantation, 3438_Mod-good, 3431_Poor, 3444_Mod-good, 4039_Mod-good, 3239_Mod-good, 3315_Thinned, 3431_Thinned, 3241_Mod-good, 3314_Thinned**	205.8	7080.00
Petrogale penicillata / Brush-tailed Rock-wallaby	**3315_Thinned, 3315_Derived, 3431_Plantation, 3438_Mod-good, 3444_Mod-good, 4039_Mod-good, 3241_Mod-good**	11.5	490.00
Phascogale tapoatafa / Brush-tailed Phascogale	**3314_Poor, 3431_Plantation, 3438_Mod-good, 3431_Poor, 3431_Thinned, 3636_Thinned, 4015_Thinned, 3314_Thinned**	86.7	2205.00
Phascolarctos cinereus / Koala	**3239_Mod-good, 3241_Mod-good, 3087_Mod-good**	8.2	381.00
Planigale maculata / Common Planigale	**3314_Thinned, 3315_Thinned, 3431_Thinned, 3438_Mod-good**	16.0	517.00
Pomaderris queenslandica / Scant Pomaderris	**3431_Thinned, 3431_Poor**	2.0	47.00
Prasophyllum petilum / Tarengo Leek Orchid	**3314_Thinned, 3315_Thinned, 3315_Derived, 3431_Thinned, 3431_Plantation**	20.3	397.00

Prasophyllum sp. Wybong / Prasophyllum sp. Wybong	**3314_Thinned, 3315_Thinned, 3315_Derived, 3431_Thinned, 3431_Plantation, 3438_Mod-good, 3444_Mod-good**	26.4	868.00
Prostanthera cineolifera / Singleton Mint Bush	**3315_Thinned, 3438_Mod-good, 3444_Mod-good**	13.2	418.00
Pterostylis chaetophora / Pterostylis chaetophora	**3314_Thinned, 3315_Thinned, 3315_Derived, 3431_Thinned, 3431_Plantation, 3438_Mod-good, 3444_Mod-good**	26.4	578.00
Pterostylis gibbosa / Illawarra Greenhood	**3431_Thinned, 3431_Plantation, 3438_Mod-good**	11.7	332.00
Rhodamnia rubescens / Scrub Turpentine	**3241_Mod-good**	10.0	30.00
Rhodomyrtus psidioides / Native Guava	**3087_Mod-good**	0.3	23.00
Rutidosis heterogama / Heath Wrinklewort	**3315_Thinned, 3315_Derived, 3444_Mod-good**	11.3	149.00
Tyto novaehollandiae / Masked Owl	**3444_Mod-good, 3239_Mod-good**	7.5	324.00
Tyto tenebricosa / Sooty Owl	**3239_Mod-good, 3087_Mod-good**	5.4	407.00

Vespadelus troughtoni / Eastern Cave Bat	**3314_Thinned, 3315_Thinned, 3431_Thinned, 3431_Plantation, 3438_Mod-good, 3444_Mod-good, 4015_Thinned, 4039_Mod-good, 3239_Mod-good, 3241_Mod-good**	56.8	2779.00

Credit Retirement Options

Like-for-like credit retirement options

Acacia bynoeana / Bynoe's Wattle	Spp	IBRA subregion
	Acacia bynoeana / Bynoe's Wattle	Any in NSW
Acacia pendula - endangered population / Acacia pendula population in the Hunter catchment	Spp	IBRA subregion
	Acacia pendula - endangered population / Acacia pendula population in the Hunter catchment	Any in NSW
Angophora inopina / Charmhaven Apple	Spp	IBRA subregion
	Angophora inopina / Charmhaven Apple	Any in NSW
Anthochaera phrygia / Regent Honeyeater	Spp	IBRA subregion
	Anthochaera phrygia / Regent Honeyeater	Any in NSW

Asperula asthenes / Trailing Woodruff	Spp	IBRA subregion
	Asperula asthenes / Trailing Woodruff	Any in NSW
Callocephalon fimbriatum / Gang-gang Cockatoo	Spp	IBRA subregion
	Callocephalon fimbriatum / Gang-gang Cockatoo	Any in NSW
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Any in NSW
Commersonia rosea / Commersonia rosea	Spp	IBRA subregion
	Commersonia rosea / Commersonia rosea	Any in NSW
Cymbidium canaliculatum - endangered population / Cymbidium canaliculatum population in the Hunter Catchment	Spp	IBRA subregion
	Cymbidium canaliculatum - endangered population / Cymbidium canaliculatum population in the Hunter Catchment	Any in NSW
Cynanchum elegans / White-flowered Wax Plant	Spp	IBRA subregion
	Cynanchum elegans / White-flowered Wax Plant	Any in NSW

Delma vescolineata / Hunter Valley Delma	Spp	IBRA subregion
	Delma vescolineata / Hunter Valley Delma	Any in NSW
Diuris tricolor / Pine Donkey Orchid	Spp	IBRA subregion
	Diuris tricolor / Pine Donkey Orchid	Any in NSW
Eucalyptus camaldulensis - endangered population / Eucalyptus camaldulensis population in the Hunter catchment	Spp	IBRA subregion
	Eucalyptus camaldulensis - endangered population / Eucalyptus camaldulensis population in the Hunter catchment	Any in NSW
Eucalyptus pumila / Pokolbin Mallee	Spp	IBRA subregion
	Eucalyptus pumila / Pokolbin Mallee	Any in NSW
Grevillea parviflora subsp. parviflora / Small-flower Grevillea	Spp	IBRA subregion
	Grevillea parviflora subsp. parviflora / Small-flower Grevillea	Any in NSW
Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW

Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Ozothamnus tesselatus / Ozothamnus tesselatus	Spp	IBRA subregion
	Ozothamnus tesselatus / Ozothamnus tesselatus	Any in NSW
Petauroides volans / Southern Greater Glider	Spp	IBRA subregion
	Petauroides volans / Southern Greater Glider	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Petrogale penicillata / Brush-tailed Rock-wallaby	Spp	IBRA subregion
	Petrogale penicillata / Brush-tailed Rock-wallaby	Any in NSW
Phascogale tapoatafa / Brush-tailed Phascogale	Spp	IBRA subregion

	Phascogale tapoatafa / Brush-tailed Phascogale	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW
Planigale maculata / Common Planigale	Spp	IBRA subregion
	Planigale maculata / Common Planigale	Any in NSW
Pomaderris queenslandica / Scant Pomaderris	Spp	IBRA subregion
	Pomaderris queenslandica / Scant Pomaderris	Any in NSW
Prasophyllum petilum / Tarengo Leek Orchid	Spp	IBRA subregion
	Prasophyllum petilum / Tarengo Leek Orchid	Any in NSW
Prasophyllum sp. Wybong / Prasophyllum sp. Wybong	Spp	IBRA subregion
	Prasophyllum sp. Wybong / Prasophyllum sp. Wybong	Any in NSW
Prostanthera cineolifera / Singleton Mint Bush	Spp	IBRA subregion
	Prostanthera cineolifera / Singleton Mint Bush	Any in NSW

Pterostylis chaetophora / Pterostylis chaetophora	Spp	IBRA subregion
	Pterostylis chaetophora / Pterostylis chaetophora	Any in NSW
Pterostylis gibbosa / Illawarra Greenhood	Spp	IBRA subregion
	Pterostylis gibbosa / Illawarra Greenhood	Any in NSW
Rhodamnia rubescens / Scrub Turpentine	Spp	IBRA subregion
	Rhodamnia rubescens / Scrub Turpentine	Any in NSW
Rhodomyrtus psidioides / Native Guava	Spp	IBRA subregion
	Rhodomyrtus psidioides / Native Guava	Any in NSW
Rutidosis heterogama / Heath Wrinklewort	Spp	IBRA subregion
	Rutidosis heterogama / Heath Wrinklewort	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW
Tyto tenebricosa / Sooty Owl	Spp	IBRA subregion

	Tyto tenebricosa / Sooty Owl	Any in NSW
Vespadelus troughtoni / Eastern Cave Bat	Spp	IBRA subregion
	Vespadelus troughtoni / Eastern Cave Bat	Any in NSW

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048860/BAAS18097/25/00055867	HTP - Hunter IBRA subregion	05/08/2025
Assessor Name	Report Created	BAM Data version *
	21/08/2025	Current classification (live - default) (82)
Assessor Number	BAM Case Status	Date Finalised
BAAS17020	Finalised	21/08/2025
Assessment Revision	BOS entry trigger	Assessment Type
0	Major Project	Scattered Trees

* 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.

Scattered Trees Credit Requirement

Class	Contains hollows	Number of trees	Ecosystem credits
3431-Central Hunter Ironbark Grassy Woodland			
3	True	6.0	6
3	True	6.0	6
3	True	3.0	3
			15
4015-Central Hunter Riparian Forest			
2	True	1.0	1
3	True	1.0	1
			2
3314-Central Hunter Slopes Grey Box Forest			
3	True	1.0	1
			1
4089-Namoi-Upper Hunter River Red Gum Forest			
3	True	2.0	2
			2
			20

Species credits for threatened species

The scattered tree module is not applicable. This species much be assessed using chapter 5 of the BAM and BAM-C development module

Eucalyptus pumila Pokolbin Mallee
Lathamus discolor Swift Parrot
Persoonia pauciflora North Rothbury Persoonia
Anthochaera phrygia Regent Honeyeater
Acacia pendula - endangered population Acacia pendula population in the Hunter catchment
Prasophyllum sp. Wybong Prasophyllum sp. Wybong

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048860/BAAS18097/25/00055867	HTP - Hunter IBRA subregion	05/08/2025
Assessor Name	Report Created	BAM Data version *
	21/08/2025	Current classification (live - default) (82)
Assessor Number	BAM Case Status	Date Finalised
BAAS17020	Finalised	21/08/2025
Assessment Revision	BOS entry trigger	Assessment Type
0	Major Project	Scattered Trees

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Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name
Black Falcon	Falco subniger
	Falco subniger
	Falco subniger
	Falco subniger
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis
	Melithreptus gularis gularis
	Melithreptus gularis gularis
Black-necked Stork	Ephippiorhynchus asiaticus
	Ephippiorhynchus asiaticus
	Ephippiorhynchus asiaticus
	Ephippiorhynchus asiaticus
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae
	Climacteris picumnus victoriae
	Climacteris picumnus victoriae
	Climacteris picumnus victoriae
Dusky Woodswallow	Artamus cyanopterus cyanopterus
	Artamus cyanopterus cyanopterus
	Artamus cyanopterus cyanopterus

Dusky Woodswallow	Artamus cyanopterus cyanopterus
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis
	Micronomus norfolkensis
	Micronomus norfolkensis
Eastern False Pipistrelle	Falsistrellus tasmaniensis
Eastern Osprey	Pandion cristatus
	Pandion cristatus
	Pandion cristatus
Flame Robin	Petroica phoenicea
	Petroica phoenicea
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis
	Pomatostomus temporalis temporalis
	Pomatostomus temporalis temporalis
Little Eagle	Hieraaetus morphnoides
	Hieraaetus morphnoides
	Hieraaetus morphnoides
	Hieraaetus morphnoides
Little Lorikeet	Glossopsitta pusilla
	Glossopsitta pusilla
	Glossopsitta pusilla
	Glossopsitta pusilla
Painted Honeyeater	Grantiella picta
Regent Honeyeater	Anthochaera phrygia
	Anthochaera phrygia
	Anthochaera phrygia
Scarlet Robin	Petroica boodang
	Petroica boodang
	Petroica boodang
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami
	Calyptorhynchus lathami lathami
	Calyptorhynchus lathami lathami
	Calyptorhynchus lathami lathami
South-eastern Hooded Robin	Melanodryas cucullata cucullata
Speckled Warbler	Chthonicola sagittata
	Chthonicola sagittata

Speckled Warbler	Chthonicola sagittata
	Chthonicola sagittata
Spotted Harrier	Circus assimilis
	Circus assimilis
	Circus assimilis
	Circus assimilis
Swift Parrot	Lathamus discolor
	Lathamus discolor
	Lathamus discolor
	Lathamus discolor
Varied Sittella	Daphoenositta chrysoptera
	Daphoenositta chrysoptera
	Daphoenositta chrysoptera
	Daphoenositta chrysoptera
White-bellied Sea-Eagle	Haliaeetus leucogaster
	Haliaeetus leucogaster
	Haliaeetus leucogaster
	Haliaeetus leucogaster
White-throated Needletail	Hirundapus caudacutus
	Hirundapus caudacutus
	Hirundapus caudacutus
	Hirundapus caudacutus
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris
	Saccolaimus flaviventris

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

Scattered Tree Report

Proposal Details

Assessment Id
00048860/BAAS18097/25/00055867

Assessment name
HTP - Hunter IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Report Created
21/08/2025

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

Assessor Number
BAAS17020

BAM Case Status
Finalised

Date Finalised
21/08/2025

Assessment Revision
0

Assessment Type
Scattered Trees

BOS entry trigger
Major Project

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Scattered Trees

PCT code	PCT name	No. of trees	Species	DBHOB Category	Contain hollows	Class	Assessment required
3314	Central Hunter Slopes Grey Box Forest	1	Eucalyptus moluccana	< 20cm	False	1	No

Scattered Tree Report

3314	Central Hunter Slopes Grey Box Forest	1	Eucalyptus moluccana	>= 50cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
3431	Central Hunter Ironbark Grassy Woodland	6	Eucalyptus crebra	>= 50cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
3431	Central Hunter Ironbark Grassy Woodland	6	Eucalyptus moluccana	>= 50cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
3431	Central Hunter Ironbark Grassy Woodland	3	Eucalyptus tereticornis	>= 50cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
4015	Central Hunter Riparian Forest	1	Eucalyptus tereticornis	>= 20cm and <50cm	True	2	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
4015	Central Hunter Riparian Forest	1	Eucalyptus tereticornis	>= 50cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species

Scattered Tree Report

4089	Namoi-Upper Hunter River Red Gum Forest	2	Eucalyptus tereticornis	>= 50cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00048860/BAAS18097/25/00055867

Proposal Name
HTP - Hunter IBRA subregion

BAM data last updated *
05/08/2025

Assessor Name

Assessor Number
BAAS17020

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

Proponent Names

Report Created
21/08/2025

Date Finalised
21/08/2025

Assessment Revision
0

BOS entry trigger
Major Project

Assessment Type
Scattered Trees

BAM Case Status
Finalised

* 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

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

Ecosystem Credit Summary

BAM Biodiversity Credit Report (Like for like)

PCT	TEC	HBT Cr	No HBT Cr	Credits
3314-Central Hunter Slopes Grey Box Forest	Not a TEC	1	0	1
3431-Central Hunter Ironbark Grassy Woodland	Not a TEC	15	0	15
4015-Central Hunter Riparian Forest	Not a TEC	2	0	2
4089-Namoi-Upper Hunter River Red Gum Forest	Not a TEC	2	0	2

Credit classes for 3314

Like-for-like options

Class	Trading group	HBT	Credits	IBRA region
Coastal Valley Grassy Woodlands	Coastal Valley Grassy Woodlands >=70% and <90%	Yes	1	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Credit classes for 3431

Like-for-like options

Class	Trading group	HBT	Credits	IBRA region
Hunter-Macleay Dry Sclerophyll Forests	Hunter-Macleay Dry Sclerophyll Forests >=70% and <90%	Yes	15	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Credit classes for					
Credit classes for 4015	**Like-for-like options**				
	Class	Trading group	HBT	Credits	IBRA region
	Coastal Floodplain Wetlands	Coastal Floodplain Wetlands >=70% and <90%	Yes	2	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Credit classes for 4089	**Like-for-like options**				
	Class	Trading group	HBT	Credits	IBRA region
	Inland Riverine Forests	Inland Riverine Forests >=90%	Yes	2	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Appendix F

Herbarium correspondence

BOTANIC GARDENS OF SYDNEY

National Herbarium of New South Wales

Lukas CLEWS
WSP
Level 27/680 George Street
Sydney, NSW 2000
AUSTRALIA

BIS Enquiry No: 22473
Botanical.Is@botanicgardens.nsw.gov.au
Ph. No: (02) 4631 5135
Date: 30 November 2023

Dear Lukas,

Re: 30 samples from Dunedoo east through to Ulan and north to Cassilis

Thank you for your enquiry of 20-Nov-23. We are happy to provide the following information:

1. ***Eucalyptus macrorhyncha*** Det. A. Orme & S. McCune 29 Nov 2023

2. ***Eucalyptus macrorhyncha*** - with possible influence from *E. cannonii* Det. A. Orme & S. McCune 29 Nov 2023

3. ***Eucalyptus macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023

4. ***Eucalyptus macrorhyncha*** Det. A. Orme & S. McCune 29 Nov 2023

5. ***Eucalyptus*** possible ***macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023 - buds indicate influence from *E.cannonii*

6. ***Eucalyptus macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023 - keeping

7. ***Eucalyptus macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023 - keeping

8. ***Eucalyptus macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023 - keeping

9. ***Eucalyptus macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023 - keeping

10. ***Eucalyptus macrorhyncha*** <-> ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023

11. ***Eucalyptus macrorhyncha*** **<->** ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023

12. ***Eucalyptus macrorhyncha*** **<->** ***E. cannonii*** Det. A. Orme & S. McCune 29 Nov 2023

13. ***Eucalyptus macrorhyncha*** Det. A. Orme & S. McCune 29 Nov 2023

14. ***Eucalyptus macrorhyncha*** with possible influence from *E. cannonii* Det. A. Orme & S. McCune 29 Nov 2023

15. ***Eucalyptus macrorhyncha*** Det. A. Orme & S. McCune 29 Nov 2023

16. ***Eucalyptus cannonii*** Det. A. Orme & S. McCune 29 Nov 2023 – not kept as poor specimen

17. ***Swainsona reticulata*** Det. P. Jobson 23 Nov 2023 Keeping

18. ***Swainsona reticulata*** Det. P. Jobson 23 Nov 2023

19. ***Swainsona reticulata*** Det. P. Jobson 23 Nov 2023

20. ***Pomaderris*** probably ***queenslandica*** Det. S. McCune 27 Nov 2023 - mature leaves and flowers and/or fruits needed

21. ***Swainsona reticulata*** Det. P. Jobson 23 Nov 2023

22. ***Leucochrysum albicans*** var. ***tricolor*** Conf. P. Jobson 23 Nov 2023 - keeping

23. ***Bothriochloa macra*** Det. S. McCune 27 Nov 2023

24. ***Bothriochloa macra*** Det. S. McCune 27 Nov 2023

25. ***Bothriochloa macra*** Det. S. McCune 27 Nov 2023

26. ***Rhodomyrtus psidioides*** Conf. P. Jobson 24 Nov 2023 - keeping

27. ***Rhodomyrtus psidioides*** Conf. P. Jobson 24 Nov 2023

28. ***Rhodomyrtus psidioides*** Conf. P. Jobson 24 Nov 2023

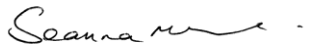
29. ***Rhodomyrtus psidioides*** Conf. P. Jobson 24 Nov 2023

30. ***Acacia ausfeldii*** Conf. P. Jobson 24 Nov 2023 - keeping

An invoice for $440.00 (incl. GST) will be forwarded to you separately by our finance section to cover cost of identification.

Thank you for your enquiry.

Yours sincerely,



Seanna McCune
Identification Senior Technical Officer
Botanical Identification Service

BOTANIC GARDENS OF SYDNEY

National Herbarium of New South Wales

Mark STABLES
WSP
331 Wattley Hill Road
Wootton, NSW 2423
AUSTRALIA

BIS Enquiry No: 22405
Botanical.Is@botanicgardens.nsw.gov.au
Ph. No: (02) 4631 5135
Date: 3 April 2024

Dear Mark,

Thank you for your enquiry of 10-Oct-23. We are happy to provide the following information:

Re: 4 specimens from Singorimbah Station & Pokolbin State Forest

Eleocharis obicis Det. P Jobson 1 Feb 2024 - retained

MS14-01 ***Eucalyptus fracta*** Conf. P Jobson & A Orme 1 Feb 2024 - retained

MS14-02-03 ***Prostanthera cineolifera*** Conf. P Jobson 1 Feb 2024 - retained

Thank you for your enquiry.

Yours sincerely,

Seanna McCune
Identification Senior Technical Officer
Botanical Identification Service

BOTANIC GARDENS OF SYDNEY

National Herbarium of New South Wales

Deborah LANDENBERGER
WSP
PO Box 1162
Newcastle, NSW 2300
AUSTRALIA

BIS Enquiry No: 22599
Botanical.Is@botanicgardens.nsw.gov.au
Ph. No: (02) 4631 5135
Date: 10 July 2024

Dear Deborah LANDENBERGER,
Identification of potential Senna acclinis

Thank you for your enquiry of 12-Mar-24. We are happy to provide the following information:

Senna acclinis Conf. SF McCune 10 July 2024

I've retained your specimen for the Herbarium collection, and would be grateful for the collection date and the collector's name if not you?

You have not been charged for this enquiry.

Yours sincerely,

Seanna McCune
Identification Senior Technical Officer
Botanical Identification Service

BOTANIC GARDENS OF SYDNEY

National Herbarium of New South Wales

Sebastian MILLER
WSP-ecology
Level 27/680 George Street
Sydney, NSW 2000

BIS Enquiry No: 22795
Botanical.Is@botanicgardens.nsw.gov.au
Ph. No: (02) 4631 5135
Date: 18 October 2024

Dear Sebastian,

Re: orchid Id – Transgrid easement near Eraring Power Station - Cooranbong

Your orchid specimen has been determined as:

Genoplesium insigne (syn. *Corunastylis insignis*) – det. A.E. Orme, 18th Oct 2024.

We have retained your specimen for the herbarium collection – NSW 1138852, in spirit.

An invoice for $75.00 (incl. GST) will be forwarded to you separately by our finance section to cover cost of expedited identification.

Thank you for your enquiry.

Yours sincerely,

Andrew Orme
Identification Senior Technical Officer
Botanical Identification Service

BOTANIC GARDENS OF SYDNEY

National Herbarium of New South Wales

Tasman CARR
Se 1, Lvl 3
51-55 Bolton St
WSP Australia
Newcastle, NSW 2290

BIS Enquiry No: 22774
Botanical.Is@botanicgardens.nsw.gov.au
Ph. No: (02) 4631 5135
Date: 19 December 2024

Dear Tasman,

Re: plant identification – Corrabare State Forest & Singleton Military Area

Thank you for your enquiry of 27th Sep 2024. We are happy to provide the following information:

Corrabare State Forest specimen - leaves consistent with *Melaleuca groveana* - material inadequate for identification – det. S.F. McCune, 18th Dec 2024 – specimen not retained.

Singleton Military Area specimen - possibly *Pterostylis gibbosa* - det. A.E. Orme, 19th Dec 2024:

* specimen pressed & dried → rehydrated but segments remained reduced in size
* labellum (hairs, dimensions, channelled shape) & labellum hinge consistent with *P. gibbosa*
* free points consistent with *P. gibbosa*
* synsepalum reduced and undersize - unable to examine or compare
* image of "neighbouring individual" appears consistent with *P. gibbosa*
* image of vouchered plant inadequate
* if possible, please recollect and place specimen in solution of 70% ethanol & 30% water (methylated spirits can be used instead of ethanol); and take image of open flower of specimen plant.
* specimen retained - rehydrated and placed in EtOH for spirit collection

An invoice for $110.00 (incl. GST) will be forwarded to you separately by our finance section to cover cost of identification.

Thank you for your enquiry.

Yours sincerely,

Andrew Orme
Identification Senior Technical Officer
Botanical Identification Service

AUSTRALIAN INSTITUTE OF BOTANICAL SCIENCE

visit NSW Flora Online at plantnet.rbgsyd.nsw.gov.au
to help you identify the plants of New South Wales

NSW GOVERNMENT Planning & Environment

Appendix G

Microbat survey results

Microbat Call Identification Report

Prepared for ("Client"):	WSP Australia
Survey location/project name:	Hunter Transmission Project
Survey dates:	January – May 2024
Client project reference:	
Job no.:	WSP-2404
Report date:	25 September 2024

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Methods

Data received

Balance! Environmental received a mix of full-spectrum (*.WAV) and zero-crossing (*.ZC) sequence files, recorded on Anabat Swift and Chorus detectors, plus ZCA files from Anabat Express units. The data were recorded at multiple sites, between January and May 2024 (see **Table 1**).

Table 1 Anabat deployment schedule: Hunter Transmission Project, January-May 2024.

Survey period and location	Start	End	No. Recording Nights	Anabat Serial	Site ID	File type	No. of files
Jan 22-25 2024 Corrabare State Forest	22/02/2024	25/02/2024	3	583114	Anabat 1_583114	ZC	1464
	22/02/2024	25/02/2024	3	583124	Anabat 2_583124	ZC	1273
	22/02/2024	25/02/2024	3	583138	Anabat 3_583138	ZC	1452
Jan 22-Feb 08 2024 Pokolbin State Forest	29/01/2024	27/02/2024	29	2982	ANA-1_HTP	WAV	4026
	30/01/2024	27/02/2024	28	7220	ANA-2_HTP	WAV	2752
	31/01/2024	26/02/2024	26	2945	ANA-3_HTP	WAV	2406
	1/02/2024	26/02/2024	25	2963	ANA-4_HTP	Wav	1728
Feb 12-16 2024 Bulga	12/02/2024	16/02/2024	4	657547	Bulga Anabat 1	ZC	16855
	12/02/2024	16/02/2024	4	583124	Bulga Anabat 2	ZC	4474
	12/02/2024	16/02/2024	4	583114	Bulga Anabat 3	ZC	7887
	12/02/2024	16/02/2024	4	583138	Bulga Anabat 4	ZC	1543
Feb 19-May 20 2024 Gehrmann Property	20/02/2024	7/04/2024	48	583138		ZC	31550
Feb 20-May 21 2024 Corrabare North Flora Reserve	20/02/2024	8/04/2024	49	657547		ZC	51053
Feb 12-23 2024 Pokolbin, Corrabare and Watagans State Forests_NVE	12/02/2024	17/02/2024	5	3067		ZC	1679
	12/02/2024	17/02/2024	5	3095		ZC	2988
	12/02/2024	17/02/2024	5	3157		ZCA	5
	12/02/2024	17/02/2024	5	7754		ZC	1315
	17/02/2024	22/02/2024	5	3067		ZC	1329
	17/02/2024	22/02/2024	5	3095		ZC	3500
	17/02/2024	22/02/2024	5	3157		ZCA	5
	17/02/2024	22/02/2024	5	7754		ZC	1553
	22/02/2024	26/02/2024	5	3067		ZC	1675
	22/02/2024	26/02/2024	5	3095		ZC	27
	22/02/2024	26/02/2024	5	3157		ZCA	4
	22/02/2024	26/02/2024	5	7754		ZC	2070
Feb 26-29 2024 Singleton Military Area	26/02/2024	29/02/2024	3	583090	Anabat Express (A1)	ZCA	3
	26/02/2024	29/02/2024	3	unknown	Anabat Swift (A2)	ZC	364

Post-processing

Anabat Insight (Version 2.1.2; Titley Scientific, Brisbane) was used to extract individual acoustic trigger events from each Anabat Express ZCA files and store them in zero-crossing call sequence format (*.ZC files). ZCA conversion settings were as follows:

- Maximum file duration = 10 s
- Recording window = 2 s
- Minimum event duration = 2 ms
- Minimum trigger frequency = 8 kHz
- Maximum trigger frequency = 500 kHz
- Smoothing = Auto

The Anabat Swift WAV files recorded at Pokolbin State Forest between 29th January and 27th February were also converted to ZC sequence file format to make the data consistent across all sites, and expedite processing and analysis.

The entire ZC file dataset was then scanned with a "noise" filter to separate files containing potentially-identifiable bat calls from those with only non-bat background noise and/or short duration calls (<4 pulses) that would be of little use for species identification. To achieve this, the following filter criteria were applied to every ZC file using the Search tool:

- Characteristic frequency (Fc) = 10 – 165 kHz
- Pulse duration (Dur) = 2 – 120 ms
- Time between pulses (TBC) = 5 – 1500 ms

For a file to pass the filter it had to contain a minimum of four (4) bat call pulses that met all the above criteria. Files that failed the Search filter (i.e., "noise" files) were excluded from further analysis.

Call analysis

All ZC files containing identifiable bat calls were analysed in *Anabat Insight*, as follows:

1. The Decision Tree tool was used to scan all ZC files and group them according to the average metrics of the calls within. Decision Tree grouping was based primarily on characteristic frequency (Fc), with some frequency groups further subdivided using metrics such as pulse duration (Dur), slope of the characteristic section (Sc), and a custom "bandwidth" metric derived from the difference between maximum frequency (Fmax) and Fc.
2. Differentiation of the species present within each Decision Tree group was achieved by:
    a. using the Search tool in an iterative process to find signals meeting species-specific metric-based filters
        i. for each target species, the relevant files were searched on a "per pulse" basis, initially accepting only files with at least 50% of pulses, and a minimum of five pulses overall meeting the species-specific criteria.
        ii. subsequent iterations of the searches used slightly broader criteria boundaries and/or varied acceptance limits (e.g. minimum of 10 pulses without the % of pulses limit).
    b. at the conclusion of each Search iteration, at least 10% of the calls that passed the filter (i.e. likely belonged to the target species) were manually vetted before applying the relevant species label.

Call metrics used in the Search process, along with the manual vetting process, relied upon published call descriptions (Pennay *et al.* 2004) and/or were derived from regionally relevant reference calls.

The likelihood of species' occurrence in the survey area was confirmed by referring to relevant distributional information (e.g., Australasian Bat Society 2021; Baker & Gynther 2023; Churchill 2008).

Some Decision Tree groups inevitably include an enormous volume of calls, often with multiple individuals and species occurring in each file. Once the iterative Search process has extracted the most reliably identifiable calls of each member species of those groups, the remaining calls in each group were ignored and moved to a "surplus calls" folder.

Species presence

Where a call receives a unique species label in the above iterative process, it is implied that the identification is highly reliable. Those positive identifications result in the species' presence being shown as "Definite" for the relevant site in the Results tables.

Some calls could not be reliably identified, but potentially represented species additional to those that were positively identified for the relevant site. These "unresolved" calls received a species-complex label. Any members of a species complex that were not also positively identified from other calls recorded at the relevant site are listed as "Possibly present" in the Results.

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Armstrong *et al.* (2020).

Results & Discussion

The total dataset, following ZCA conversion and noise/short-call filtering included 40,548 ZC files; however, only 3444 of those files were required to identify every species present across all survey sites. The other 37,104 "surplus" files were processed only to Decision Tree group level and were subsequently ignored once all species were identified for each site.

A total of 3514 individual bat calls were identified, with 90% (3150) of those calls assigned positively to the following 20 taxa:

- *Rhinolophus megaphyllus*
- *Chalinolobus dwyeri*
- *Chalinolobus gouldii*
- *Chalinolobus morio*
- *Falsistrellus tasmaniensis*
- *Myotis macropus*
- *Nyctophilus* sp.†
- *Scoteanax rueppellii*
- *Scotorepens balstoni*
- *Scotorepens orion*
- *Vespadelus darlingtoni*
- *Vespadelus pumilus*
- *Vespadelus regulus*
- *Vespadelus vulturnus*
- *Miniopterus australis*
- *Miniopterus orianae oceanensis*
- *Austronomus australis*
- *Micronomus norfolkensis*
- *Ozimops planiceps*
- *Ozimops ridei*

† Up to three *Nyctophilus* spp. potentially occur in the study area, including: *N. corbeni, N. geoffroyi* and *N. gouldi*.

One additional species – *Vespadelus troughtoni* – may also have been recorded; however, it's calls and those of *V. vulturnus* are almost impossible to distinguish, so both species were listed as "Possible" at sites where the relevant call types were detected. *V. vulturnus* was identified reliably only for one site (Corrabare SF, Anabat 583114, 24/01/2024), with the six detected calls having a characteristic frequency (Fc) of ~47 kHz, which is too low for *V. troughtoni*. All calls assigned to the species pair had Fc~49-52 kHz. Numerous other unresolved calls in the same frequency range could have been from either of these *Vespadelus* spp. or *Chalinolobus morio*. The latter species was positively differentiated only where most pulses in a sequence had distinctive downward-sweeping tails (*cf.* mostly upward-sweeping tails, or "hooks", assigned to *Vespadelus* spp.).

Species detected at each site are presented in **Table 2(a-c)**.

Sample spectrograms of each identified call type are presented in **Appendix 1**.

References

Armstrong, K.N., Reardon, T.B., and Jackson, S.M. (2020). A current taxonomic list of Australian Chiroptera. Australasian Bat Society. Version 2020-06-09. URL: http://ausbats.org.au/species-list/4593775065

Australasian Bat Society (2021), *BatMap.* http://ausbats.org.au/batmap. Accessed 12/2/2024.

Baker, A.M. and Gynther, I.C. (editors) (2023). *Strahan's Mammals of Australia*. Fourth Edition; Reed New Holland Publishers; Sydney.

Churchill, S. (2008). *Australian Bats.* Jacana Books, Allen & Unwin; Sydney.

Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

Table 2a Bats recorded during the Hunter Transmission Project surveys, January-May 2024.

♦ Definite – at least one calls from the site was attributed unequivocally to the species

□ Possible – calls like those of the species were recorded but could not be reliably identified

Area/period	Corrabare State Forest_Jan 22-25 2024			Pokolbin State Forest_Jan 22-Feb 08 2024			
Detector/site	Anabat_583114	Anabat_583124	Anabat_583138	ANA-1_HTP (2982)	ANA-2_HTP (7220)	ANA-3_HTP (2945)	ANA-4_HTP (2963)
Rhinolophus megaphyllus	D	D	D	D	D	D	D
Chalinolobus dwyeri	D	D	D	D	D	D	
Chalinolobus gouldii	D	D		D	D	D	D
Chalinolobus morio	D	D		D	D	D	
Falsistrellus tasmaniensis	D		D	p	D	p	
Myotis macropus	p		p				
Nyctophilus sp.	D		D			D	D
Scoteanax rueppellii	p				p	D	
Scotorepens balstoni	D		D	D	D	D	
Scotorepens orion	D	D	D	D	D	D	D
Vespadelus darlingtoni			p	D	D	D	
Vespadelus pumilus	D		D				
Vespadelus regulus	D		D	D	D	D	
Vespadelus troughtoni		p		p	p	p	
Vespadelus vulturnus	D	p	p	p	p	p	
Miniopterus australis	D	D	D	D	D	D	D
Miniopterus orianae oceanensis	D		D	D	D	D	
Austronomus australis	D			D	D	D	
Micronomus norfolkensis	D	D		D	D	D	
Ozimops planiceps				D	D	D	D
Ozimops ridei		D		D	D	D	

Table 2b Bats recorded during the Hunter Transmission Project surveys, January-May 2024.

♦ Definite – at least one calls from the site was attributed unequivocally to the species

□ Possible – calls like those of the species were recorded but could not be reliably identified

Area/period	Bulga_Feb 12-16 2024				Gehrmann Property_Feb 19-May 20 2024	Corrabare North Flora Reserve_Feb 20-May 21 2024
Detector/site	Anabat 1	Anabat 2	Anabat 3	Anabat 4		
Rhinolophus megaphyllus				D	D	D
Chalinolobus dwyeri	D	D	D	D	D	D
Chalinolobus gouldii	D	D	D	D	D	D
Chalinolobus morio	D	D	D	D	D	D
Falsistrellus tasmaniensis					p	p
Myotis macropus	D	D		D		
Nyctophilus sp.					D	D
Scoteanax rueppellii	D	D		D	p	
Scotorepens balstoni	D	D	D	D	D	D
Scotorepens orion	D	D	D	D	D	D
Vespadelus darlingtoni	p	D				
Vespadelus pumilus						
Vespadelus regulus	D	p				D
Vespadelus troughtoni		p	p	p	p	p
Vespadelus vulturnus	p	p	p	p	p	p
Miniopterus australis	D	D	D	D	D	D
Miniopterus orianae oceanensis	D	D	D	D		D
Austronomus australis		D	D	D	D	D
Micronomus norfolkensis	D	D	D	D	D	D
Ozimops planiceps	D	D	D	D	D	D
Ozimops ridei	D	D	p	D	D	D

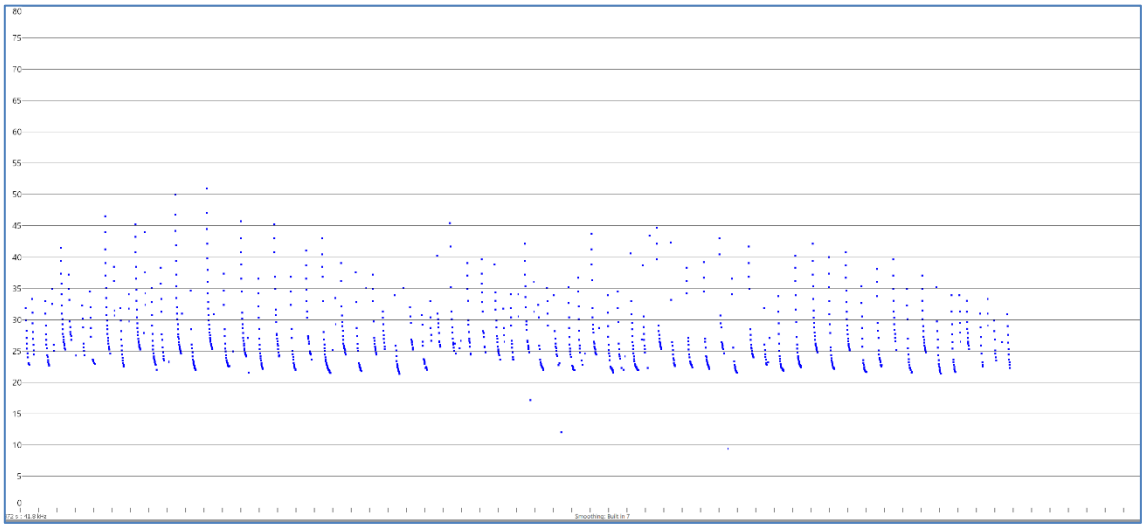
Table 2c Bats recorded during the Hunter Transmission Project surveys, January-May 2024.

♦ Definite – at least one calls from the site was attributed unequivocally to the species

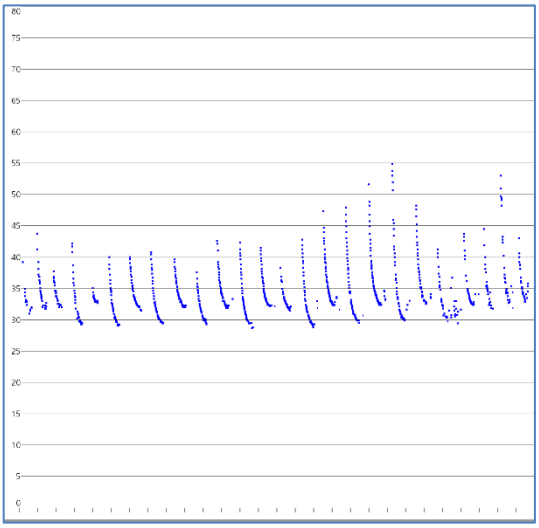
□ Possible – calls like those of the species were recorded but could not be reliably identified

Area/period	Pokolbin, Corrabare, Watagans State Forests_NVE_Feb 12-23 2024											Singleton Military Area_Feb 26-29 2024	
Sub-period	Feb 12 - 17				Feb 17 - 22				Feb 22 - 26				
Detector/site	3067	3095	3157	7754	3067	3095	3157	7754	3067	3157	7754	Anabat Swift (A2)	Express (A1)
Rhinolophus megaphyllus	D	D	D	D	D	D	D	D	D	D	D		D
Chalinolobus dwyeri		D	D		D	D	D	D				D	D
Chalinolobus gouldii	D	D	D	D	D	D	D	D				D	D
Chalinolobus morio	D	D	D	D	D	D	D	D			D	D	D
Falsistrellus tasmaniensis		D	D			p	p	p					p
Myotis macropus					p								
Nyctophilus sp.		D	D		D	D	D	D	D	D	D	D	D
Scoteanax rueppellii	p	D				p							D
Scotorepens balstoni	D		D				D					D	D
Scotorepens orion	D	D	D	D	D	D	p	p			D	D	D
Vespadelus darlingtoni		D	D			p	p						
Vespadelus pumilus				p	D			D	p	D	D	D	D
Vespadelus regulus		D	D		D	p	D		D			D	D
Vespadelus troughtoni		p	p	p	p			p			p	p	p
Vespadelus vulturnus		p	p	p	p			p			p	p	p
Miniopterus australis	D	D	D	D	D	D	D	D	D	D	D	D	D
Miniopterus orianae oceanensis	D	D	D	D	D	D	D	D	D	D		D	D
Austronomus australis	D	D	D			D		D					D
Micronomus norfolkensis	D		D		D	D		D					D
Ozimops planiceps		D	D		D	D		D					D
Ozimops ridei	D	D	D	D	D	D	D	D			D		D

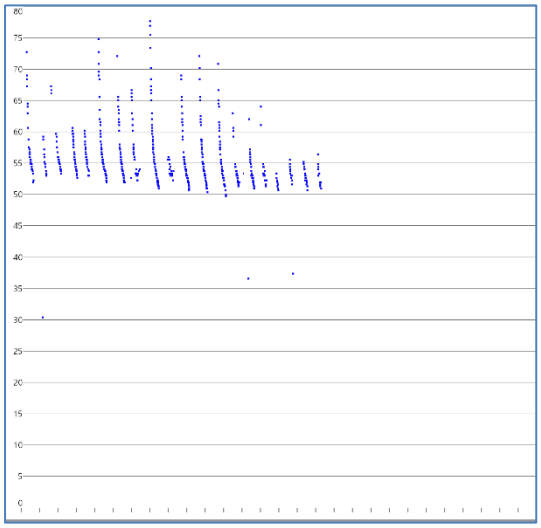
Appendix 1 Representative call sequences from the HTP surveys, January-May 2024.
x-axis = 10 ms per tick-mark; time between pulses removed ("compressed")



Chalinolobus dwyeri



Chalinolobus gouldii



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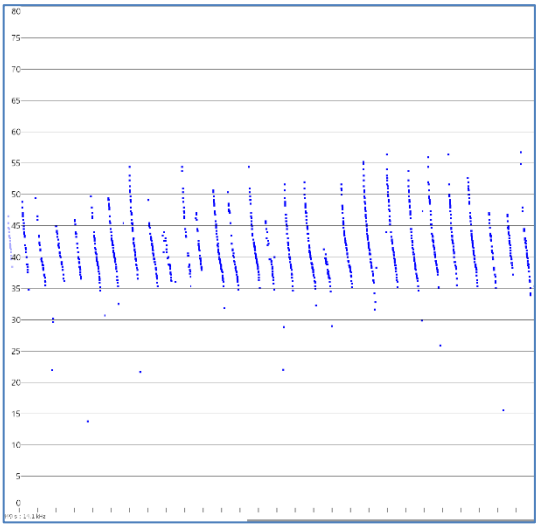

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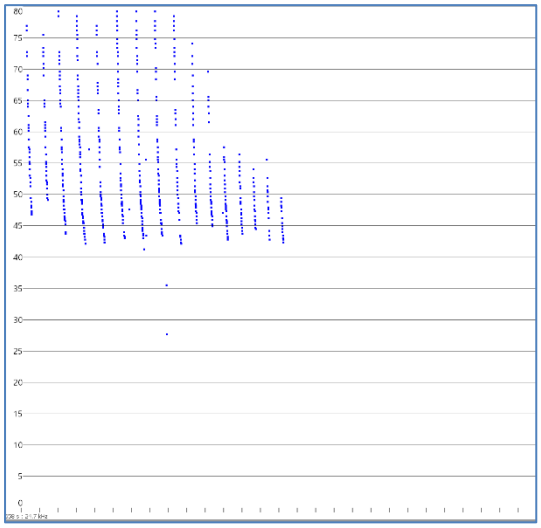
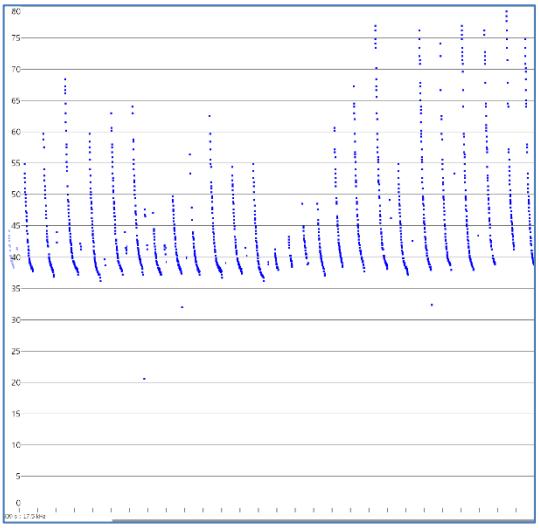
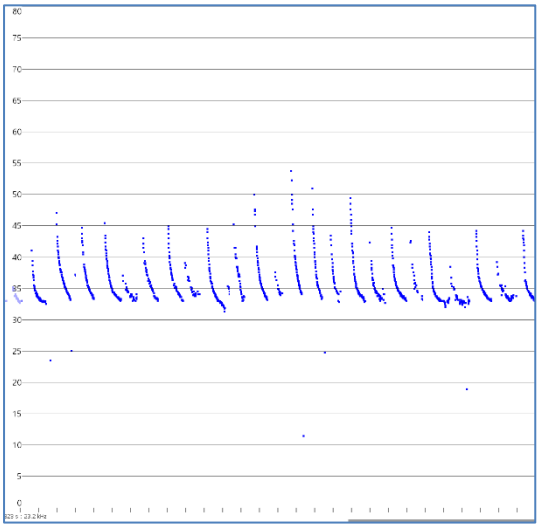


Nyctophilus sp.



Falsistrellus tasmaniensis



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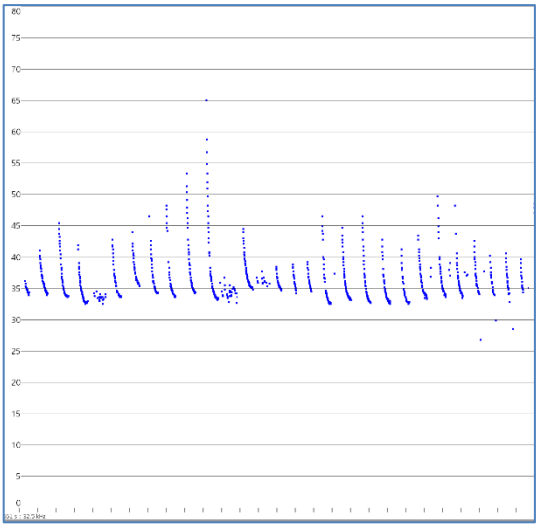

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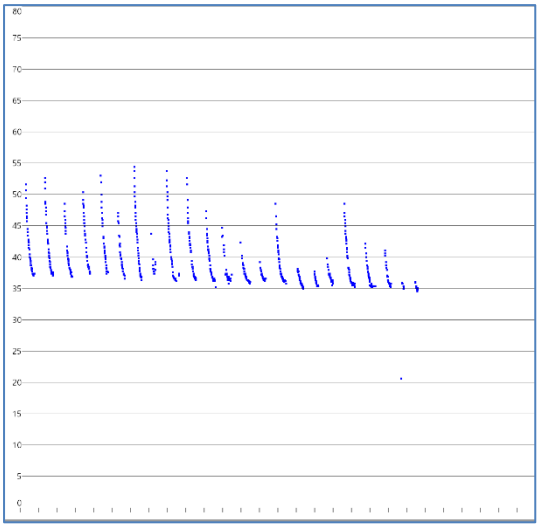

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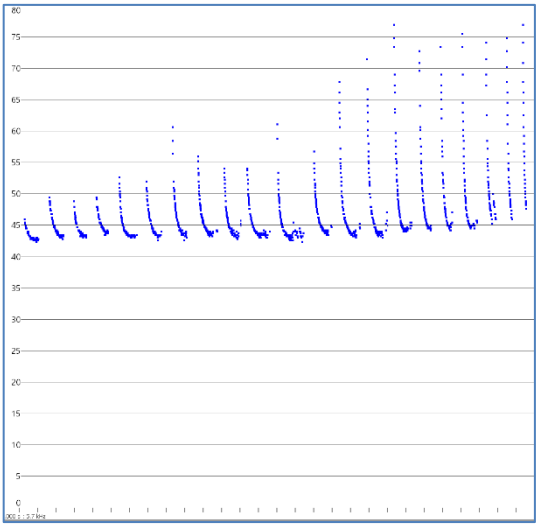
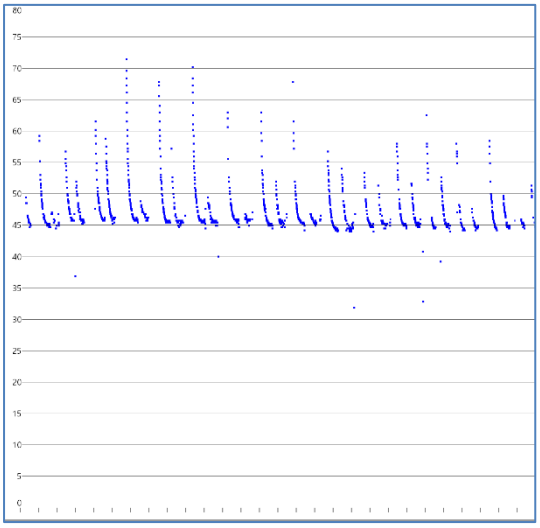
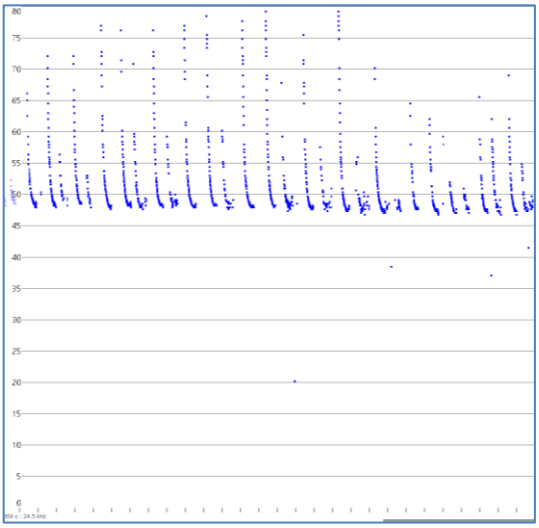


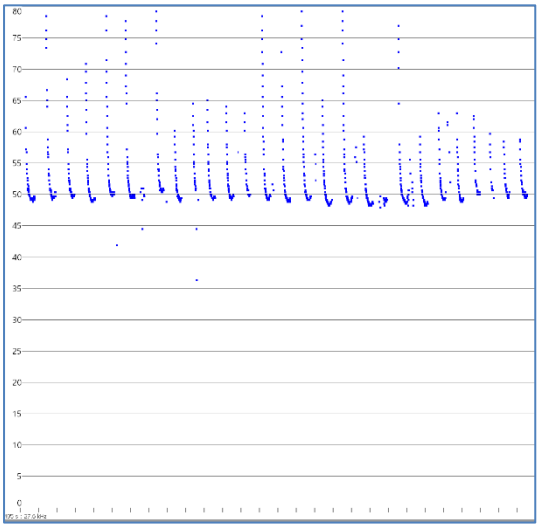
Vespadelus darlingtoni



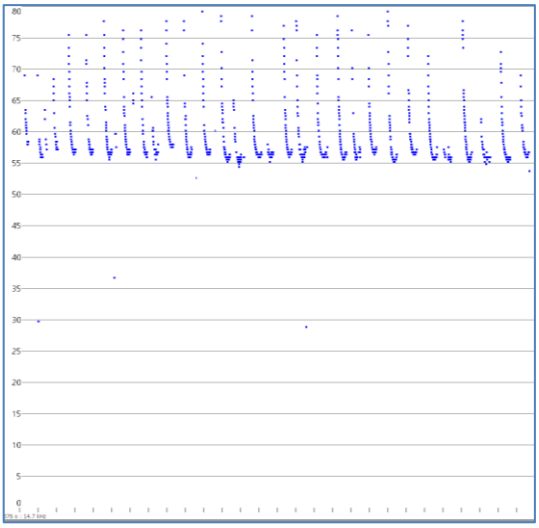
Vespadelus regulus



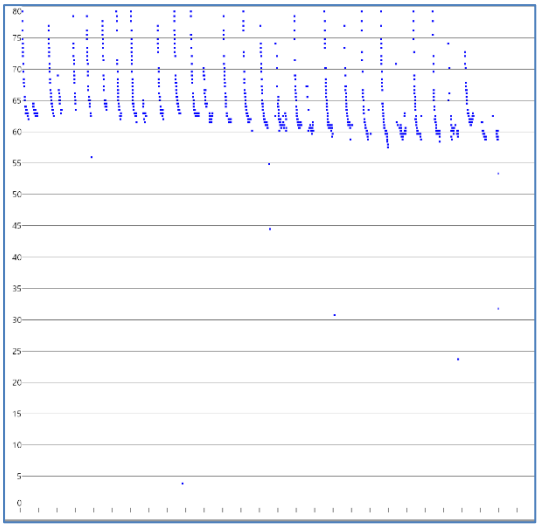
Vespadelus vulturnus



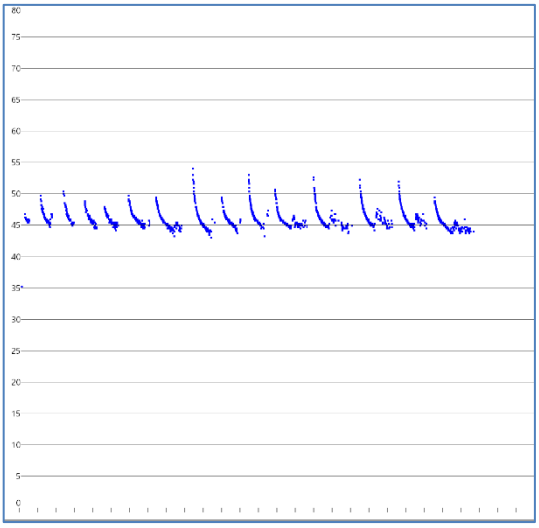
V. vulturnus or *V. troughtoni*



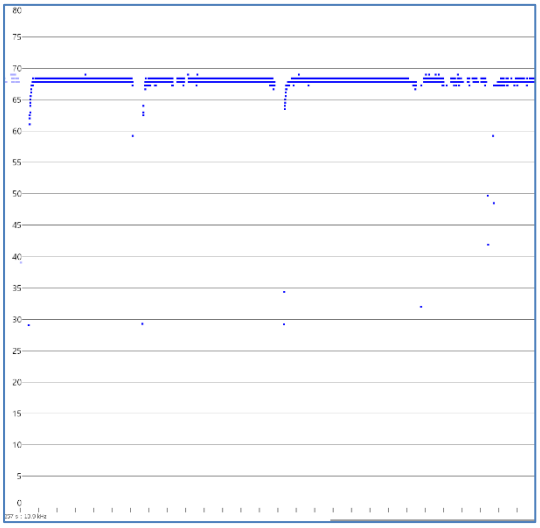
Vespadelus pumilus



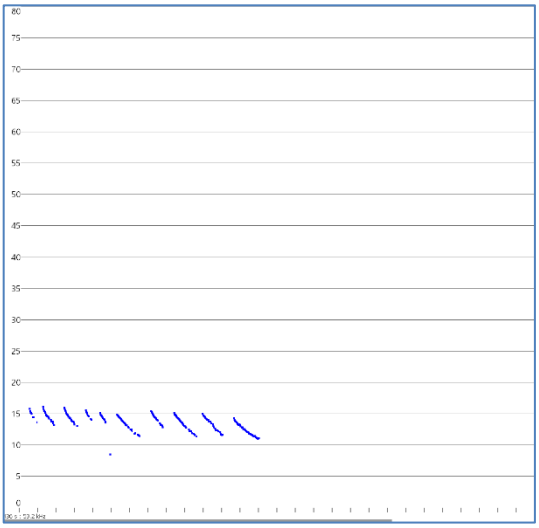
Miniopterus australis



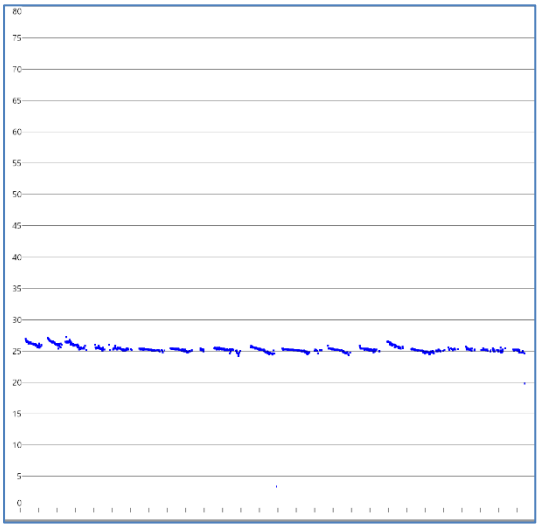
Miniopterus orianae oceanensis



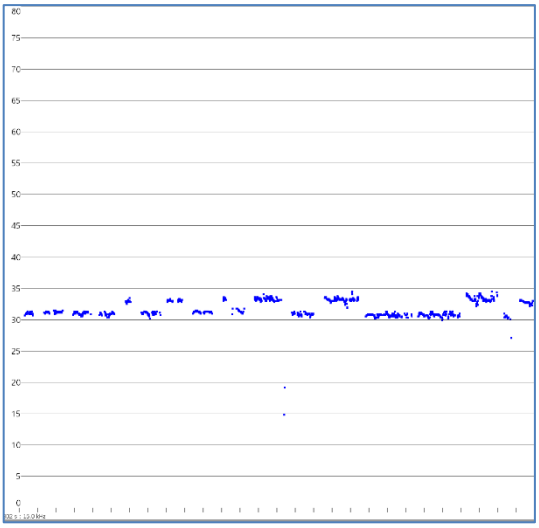
Rhinolophus megaphyllus



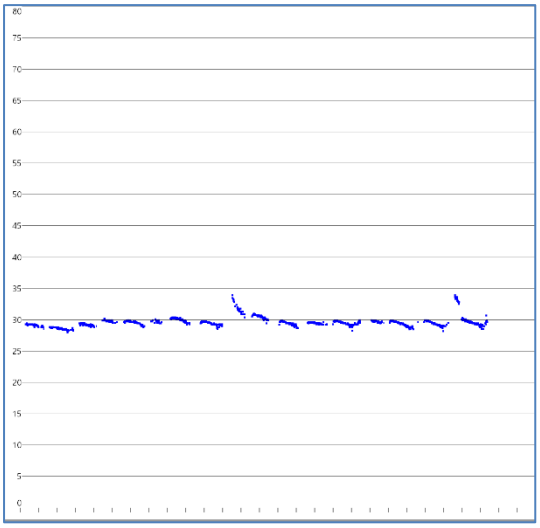
Austronomus australis



Ozimops planiceps



Micronomus norfolkensis



Ozimops ridei

Identification of echolocation call sequences recorded at Pokolbin and Watagans State Forest, New South Wales

Methods

Data

Data was received by hard drive in January of 2025. In total 66,390 WAV files were received, collected at three locations and 11 sites over 97 survey nights from the 17th November to the 18th December 2024 (Table 1).

Bat call analysis and species identification

Acoustic recordings made with Wildlife Acoustics Song Meter Mini-Bat-Full Spectrum (FS) Detectors. Files were initially filtered to exclude from further analysis any files containing only non-bat noise or bat calls with fewer than three identifiable pulses. A Decision Tree analysis was then applied to the files that passed the filter (i.e. contained potentially identifiable bat calls) to group and label files based on the average zero-crossing metrics (e.g. characteristic frequency, slope, duration) of the calls within each file using Anabat Insight v2.0.8. Please note that decision tree is based on the ZC metrics of each recording. All files were then checked and labelled manually.

Call identification was based on call keys and descriptions for bat species in New South Wales (Pennay et al. 2004), and with further reference to information on bat species in southern Queensland (Reinhold et al. 2001), plus the authors' own resource of echolocation recordings collected in southern Victoria (A. Lo Cascio unpublished data).

Nomenclature follows Jackson and Groves (2015). Identifications were supported by distribution information in a curated source of distribution records maintained by the Australasian Bat Society, Inc. (https://www.ausbats.org.au/batmap.html).

Results

If an identification could not be made unambiguously from this dataset, then presence of the species is regarded as a possibility, and presence should be assumed. Statements on species presence are based on this premise. If confirmation of the presence of any species listed here with an ambiguous identification is required, then further work would be necessary (see point 8 in the Limitations section).

Filtering marked 50,237 recordings as noise. In line with the scope of the project a species inventory per recording site was completed. Species complexes were identified only if they included a species not previously identified at a site and therefore should be taken as a presence.

The reliability of identifications attributed to bat species are defined as follows:

- Definite (D)—for call sequences that could be attributed unambiguously to the species.

- Probable (Pr)—for call sequences that are probably attributable to the species named, but with a low likelihood of an alternative attribution to another species that produces echolocation calls with similar characteristics.
- Possible (Po)—for call sequences that are possibly attributable to the species named, but with a moderate to high likelihood of an alternative attribution to another species that produces echolocation calls with similar characteristics.

Table 2 provides a summary of the presence of species at each site. Example spectrograms for species of conservation significance are provided in Appendix 1.

Table 1. Deployment summary

Location	Site	Serial	Latitude	Longitude	First night	Last night	Total nights
Pokolbin_SF_Nov_2024	Tower 60_SN583138	583138	-32.836427	151.208738	17/11/2024	21/11/2024	4
	Tower 64_SN583124	583124	-32.82654	151.20697	17/11/2024	21/11/2024	4
Song Meter Mini Bats_Watagans_SF_Nov-Dec_2024	Line 1 SN2967		*-34.93366*	*144.23102*	28/11/2024	11/12/2024	13
	Line 2 SN3042		*-34.88756*	*144.38042*	28/11/2024	11/12/2024	13
	Line 3 SN3131		*-34.92837*	*144.26198*	28/11/2024	12/12/2024	14
	Line 4 SN2965		*-34.86941*	*144.35172*	28/11/2024	11/12/2024	13
	Line 5 SN3044		*-34.89188*	*144.18261*	29/11/2024	13/12/2024	14
Watagans_SF_Dec_2024	0018 Tower 14 - collected 18.12.24	110018	-33.03336	151.31798	13/12/2024	18/12/2024	5
	3067 Tower 13 - collected 18.12.24	583067	-33.036563	151.32104	12/12/2024	16/12/2024	4
	3124 Tower 16 - collected 18.12.24	583124	-33.025715	151.306705	12/12/2024	19/12/2024	7
	3138 Tower 25 - collected 18.12.24	583138	-33.009675	151.265885	12/12/2024	18/12/2024	6

*Location values for Song Meter Mini Bats_Watagans_SF_Nov-Dec_2024 are incorrect. Information provided with the project facilitated correction.

Table 2. Species presence per site.

Location	Pokolbin_SF_Nov_2024		Song Meter Mini Bats_Watagans_SF_Nov-Dec_2024					Watagans_SF_Dec_2024			
Sites	Tower 60_SN583138	Tower 64_SN583124	Line 1 SN2967	Line 2 SN3042	Line 3 SN3131	Line 4 SN2965	Line 5 SN3044	0018 Tower 14 - collected 18.12.24	3067 Tower 13 - collected 18.12.24	3124 Tower 16 - collected 18.12.24	3138 Tower 25 - collected 18.12.24
Total files from client	4,993	2,242	10,550	4,003	10,016	6,825	5,919	7,293	4,000	3,531	7,018
Sum of noise	2,066	1,228	8,143	3,591	8,313	6,197	5,522	5,312	1,477	3,029	5,359
Austronomus australis	D	D	D					D	D	D	D
Saccolaimus flaviventris			Po								
Chalinolobus dwyeri	D	D	D		D			D		D	D
Ozimops planiceps	D		D	D				D	D		
Ozimops ridei	D	D	D	D				D	D	D	D
Micronomus norfolkensis	D	D	D	D			D	D	D	D	D
Chalinolobus gouldii	D	D	D				D	D	D	D	D
Scotorepens balstoni										Pr	
Scoteanax rueppellii	D		D				D	D	D		D
Falsistrellus tasmaniensis	D	D	D					D	D		D
Miniopterus orianae oceanensis									D		D
Nyctophilus spp./*Myotis macropus*			D			D		D	D	D	D
Vespadelus darlingtoni			D				D		D		D
Vespadelus regulus		D							D	D	D
Vespadelus vulturnus	D										
Chalinolobus morio	D	D							D	D	
Miniopterus australis	D	D								D	D
Rhinolophus megaphyllus	D		D	D	D			D	D	D	D
C. gouldii or O. ridei			Pr						Pr		
C. gouldii or S. balstoni	Pr										
Vespadelus spp. M.o. oceansis	Pr	Pr	Pr				Pr	Pr	Pr		Pr
Ozimops spp	Pr		Pr				Pr	Pr			
Vespadelus spp.@ 50 KhZ	Pr	Pr							Pr	Pr	Pr
Vespadelus spp./*C. morio*	Pr	Pr						Pr	Pr	Pr	Pr

Reliability of species identification for species of conservation significance.

Saccolaimus flaviventris

No echolocation sequence was attributed unambiguously to *S. flaviventris*. One sequence was inspected and manually identified as possibly belonging to the species. **This species was identified in this dataset.**

Chalinolobus dwyeri

This species can be identified reliably from representations in Zero Crossings format. The alternating pattern of high and low characteristic frequency in successive pulses is diagnostic. **This species was identified in this dataset.**

Micronomus norfolkensis

This species can be identified reliably from representations in Zero Crossings format. The alternating pattern of high and low characteristic frequency in successive pulses combined with the pulse shape (convex 'upside down cup shapes') is diagnostic, and attribution to this species was made for examples with these features. **This species was identified in this dataset.**

Scoteanax rueppellii

Scoteanax rueppellii can be distinguished by a frequency of 32 – 36 kHz, lack of a tail or short down-sweeping tail, frequency of the knee greater than 37 kHz, and drop of more than 3 kHz from the knee to the characteristic section. A longer pre-characteristic section can separate the species from *Falsistrellus tasmaniensis* at lower frequencies (below 36.5 kHz). **This species was identified in this dataset.**

Falsistrellus tasmaniensis

Clutter type calls where there was insufficient detail of the initial portion of the call or characteristic frequency (c. 35 kHz) to allow separation from *Scoteanax rueppellii* or *Scotorepens orion* were assigned to a complex group based on Fc. **This species was identified in this dataset.**

Miniopterus orianae oceanensis

The search phase echolocation calls of *M.o. orianae* sometimes have 'drooped' (decreasing frequency) terminations to pulses, but pulses also terminate abruptly without increasing or decreasing terminating frequency sweeps. The presence of echoes can make interpretations of the character of pulse terminations difficult, especially in Zero Crossings format. The frequency characteristics of the feeding buzz can also be used to separate Miniopterus from vespertilionids, but there are typically relatively few feeding buzz examples in a dataset. These features can be used in combination, when present, and as observed across several quality examples to make a relatively confident identification of *M. orianae* at a particular recording site. Other useful features for use in identification have been reported for Miniopterus species in the Solomon Islands (energy distribution at different points of the pulse; Pennay and Lavery 2017), but their applicability needs to be demonstrated further in Australia, as well as the degree to which such features are diagnostic. **This species was identified in this dataset**.

Myotis macropus/Nyctophilus species

Calls of *Myotis macropus*, and species of long-eared bat Nyctophilus spp. cannot always be separated reliably. These species are typically reported as a species complex. All calls within this dataset attributed to this complex were visually inspected. **This species was identified in this dataset.**

Vespadelus species including V. troughtoni

Within this region of New South Wales three Vespadelus species, Vespadelus vulturnus, V. troughtoni and V. pumilus are reported as having calls that overlap at ~ 50 kHz. Although V. pumilus is often seen calling a little higher. This species was identified in this dataset.

Miniopterus australis

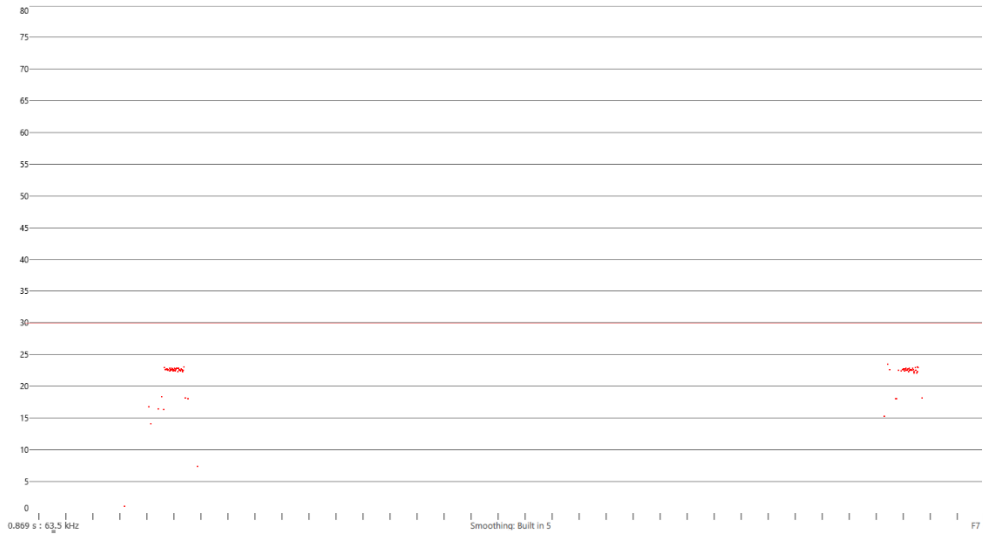
Highly distinctive calls with characteristic frequency 56-60kHz. Calls without clear definition could be confused with Vespadelus spp clutter calls, or Chalinolobus morio were calls appear to have a down sweeping tail. **This species was identified in this dataset**.

Limitations

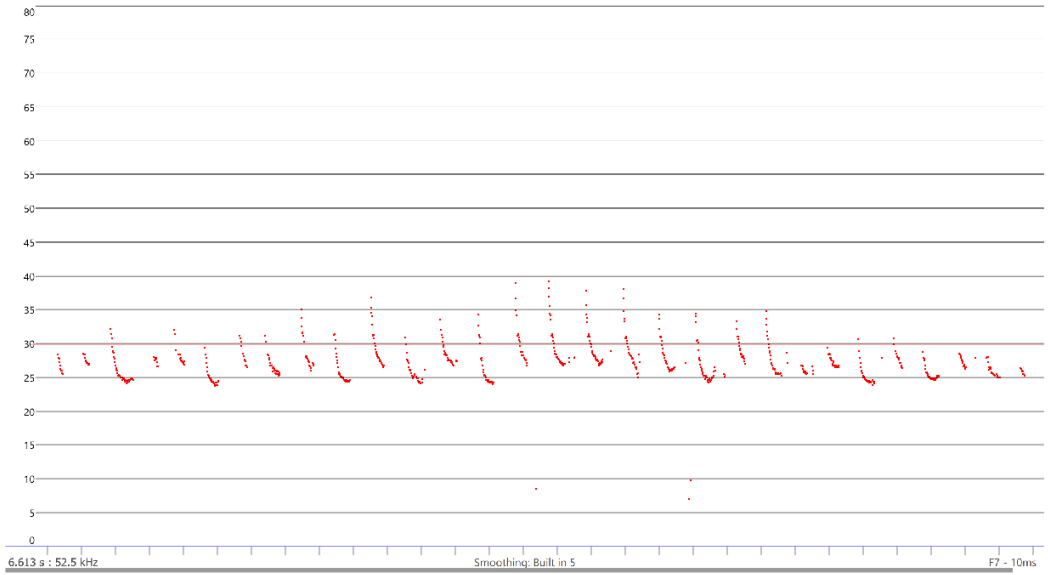
The identifications presented in this report have been made within the following context:

1. The identifications made herein were based on the ultrasonic acoustic data recorded and provided by WolfPeak.
2. The scope of this report extended to providing information on the identification of bat species in the recordings provided. Further comment on these species and the possible impacts of a planned project on bat species were not part of the scope.
3. In the case of the present report the equipment was operated by WolfPeak during the survey.
4. Other than the general location of the study area, Amanda Lo Cascio (ABN 59 357 037 376) has not been provided with detailed information of the survey area, has not made a visit to observe the habitats available for bats, nor have we visited the specific project areas on a previous occasion.
5. Amanda Lo Cascio (ABN 59 357 037 376) has had no input into the overall design and timing of this bat survey, recording site placement, nor the degree of recording site replication.
6. The identifications listed herein have been made to the best of our ability given the available materials, and we reserve the right to re-examine the data and revise any identification following a query. It is the client's and / or proponent's responsibility to provide supporting evidence for any identification, which might require follow-up trapping effort or non-invasive methods such as video recordings. Amanda Lo Cascio (ABN 59 357 037 376) bears no liability for any follow-up work that may be required to support an identification based initially on the analysis of acoustic recordings undertaken and reported on here.
7. There are a variety of factors that affect the 'detectability' of each bat species, given the frequency, power and shape characteristics of their calls. Further information on the analysis and the various factors that can impinge on the reliability of identifications can be provided upon request.
8. The analysis of ultrasonic recordings is one of several methods that can be used to survey for bats, and comprehensive surveys typically employ more than one method. If an identification in the present report is ambiguous or in question, a trapping programme would help to resolve the presence of the possibilities in the project area.
9. This version of the document supersedes any previous version. Previous drafts are not authorised by us for submission to the regulator or the public domain.

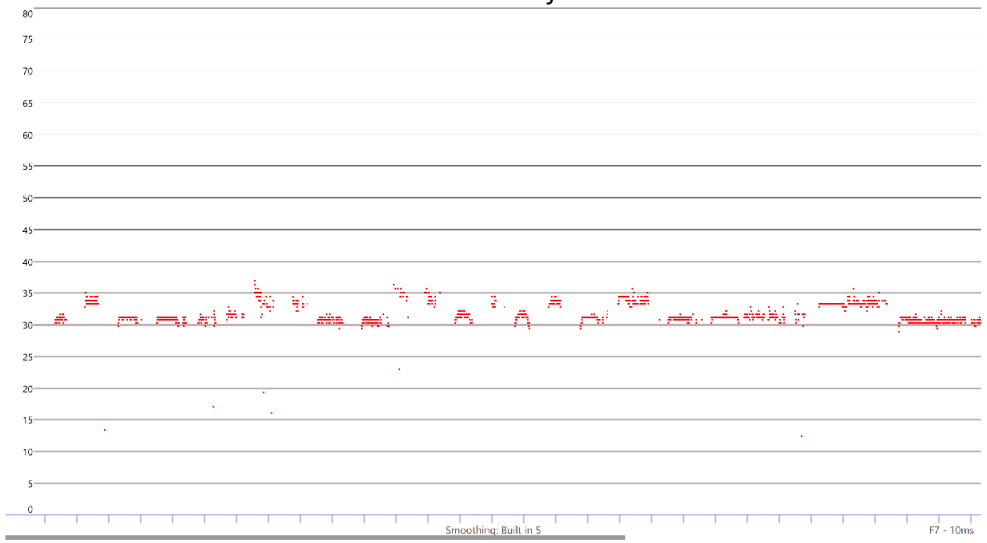
Appendix 1. Representative call sequences of species of conservation significance and Ozimops species phonic groups



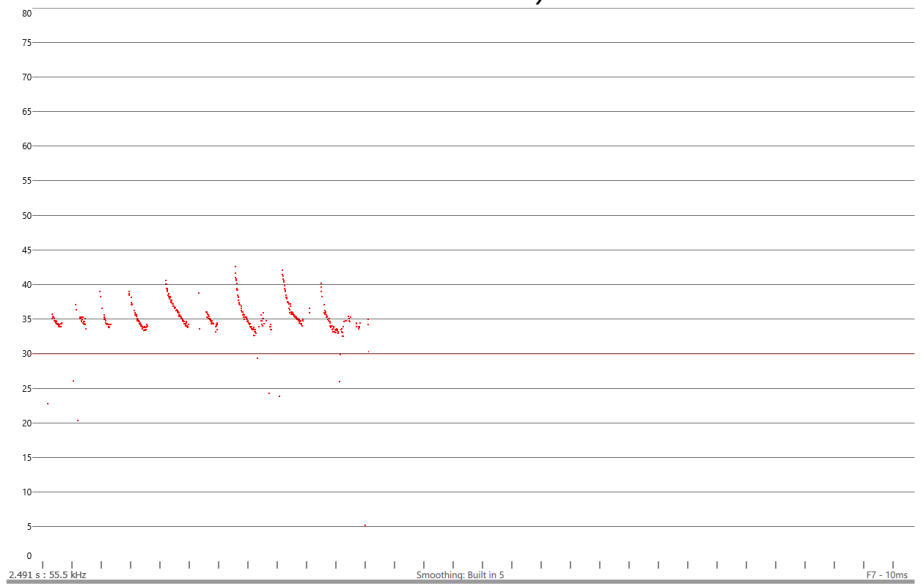
Possible *Saccolaimus flaviventris*



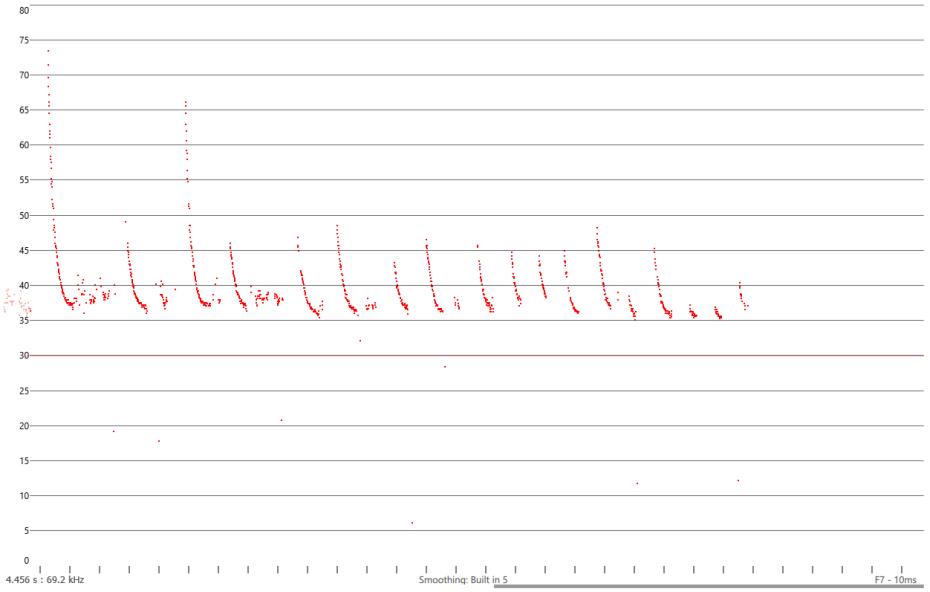
Chalinolobus dwyeri



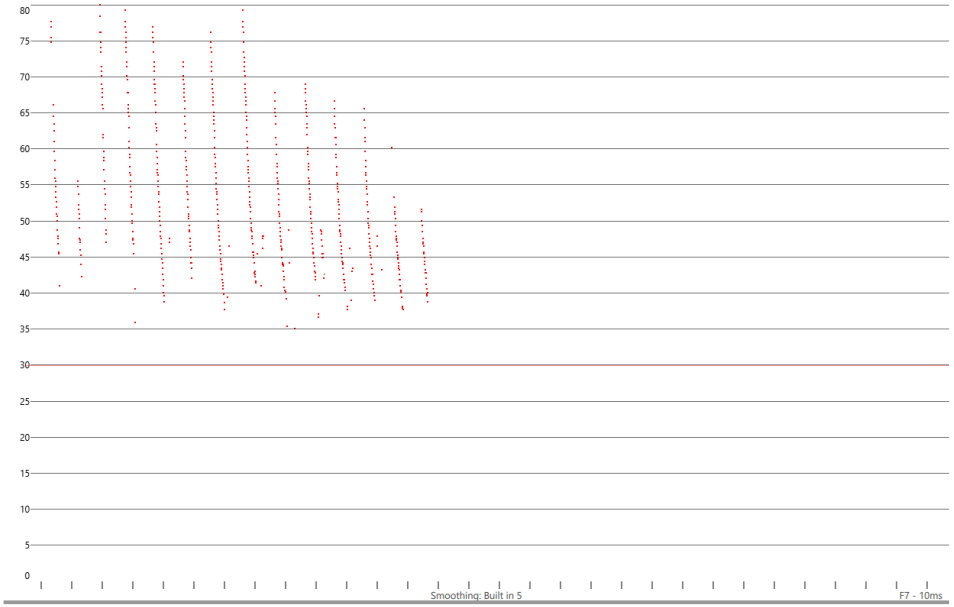
Micronomus norfolkensis



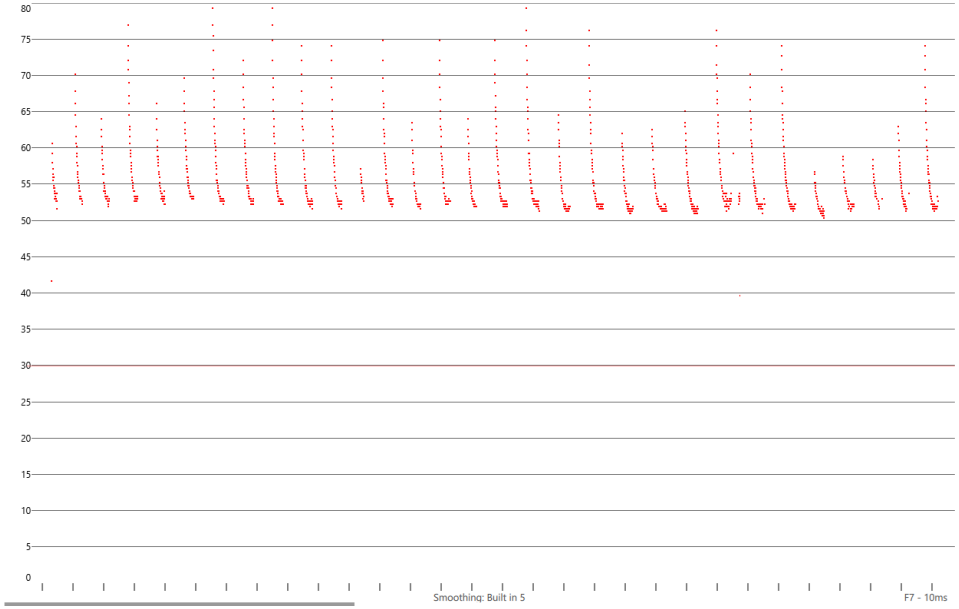
Scoteanax rueppellii



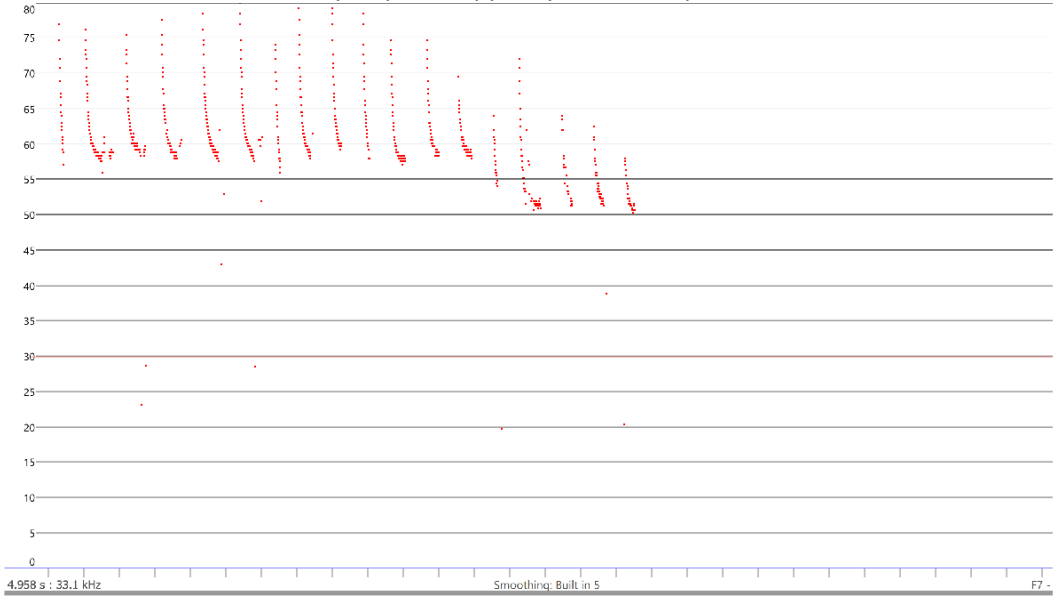
Falsistrellus tasmaniensis



Nyctophilus spp./*Myotis macropus*



Vespadelus spp@ *50 KhZ*



Miniopterus australis

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Appendix H

Recorded fauna

Table H.1 Fauna species list

Survey method	Common name	Scientific name
Anabat (Passive and Active)	Australasian bent-wing bat	*Miniopterus orianae oceanensis*
	Chocolate wattled bat	*Chalinolobus morio*
	Eastern Broad-nosed Bat	*Scotorepens orion*
	Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*
	Eastern false pipistrelle	*Falsistrellus tasmaniensis*
	Eastern Forest Bat	*Vespadelus pumilus*
	Eastern Free-tailed Bat	*Ozimops ridei*
	Eastern horseshoe-bat	*Rhinolophus megaphyllus*
	Gould's wattled bat	*Chalinolobus gouldii*
	Greater Broad-nosed Bat	*Scoteanax rueppellii*
	Inland Broad-nosed Bat	*Scotorepens balstoni*
	Large Forest Bat	*Vespadelus darlingtoni*
	Large-eared pied bat	*Chalinolobus dwyeri*
	Little bent-wing bat	*Miniopterus australis*
	Little Forest Bat	*Vespadelus vulturnus*
	Nyctophilus sp.	*Nyctophilus sp.*
	South-eastern Free-tailed Bat	*Ozimops planiceps*
	Southern Forest bat	*Vespadelus regulus*
	Southern Myotis	*Myotis macropus*
	White-striped free-tailed bat	*Austronomus australis*
Camera trap	Australian Brush-turkey	*Alectura lathami*
	Australian Bush Rat	*Rattus fuscipes*
	Australian King-Parrot	*Alisterus scapularis*
	Bassian Thrush	*Zoothera lunulata*
	Black Rat	*Rattus rattus*
	Brown antechinus	*Antechinus stuartii*
	Brush Turkey	*Alectura lathami*
	Brush-tailed Phascogale	*Phascogale tapoatafa*
	Cat	*Felis catus*
	Common Brush-tailed Possum	*Trichosurus vulpecula*
	Common Dunnart	*Sminthopsis murina*
	Common Planigale	*Planigale maculata*

Survey method	Common name	Scientific name
	Common Ring-tail Possum	*Pseudocheirus peregrinus*
	Common Wombat	*Vombatus ursinus*
	Cow	*Bos taurus*
	Dog	*Canis familiaris*
	Donkey	*Equus asinus*
	Eastern Grey Kangaroo	*Macropus giganteus*
	Eastern Striped Skink	*Ctenotus robustus*
	Eastern Whipbird	*Psophodes olivaceus*
	European hare	*Lepus europaeus*
	Feather-tail Glider	*Acrobates pygmaeus*
	Fox	*Vulpes vulpes*
	Grey Shrike-thrush	*Colluricincla harmonica*
	House Mouse	*Mus musculus*
	King Parrot	*Alisterus scapularis*
	Koala	*Phascolarctos cinereus*
	Lace Monitor	*Varanus varius*
	Long-nosed Bandicoot	*Perameles nasuta*
	Long-nosed Potoroo	*Potorous tridactylus*
	Mountain Dragon	*Rankinia diemensis*
	Northern Brown Bandicoot	*Isoodon macrourus*
	Painted Button-quail	*Turnix varius*
	Pied currawong	*Strepera graculina*
	Pig	*Sus scrofa*
	Pygmy Possum	*Cercartetus nanus*
	Rabbit	*Oryctolagus cuniculus*
	Red-necked Pademelon	*Thylogale thetis*
	Red-necked Wallaby	*Macropus rufogriseus*
	Short-beaked Echidna	*Tachyglossus aculeatus*
	Skink	*Lampropholis guichenoti*
	Southern Angle-headed Dragon	*Lophosaurus spinipes*
	Speckled Warbler	*Pyrrholaemus sagittatus*
	Spotted Black Snake	*Pseudechis guttatus*
	Spotted Quail-thrush	*Cinclosoma punctatum*

Survey method	Common name	Scientific name
	Spotted-tail Quoll	*Dasyurus maculatus*
	Sugar Glider	*Petaurus breviceps*
	Superb Fairy-wren	*Malurus cyaneus*
	Superb Lyrebird	*Menura novaehollandiae*
	Swamp Wallaby	*Wallabia bicolor*
	Tawny Frogmouth	*Podargus strigoides*
	Tree Skink	*Egernia striolata*
	Variegated Fairy Wren	*Malurus lamberti*
	White-browed Scrubwren	*Sericornis frontalis*
	White-throated Treecreeper	*Cormobates leucophaea*
	Wonga Pigeon	*Leucosarcia melanoleuca*
	Yellow-footed Antechinus	*Antechinus flavipes*
	Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*
	Yellow-throated Scrubwren	*Sericornis citreogularis*
Drone	Crimson Rosella	*Platycercus elegans*
	Eastern Grey Kangaroo	*Macropus giganteus*
	Feathertail Glider	*Acrobates pygmaeus*
	Fox	*Vulpes vulpes*
	Gang-gang Cockatoo	*Callocephalon fimbriatum*
	Glossy Black-Cockatoo	*Calyptorhynchus lathami*
	Grey-headed Flying-fox	*Pteropus poliocephalus*
	Koala	*Phascolarctos cinereus*
	Long-nosed Bandicoot	*Perameles nasuta*
	Northern Brown Bandicoot	*Isoodon macrourus*
	Parma Wallaby	*Macropus parma*
	Red-necked Wallaby	*Macropus rufogriseus*
	Ringtail Possum	*Pseudocheirus peregrinus*
	Short-beaked Echidna	*Tachyglossus aculeatus*
	Short-eared Brushtail Possum	*Trichosurus caninus*
	Southern Boobook	*Ninox boobook*
	Southern Greater Glider	*Petauroides volans*
	Squirrel Glider	*Petaurus norfolcensis*
	Sugar Glider	*Petaurus breviceps*

Survey method	Common name	Scientific name
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Superb Lyrebird	*Menura novaehollandiae*
	Swamp Wallaby	*Wallabia bicolor*
	Wedge-tailed Eagle	*Aquila audax*
	Yellow-bellied Glider	*Petaurus australis*
	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*
Frog surveys	Giant Barred Frog	*Mixophyes iteratus*
	Giant Burrowing Frog	*Heleioporus australiacus*
	Green and Golden Bell Frog	*Litoria aurea*
	Green Stream Frog	*Litoria phyllochroa*
	Green-thighed Frog	*Litoria brevipalmata*
	Littlejohn's Tree Frog	*Litoria littlejohni*
	Blue Mountains Tree Frog	*Litoria citropa*
	Red-crowned toadlet	*Pseudophryne australis*
	Southern Stuttering Frog	*Mixophyes australis*
	Striped Marsh Frog	*Limnodynastes peronii*
	Stuttering Frog	*Mixophyes balbus australis*
Harp trap	Chocolate Wattled Bat	*Chalinolobus morio*
	Eastern Broad-nosed Bat	*Scotorepens orion*
	Eastern Cave Bat	*Vespadelus troughtoni*
	Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*
	Eastern Forest Bat	*Vespadelus pumilus*
	Eastern Free-tailed Bat	*Ozimops ridei*
	Eastern Horseshoe Bat	*Rhinolophus megaphyllus*
	Gould's Long-eared Bat	*Nyctophilus gouldii*
	Gould's Wattled Bat	*Chalinolobus gouldii*
	Greater Broad-nosed Bat	*Scoteanax rueppellii*
	Large-eared Pied Bat	*Chalinolobus dwyeri*
	Large Forest Bat	*Vespadelus darlingtoni*
	Lesser Long-eared Bat	*Nyctophilus geoffroyi*
	Little Forest Bat	*Vespadelus vulturnus*

Survey method	Common name	Scientific name
Opportunistic sightings and bird surveys	Australian Brush-turkey	*Alectura lathami*
	Australian Boobook	*Ninox boobook*
	Australian King-Parrot	*Alisterus scapularis*
	Australian Magpie	*Cracticus tibicen*
	Australian Owlet-nightjar	*Aegotheles cristatus*
	Australian Raven	*Corvus coronoides*
	Bandicoot sp.	*Perameles*
	Bassian Thrush	*Zoothera lunulata*
	Bell Miner	*Manorina melanophrys*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Black-faced monarch	*Monarcha melanopsis*
	Black Rat	*Rattus rattus*
	Black-soled Frog	*Lechriodus fletcheri*
	Bleating Tree Frog	*Litoria dentata*
	Blue Mountains Tree Frog	*Litoria citropa*
	Broad-palmed Frog	*Litoria latopalmata*
	Broad-tailed Gecko	*Phyllurus platurus*
	Brown Antechinus	*Antechinus stuartii*
	Brown cuckoo-dove	*Macropygia phasianella*
	Brown Gerygone	*Gerygone mouki*
	Brown Thornbill	*Acanthiza pusilla*
	Brown Tree Snake	*Boiga irregularis*
	Brown-headed Honeyeater	*Melithreptus brevirostris*
	Buff-rumped Thornbill	*Acanthiza reguloides*
	Bush Rat	*Rattus fuscipes*
	Carpet Python	*Morelia spilota*
	Cicadabird	*Coracina tenuirostris*
	Common Brushtail Possum	*Trichosurus vulpecula*
	Common Eastern Froglet	*Crinia signifera*
	Common Ringtail Possum	*Pseudocheirus peregrinus*
	Common wallaroo	*Osphranter robustus*
	Common Wombat	*Vombatus ursinus*
	Copper-tailed Skink	*Ctenotus taeniolatus*

Survey method	Common name	Scientific name
	Crimson Rosella	*Platycercus elegans*
	Delicate skink	*Lampropholis delicata*
	Eastern Barn Owl	*Tyto javanica*
	Eastern Dwarf Tree Frog	*Litoria fallax*
	Eastern Koel	*Eudynamys orientalis*
	Eastern Pobblebonk	*Limnodynastes dumerilii*
	Eastern Rosella	*Platycercus eximius*
	Eastern Small-eyed Snake	*Cryptophis nigrescens*
	Eastern Spinebill	*Acanthorhynchus tenuirostris*
	Eastern Stone Gecko	*Diplodactylus vittatus*
	Eastern Stony Creek Frog	*Litoria wilcoxii*
	Eastern Water Dragon	*Intellagama lesueurii*
	Eastern Water Skink	*Eulamprus quoyii*
	Eastern Whipbird	*Psophodes olivaceus*
	Eastern Yellow Robin	*Eopsaltria australis*
	Emerald-spotted Tree Frog	*Litoria peronii*
	Fan-tailed Cuckoo	*Cacomantis flabelliformis*
	Fox	*Vulpes vulpes*
	Gang-gang Cockatoo	*Callocephalon fimbriatum*
	Garden Skink	*Lampropholis guichenoti*
	Giant Barred Frog	*Mixophyes iteratus*
	Glossy Black-Cockatoo	*Calyptorhynchus lathami*
	Golden Whistler	*Pachycephala pectoralis*
	Golden-crowned Snake	*Cacophis squamulosus*
	Grass Skink	*Lampropholis delicata*
	Great Barred Frog	*Mixophyes fasciolatus*
	Greater Glider	*Petauroides volans*
	Green Catbird	*Ailuroedus crassirostris*
	Grey butcherbird	*Cracticus torquatus*
	Grey Fantail	*Rhipidura albiscapa*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Grey-crowned babbler	*Pomatostomus temporalis*
	Haswell's Frog	*Paracrinia haswelli*

Survey method	Common name	Scientific name
	Jacky Dragon	*Amphibolurus muricatus*
	King Parrot	*Alisterus scapularis*
	Lace Monitor	*Varanus varius*
	Large-billed Scrubwren	*Sericornis magnirostra*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Leaden flycatcher	*Myiagra rubecula*
	Leaf Green Tree Frog	*Litoria phyllochroa*
	Leaf-tailed gecko	*Saltuarius cornutus*
	Lesueur's Velvet Gecko	*Amalosia lesueurii*
	Lewins honeyeater	*Meliphaga lewinii*
	Little lorikeet	*Glossopsitta pusilla*
	Littlejohn's Tree Frog	*Litoria littlejohni*
	Long-nosed Bandicoot	*Perameles nasuta*
	Masked Lapwing	*Vanellus miles*
	Mountain Dragon	*Rankinia diemensis*
	New Holland Honeyeater	*Phylidonyris novaehollandiae*
	Noisy Friarbird	*Philemon corniculatus*
	Noisy Miner	*Manorina melanocephala*
	Noisy Pitta	*Pitta versicolor*
	Owlet Nightjar	*Aegotheles cristatus*
	Pacific Black Duck	*Anas superciliosa*
	Peron's Tree Frog	*Litoria peronii*
	Pied Butcherbird	*Cracticus nigrogularis*
	Pied Currawong	*Strepera graculina*
	Powerful Owl	*Ninox strenua*
	Purple Swamphen	*Porphyrio porphyrio*
	Rainbow Lorikeet	*Trichoglossus haematodus*
	Red Wattlebird	*Anthochaera carunculata*
	Red-backed Toadlet	*Pseudophryne coriacea*
	Red-bellied Black Snake	*Pseudechis porphyriacus*
	Red-browed Finch	*Neochmia temporalis*
	Red-crowned Toadlet	*Pseudophryne australis*
	Red-necked Pademelon	*Thylogale thetis*

Survey method	Common name	Scientific name
	Red-necked wallaby	*Notamacropus rufogriseus*
	Rockwarbler	*Origma solitaria*
	Rose Robin	*Petroica rosea*
	Rufous Whistler	*Pachycephala rufiventris*
	Satin Bowerbird	*Ptilonorhynchus violaceus*
	Scarlet Honeyeater	*Myzomela sanguinolenta*
	Screaming Tree Frog	*Litoria quiritatus*
	Shining Bronze-Cuckoo	*Chrysococcyx lucidus*
	Short-beaked Echidna	*Tachyglossus aculeatus*
	Silvereye	*Zosterops lateralis*
	Sooty Owl	*Tyto tenebricosa*
	Southern Boobook	*Ninox novaeseelandiae*
	Southern Long-nosed Bandicoot	*Perameles nasuta*
	Southern Stuttering Frog	*Mixophyes australis*
	Spotted Pardalote	*Pardalotus punctatus*
	Spotted Quail-thrush	*Cinclosoma punctatum*
	Spotted-tailed Quoll	*Dasyurus maculatus*
	Stephens' Banded Snake	*Hoplocephalus stephensii*
	Striated Thornbill	*Acanthiza lineata*
	Striped Marsh Frog	*Limnodynastes peronii*
	Sugar Glider	*Petaurus breviceps*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Superb Fairy-wren	*Malurus cyaneus*
	Superb Lyrebird	*Menura novaehollandiae*
	Swamp wallaby	*Wallabia bicolor*
	Thick-tailed Gecko	*Underwoodisaurus milii*
	Three-toed skink	*Saiphos equalis*
	Tree Martin	*Petrochelidon nigricans*
	Tusked Frog	*Adelotus brevis*
	Variegated Fairy-wren	*Malurus lamberti*
	Water-rat	*Hydromys chrysogaster*
	Weasel Skink	*Saproscincus mustelinus*
	Wedge-tailed Eagle	*Aquila audax*

Survey method	Common name	Scientific name
	Welcome Swallow	*Hirundo neoxena*
	Whistling Tree Frog	*Litoria verreauxii*
	White-browed Scrubwren	*Sericornis frontalis*
	White-cheeked Honeyeater	*Phylidonyris niger*
	White-eared Honeyeater	*Lichenostomus leucotis*
	White-naped Honeyeater	*Melithreptus lunatus*
	White-necked Heron	*Ardea pacifica*
	White-throated Needletail	*Hirundapus caudacutus*
	White-throated Nightjar	*Eurostopodus mystacalis*
	White-throated Treecreeper	*Cormobates leucophaea*
	Wombat	*Vombatus ursinus*
	Wonga Pigeon	*Leucosarcia melanoleuca*
	Yellow-bellied Glider	*Petaurus australis*
	Yellow-faced honeyeater	*Caligavis chrysops*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Yellow-tailed black-cockatoo	*Calyptorhynchus funereus*
	Yellow-throated Scrubwren	*Sericornis citreogularis*
Tiles	Common Planigale	*Planigale maculata*
	Olive Delma	*Delma inornata*
	Hunter Valley Delma	*Delma vescolineata*

Appendix I

Powerline impacts on birds and ameliorative measures

I1 Introduction

Ecologically, birds encounter power transmission infrastructure in 2 broad ways, as landscape features occurring in their resident territories, whether those territories are permanent or seasonal, or as unfamiliar features they encounter during long or short-distance movements. For birds which migrate, both broad types of power transmission infrastructure interaction may apply during different periods of their lifecycle.

The distinct types of impacts power transmission infrastructure represent to birds also fall into 2 broad categories; impacts associated with the power being carried through the infrastructure and impacts the infrastructure represents as collision risks. The different ways birds encounter power transmission infrastructure determines the type of risk infrastructure will represent to them.

The potential effects of power carried by electrical infrastructure are more likely to affect birds that are familiar with the infrastructure, and who use it on a day to day basis, while the collision risks power transmission infrastructure represents to birds are more likely to affect those birds that are unfamiliar with its presence or distracted by important behaviours.

Both behavioural groups may be at risk from electrocution, for the same 2 behavioural reasons, both familiarity and ignorance.

Collision risk also represents a significant hazard to birds that are familiar with power infrastructure at a given location, just as humans might fall foul of familiar hazards due to concentration distractions. For example, while birds are defending territories, hunting, are being hunted, or aerial displaying, they will naturally be more susceptible to collisions with infrastructure that is usually familiar to them and otherwise avoided, particularly if the obstacles have some degree of detection difficulty.

I2 Power transmission and electric and magnetic fields

Electricity is generated from both natural and artificial sources. Extremely low frequency (ELF) electrical and magnetic fields (EMF) are those that fall within the 0–3000 hertz frequency range. ELF EMF's exist wherever electricity is generated, transmitted or distributed in power lines or cables, or used in electrical appliances (arpansa 2020). Although ELF EMF's are sometimes produced through natural processes, artificial sources are the most common sources of ELF EMF and are generally a product of the generation, distribution and use of electricity at the frequency of 50 hertz in Australia or 60 hertz in some other countries (arpansa 2020). The electrical component of ELF EMF is formed by voltage, but current produces the magnetic field component of ELF EMF (arpansa 2020).

The level of electrical fields is measured in thousands (k) of volts (V) per (/) metre (m), kV/m or just as V/m. The level of magnetic fields is measured in units of amperes (A) per (/) metre (m), A/m, however it is often denoted by its magnetic flux density quantified in units of tesla (T) or microtesla (µT). Another unit that is often applied to the quantification of magnetic fields is the gauss (G) or milliGauss (mG), where one gauss is equal to 10^{-4} T (or 1 mG = 0.1 µT) (arpansa 2020).

I2.1 ELF EMF and birds

It is widely known and observed that, of all fauna groups, birds most regularly use electrical power lines, and their associated infrastructure, such as proposed transmission line towers and poles, for perching and nesting. The reasons bird species use tall structures, such as electrical transmission infrastructure include:

- increased separation from terrestrial threats
- as vantage points to allow early detection of airborne and terrestrial threats
- for a commanding view over a patch of hunting territory
- for the defence and proclamation of breeding territories, and
- as safe elevated locations to build nests and raise their young.

The use of power lines does not extend across all bird species, as the open spaces in which aerial power infrastructure are located is too exposed for many bird species, especially smaller cover preferring bird groups. Therefore, the most common powerline using groups are birds that use open and aerial habitats.

The infrastructure of electricity transmission is often desirable as nesting locations for large species, such as birds of prey and the corvids (ravens and crows), due to their propensity to build on high landscape features in otherwise open habitats.

While several small open country birds, such as larks, pipits and finches have been observed to use power lines through direct observations, there appears to be a reduced use of the tallest power infrastructure by such species, due to the considerable expenditure of energy required to reach it and the considerable separation it represents from their territories.

Aerial foraging species, such as dollarbirds, bee-eaters, swallows, martins and woodswallows are also frequent users of electricity infrastructure for resting or as hunting vantage points, however, the insect prey that this group targets can often be in greater densities closer to the ground, and so lower perches are more desirable when available.

Therefore, as the distance between vegetation from associated electricity infrastructure increases, many smaller bird species appear less likely to use it, particularly when lower and less exposed options are present in their habitats.

In wooded habitats where vegetation heights more closely approach the height of power lines, avifauna appear more likely to use them, due to the increased opportunity to perch on power infrastructure where it is more accessible, because of greater adjacent canopy heights.

Apart from those birds that use power infrastructure as perching opportunities, a small group of birds also use power infrastructure for nesting sites. Birds of prey, storks and cranes, and the corvids are the groups that are most likely to use the tallest power line infrastructure for nesting purposes.

I3 Effects of electric and magnetic fields on birds

Considerable research has been undertaken to determine if there are any significant effects from EMF upon living organisms, including birds. Several scientific papers have endeavoured to determine if there are changes to bird biology because of proximity to EMF with few undertaken on wild birds outside of laboratory contexts. Nevertheless, there are some studies which have tested the effects of EMFs on wild birds.

In their 2005 review paper, Fernie and Reynolds (2005) observe that electrical power lines are widely used throughout the developed world, and that, all electric currents, including those conducted by electrical power lines, produce electric and magnetic fields (EMFs). They note that, due to their propensity to use power line infrastructure, some birds, like humans, are exposed to EMFs throughout their lives. They also note that EMFs have been, not without controversy, implicated in adversely affecting different components of human health, and that past and ongoing laboratory research have used mammal and bird surrogates to determine if EMFs may adversely affect key life systems in humans. Their 2005 review, draws on previous EMF research on effects to wild and aviary kept birds, to determine if this body of work might contribute to the current knowledge on EMF potential to adversely affect humans. They found that the majority of studies found when birds are subjected to EMFs, changes are observed in; bird behaviour, reproductive success, growth and development, physiology and endocrinology, and oxidative stress, although not always with a consistent effect or direction (Fernie and Reynolds 2005).

Fernie et al. (1999) observe that some bird groups reproduce within EMFs from transmission lines, and that critical survival processes are dependent on melatonin, while melatonin has only been equivocally suppressed by EMFs in mammalian species. They erected a study to examined whether EMFs affect photophasic plasma melatonin in adult and fledgling American Kestrels (*Falco sparverius*) during short-term (one breeding season) and long-term (2 breeding seasons) breeding behaviours, and compared the results to observed changes in body mass. The study included kestrels subjected to EMF effects and a control group of kestrels (56 pairs in all) against which results could be compared. They found that EMFs affected plasma melatonin in male kestrels, by suppressed plasma values at 42 days and elevated plasma values at 70 days of EMF exposure. The 42 day melatonin levels in EMF males were the same levels as 70 day control males, suggesting a seasonal phase-shift in melatonin profile due to EMF exposure. Melatonin levels were also suppressed in long-term fledglings but not short-term fledglings or females. They propose higher levels of melatonin in male kestrels than females may affect the sexually different results to EMF exposure. Results found that melatonin levels were not correlated to body-mass in American Kestrels and it was considered likely that results returned by the study are relevant to wild raptors nesting within EMFs (Fernie et al. 1999).

Fernie et al. (2000a) observed that although there was documentation of reduced avian reproductive success when associated with power lines, such impacts had not been directly attributable to EMFs. They also noted that while laboratory studies had been undertaken to determine the effects of EMFs on embryonic development, such studies were unable to test the effects of EMFs on other factors that affect breeding success in wild birds, such as fertility, egg size, hatching, and fledgling success. In response, they undertook a study to determine the effect of EMFs on the reproductive success on birds, using captive American Kestrels (*Falco sparverius*) over 2 consecutive annual breeding seasons. The kestrels were separated into separate control and EMF effect groups. EMF exposure was set to the same levels as would be experienced by wild breeding kestrels and weakly correlated with a reduction in egg laying in only the first year. In both breeding events pairs subjected to EMF exposure, experienced higher fertility and lower hatching success than control pairs. Fledgling success was higher for EMF subjected pairs than control pairs in only one of the breeding events. In a single year when egg composition and embryonic development were examined, eggs were larger, with more yolk, albumen, and water, but exhibited thinner egg shells than control eggs. Late-term EMF embryos were larger and longer than control embryos, although hatchlings were similar in body mass and size (Fernie et al. 2000a).

For their study Fernie et al. (2000a) found that there was a different result in reproductive success in EMF exposed kestrels, resulting in increased fertility, egg size, embryonic development and fledgling success and reducing hatching success when compared to control kestrels.

Fernie et al. (2000b) note that wild birds particularly raptors use electrical transmission infrastructure for perching, hunting, roosting nesting, and consequently are exposed to EMFs. They determined the time periods wild American Kestrels (*Falco sparverius*) were exposed to EMFs from 735-kV power lines, so that the effect of EMFs on the behaviour of captive breeding kestrels could be studied. During their study they found that wild kestrels were exposed to EMFs for 25% to 75% of the observation periods. Over a 24 hr period, it was estimated that EMF exposure to wild kestrels ranged from 71% during courtship, to 90% during incubation, which was comparable to the exposure figures (88%) that captive breeding kestrels were subjected to. The results found that captive female EMF kestrels exhibited increased activity and alertness, and, in comparisons to control females, perched more often on the pen roof. EMF female kestrels were observed to preen and rest less often during the rearing of their broods. As with female EMF kestrels, male EMF kestrels were observed to be more active than control males during courtship, and more alert during incubation. The observed behavioural changes in breeding EMF kestrels were unlikely to contribute to increased growth of nestlings or increase the survival rates of fledglings, or reduce hatching success, though previously reported as such Fernie et al. (2000b). Fernie et al. (2000b) note that behavioural changes observed in captive EMF kestrels may be observed in wild kestrels.

Fernie and Bird (2001) observe that exposure to EMFs alters melatonin, behaviour, growth, and reproduction of captive American Kestrels (*Falco sparverius*), particularly males. Therefore, they undertook a study to determine whether EMF exposure triggers an avian immune response and alters oxidative stress levels. Captive kestrels were bred under control or EMF conditions at levels similar to those wild kestrels are subject to. They found that short-term (single breeding season) exposure to EMFs suppressed plasma total proteins, hematocrits and carotenoids in the first half of the breeding cycle, as well as suppressing erythrocyte cells and lymphocyte proportions at the end of the breeding season. Long-term (2 breeding seasons) studies also resulted in a suppression of hematocrits in the first half of the reproductive. The study deduced that the elevation of granulocytes, and the suppression of carotenoids, total proteins, and previously melatonin in the same kestrels, signified that the short-term EMF male kestrels had higher level of oxidative stress, due to an immune response and/or EMF exposure and that long-term EMF exposure may be linked to higher levels of oxidative stress through EMF exposure alone (Fernie and Bird 2001).

In a study conducted over 9 breeding seasons, Tomas et al. (2012) note that within a single population of Great Tits (*Parus major*), breeding occurrences subjected to the effects of EMF exposure showed an increase in clutch size (7%) and an increase in egg volume (3%). Although the study showed that there was an increase in both clutch size and egg volume the overall average productivity as a function of fledgling and reproductive success, including nestling body mass, did not exhibit any change. In comparison to Great Tit breeding events not associated with artificial EMF influences, researchers noted Great Tit breeding events subjected to artificial EMF's influences realise the same breeding success, but with a greater expenditure of energy resources (Tomas et al. 2012).

I4 Power transmission line bird strike

Bernardino et al. (2018) observe that growing global energy demands are causing worldwide increases in electrical infrastructure, representing significant negative impacts to biodiversity, predominantly birds.

They undertook a systematic review of available literature, dealing with bird power line related collisions, with attention to specific areas of previous research, including:

- an assessment of overall trends in scientific research in recent decades
- a review of existing knowledge of bird collision factors, as well as their effectiveness in reducing collision risk; including
  - species-specific factors (e.g. vision, morphology)
  - site-specific factors (e.g. topography, light and weather conditions, and anthropogenic disturbance), and
  - power line-specific factors (e.g. number of wire levels, wire height and diameter)
- an evaluation of existing mitigation measures (e.g. power line routing, underground cabling, power line configuration, and wire marking), as well as their effectiveness in reducing collision risk (Bernardino et al. 2018).

The Bernardino et al. (2018) review concluded:

- a general paucity of specific scientifically tested information regarding factors leading to bird power line collision
- there are few studies conducted in Asia, Africa, and South America
- several suggested methods of good practice were not at the time of publication, supported by scientific evidence.

Gap analysis undertaken by the Bernardino et al. (2018) study identified 3 key directions for future research, innovation, and scientific testing of current impact avoidance methodologies:

1. Bird behaviour – including the use of data loggers and sensors
2. Impact assessment – the identification and understanding of specific drivers at mortality hotspots, assessment of population-level impacts, development of methods for automatic detection of bird impacts
3. Mitigation measures – outlining a greater need for BACI level studies to determine the effectiveness of different wire- marking/bird avoidance devices and strategies.

They conclude by observing that, globally, the predictiveness and effectiveness of bird power line impact and mitigation, is compromised by a general lack of understanding about the regionally specific complexity of bird ecologies and how they interact with different collision drivers (Bernardino et al. 2018).

In a review of 14 studies, qualified by specific inclusion criteria, Loss et al. (2014) estimated that between 12 and 64 million birds are killed each year in the United States (U.S.) through power line associated fatalities. Eighty-nine percent (89%) of the bird fatalities were attributable to collision mortality, the remaining 11% were caused by electrocution. Variations in mortality rates were a product of the relatively small number of rigorous studies available that deal with the study of bird mortality. The review found that while there is a general dearth of studies, and most were limited in scope (relating to diversity of species, habitat types and locations), the data collected showed that bird mortality associated with power lines in the U.S. is substantial and requires conservation management and policies to lower mortality rates (Loss et al. 2014).

I5 Power transmission line impacts and the project

I5.1 Collision risks

I5.1.1 Alignment geographical context

The project will connect a new overhead 500 kV transmission line between 2 new 500 kV substations at Bayswater and in Olney State Forest. The new substations will be connected to the existing 500 kV transmission lines near Bayswater and Eraring to unlock electricity supply from the Central West Orana and New England Renewable Energy Zones.

From the new 500 kV Bayswater substation, the line will maximise use of existing disturbed mining areas to run south-easterly to Lemington before making several crossings of the Hunter River to pass through the Hunter Valley Operations (HVO) coal mine between the HVO North and HVO South operational areas. The line then heads southeast crossing Wollombi Brook and avoiding vegetation constraints in Gouldsville. The line continues southward through Mount Thorley, keeping east of Jerrys Plains Road, and into Broke, crossing Putty Road, a rail corridor, and Broke Road. The line navigates around Bulga Coal mine operations, continuing south to cross over the existing 330 kV lines – Lines 81 and 82, and then co-locates for approximately 4.5 kilometres.

The line then continues south to maximise the use of public land into Pokolbin State Forest, emerging just east of Cedar Creek near Wollombi. It then traverses the Corrabare State Forest and across the Watagans through Watagan State Forest and Olney State Forest before truncating at the new 500 kV Olney substation and connection to the existing Eraring-Kemps Creek double circuit 500 kV transmission line.

The subject land is located within the Hunter-Central Rivers catchment. The subject land crosses several poor to good quality watercourses including the Hunter River.

Watercourses include the upper catchments of Wollombi Brook, which flow towards the north, and crossing the subject land again just before entering the Hunter River near Warkworth.

Additionally, sections of the Dora Creek catchment cross through areas of national parks and State forest throughout the southeast end of the subject land. This catchment ends within Lake Macquarie, with the other catchments of the subject land flowing through the Hunter River and into the Tasman Sea at Newcastle (NSW DPI 2006).

The catchments within the subject land have been impacted from a mixture of rural activities, forestry, urban development and mining. These activities have modified the natural aquatic environment substantially, including major infrastructure developments, roads, rail and agriculture.

The lower catchments of Wollombi Brook consist of gently sloping rural land that is largely cleared. Land use in the subject land from the northwest end to the southeast before Pokolbin State Forest consists mostly of cleared rural properties and coal mines. Very few patches of remnant bushland occur within this section of the catchment area. The subject land is dominated by surface runoff from rainfall which concentrates into defined watercourse catchments.

Historic records of rainfall and flood events indicates that runoff is typically confined to the main channels and relatively quickly flow down to the lower portions of the catchments in the subject land. Water quality, quantity and velocity of flows within the subject land have been influenced by agricultural activities. Vegetation removal, agriculture, de-snagging, and construction of in-stream dams has affected the physical stability of the watercourses within the subject land and streambank erosion is common, particularly in the north of the subject land.

I5.1.2 Migratory and nomadic birds

Australia provides important seasonal and stochastic weather derived resources for many bird species from a range of bird groups. International migrant wader species, many from the northern hemisphere visit Australia during the austral summer, with some age cohorts overstaying the austral winter, while some New Zealand bird species visit Australia during the austral winter to escape New Zealand's cooler winter conditions.

Many passerines which breed in southern Australia, winter in northern Australia and New Guinea where food is more readily available during the winter months.

Large numbers of resident water birds are attracted to the ebb and flow of water levels between regional and State level distributions, which often entail long-distance movements to and from ephemeral wetlands.

Apart from migratory movements, many birds move regionally or within their established territories during the seeking of food or for territorial defence.

Not all movements by birds are undertaken during day as some birds move non-stop for days, as is the case with international migrants, and others move at night to avoid predators. A number of waterbirds and shorebirds have been observed to undertake movements from one wetland habitat to another during nocturnal hours (Richardson 2016a). During winter occupation of the Hunter River estuary, migratory wading birds were observed to move equally during day and night periods, as a response to the availability of foraging areas and the need to access roosting areas during high tide levels (Richardson 2004). Long distance movements, representing 1,000's of kilometres, by a number of shorebird species take place continuously without breaks throughout nocturnal and diurnal hours (Battley et al. 2012). McEvoy (2015) observed that long distance movements undertaken by radio-tracked South Australian Pacific Black Ducks, in response to moderate to high rainfall events, were almost exclusively undertaken during nocturnal hours. During the Pacific Black Duck study, reasons for nocturnal movements could not be clearly determined, although avoidance of diurnal avian predators, which are key predators of waterbirds and shorebirds, were cited as a likely incentive to avoiding long distance movements during the day (McEvoy 2015). Birds of prey were observed to be the major predatory risk for diurnal shorebirds in a study of wintering shorebirds in the Hunter River Estuary (Richardson 2004; Richardson 2016c).

Other groups of birds prone to nomadic movements are also likely to be at risk of collision, such as the larger birds of prey. While possessing excellent eyesight, birds of prey are at risk of power line strike as a consequence of their potential to strike obstacles before them when searching the ground for prey and the location of power lines within elevations where they fly.

While most birds of prey are not usually migratory, many periodically move in relation to variations in productivity (i.e. prey availability). Birds of prey respond by moving to areas where greater productivity increases survival and breeding-cycle success. A limited number of larger birds of prey, with some of the largest wingspans (WS) of Australia's birds, have been observed or are expected to regularly occur in habitats associated with the alignment, those most likely to occur in its vicinity from time to time (in order of wingspan width, include; Wedge-tailed Eagle (WS~2.8 metres), Square-tailed Kite (WS~1.3 metres), Little Eagle (WS~1.3 metres), Spotted Harrier (WS~1.2 metres) Black Kite (WS~1.2) Whistling Kite (WS~1.2), Brown Falcon (WS~1.2), Peregrine Falcon (WS~0.95), Australian Hobby (WS~0.9) and Nankeen Kestrel (WS~0.8) (Pizzey and Knight 2012).

While it is highly likely that some bird species, within collision risk bird groups, would be at lesser risk of collision than others, even when closely related (Loss et al. 2014) to those at greatest risk, a greater or lesser proportion of different migrating or nomadic bird species are likely to be impacted by the introduction of additional infrastructure into their flight paths.

I5.1.3 Resident birds

A substantial proportion of birds that occur in territories through which the alignment passes, will not be at risk of power lines strike, since their use of habitat never extends to open areas especially at elevations where power lines are located. Nevertheless, there are some groups of resident birds that favour open areas, which are at increased risk of collision, because power lines occur in the habitats they often frequent. Although resident birds around the alignment footprint are likely to quickly adapt to changes made within their well-known territories, new infrastructure represents an increase in hazardous obstacles with which some groups might collide when distracted by high priority activities, such as hunting, territorial defence, breeding behaviours and learning to fly.

As noted above, a proportion of local birds are unlikely to be placed at risk of collision since their habits do not extend to the open elevated habitats where greater risk of collisions occurs. Large areas of the alignment are associated with either open country or managed understories associated with the new alignment and adjacent infrastructure, where the flight lines of small to small-medium sized birds are much less likely to intercept power lines and for such species, the chances of impact are considered unlikely.

Tall vegetation communities where canopies are dominated by taller forest trees are areas most likely to represent higher risk for smaller resident woodland bird guilds, although their lower flight speeds and sedentary behaviour reduce collision risks for many in this group.

Those considered as bird species to be at higher risk of collision include local birds that fall into guilds of larger and higher-flying birds, and which reside over larger territories, such as birds of prey, ravens and magpies, cockatoos and some parrots, and waterbirds and waterfowl where the alignment rarely occurs near wetland habitat; there is some minor wetland habitat associated with areas such as Lake Liddell and Plashett Reservoir near Bayswater Power Station and the Hunter River.

I5.2 Mitigation of collision risks to birds

Power lines represent a collision risk to birds, because they occur within spaces where they do not expect to encounter obstacles, and, due to a relatively narrow linear profile, power lines easily blend in with the landscape or are obscured by lighting conditions, such as darkness or other light conditions that obscure the presence of the lines or make them appear much further away. Key strategies for reducing the numbers of birds striking power lines is making them visible to birds. Mitigation measures employed in areas where birds are at greater risk often take the form of large bright beacon-like objects to make birds aware of the presence of power lines.

I5.3 EMF and electrocution risks

I5.3.1 Migratory and nomadic birds

Even though some species of migratory birds are electrocuted when they collide with power lines, it is most likely that many of these incidents are associated with smaller power line infrastructure, or installations where individual conductors and earth potentials are close together, such that birds have the potential to touch multiple components of different electrical potential. For birds moving through the alignment, it is considered unlikely that birds would be at high risk of electrocution, as electrocution would require contact with different phases or conductor potentials, and the horizontal separation between individual conductors, or bundled conductors, exceeds the wingspans (WS) of all birds, including the largest migratory birds, such as Brolgas (WS~2.4 metres) Pelicans (WS~2.4–2.6 metres) Black Swans (WS~2.0 metres) and Australian Shelduck (WS~1.2 metres) (Pizzey and Knight 2012). Separation distances between proposed transmission line tower arms and conductors achieved by insulators are shorter than between different conductors (7200 millimetres and smaller designs 5700 millimetres), but the separation, at 3720 millimetres, is beyond the wingspans of all the world's birds. Large bird species are at a greater risk of collision impact injuries, than electrocution, due to their size and flight speed.

The other group of nomadic birds of sufficient sizes to be at risk of electrocution are the larger birds of prey, although as with other large bird species their wing spans are not sufficient to reach between different conductors or from conductors to conductive proposed transmission line tower components. While most are not migratory many periodically move in relation to variations of ecological productivity, since dryer and wetter periods drive resource increases and lulls, and birds of prey respond by moving to areas where greater productivity increases survival and breeding-cycle success. Those larger birds of prey observed in habitats associated with the alignment, or are considered likely to occur in its vicinity from time to time, include; Wedge-tailed Eagle (WS~2.8 metres), Square-tailed Kite (WS~1.3 metres), Little Eagle (WS~1.3 metres), Spotted Harrier (WS~1.2 metres) Black Kite (WS~1.2) Whistling Kite (WS~1.2 metres), Brown Falcon (WS~1.2 metres), Peregrine Falcons (WS~0.95 metres), Australian Hobby (WS~0.9 metres) and Nankeen Kestrel (WS~0.8 metres) (Pizzey and Knight 2012). All bird of prey species have wingspans that are well below the smallest separations between conductors and other conductors, or potential earthing infrastructure components.

Although some birds of prey undertaking dispersive or nomadic movements may occasionally land on powerline infrastructure, under such circumstances they are unlikely to be sufficiently affected by EMF's to be of any significant effect. Nevertheless, birds of prey, which are resident in habitats associated with the alignment, are part of the group of birds which are most likely at risk to longer periods of exposure to EMFs because they often use the infrastructure for perching, but most particularly if they use the infrastructure for nesting. Most of the project's alignment occurs within areas within areas where woodlands and forests are within the landscape, and which offer an abundance of suitably elevated nesting opportunities for birds of prey and so birds of prey using proposed transmission line tower infrastructure for nesting purposes for this project are considered to be rare.

I5.3.2 Resident birds

Those birds that occur as residents in the habitats surrounding power line infrastructure are that subset of all birds that will have to live with power transmission infrastructure for a good portion, if not all, of their lives. However, for many of the birds that live in close association with such infrastructure the greatest risk is loss of habitat during the construction phase of the project. Providing sufficient habitat has been retained for them to survive after the infrastructure's installation their behaviour will continue as it did before construction. A range of small birds that prefer the cover and foraging opportunities that the foliage of trees and shrubs offer will never ascend to the powerline region of the installation or use the bottom of proposed transmission line towers for perches.

Those species most likely to ascend to power lines and the tops of proposed transmission line towers are those species that are tolerant of open spaces and which habitually fly at those elevations and above. The most likely resident bird candidates to use power line infrastructure are large passerines like ravens and crows, birds of prey preferring open habitats, and aerial foraging species, such as woodswallows, swallows and martins, and dollarbirds and bee-eaters. Although magpies will use power lines, they forage on the ground and prefer perches and nesting locations with the added cover of trees. Often the height of high transmission lines is too high for them, and the same for smaller aerial foragers, much of the time, which also prefer to perch low when foraging close to the ground.

Although there is a small group of birds for which proposed transmission line towers are preferable for nest building, including ravens and crows, and medium to large birds of prey, in the landscapes surrounding the project alignments there are ample natural nesting opportunities, which are more likely to be used by these species than transmission line infrastructure. No nests in powerline infrastructure were observed during field works carried out throughout the project's alignments by a wide range of field personnel, but it considered likely that large birds from the group described above may occasionally use infrastructure where there are limited natural options.

When there are limited natural nest site opportunities, t is such species that have the greatest risk of EMF effects, due to their familiarity with infrastructure and extended periods in relatively close proximity to conductors. Most proposed transmission line towers are designed to minimise their use by birds, however the benefits of power infrastructure to bird behavioural priorities make some individuals determined to use such structures across locations where elevated nest sites in old growth trees are limited.

In assessing the types of proposed transmission line towers likely to be used for the project, the dimensions of the tower structures were considered. The minimum distance from conductors to earthed infrastructure that birds might build nests on is 3930 millimetres, and greater than the wingspans of the largest Australian birds. If a nest is built on an arm with a conductor above it, the height of the nest and the bird will reduce that figure.

The period chicks will occupy the nest from the laying of the egg to leaving the nest has been added below for the birds of prey most likely to occur. For all these species the nest is not usually occupied outside the breeding period.

The largest Australian bird of prey occurring in the alignment locality is the Wedge-tailed Eagle, which has the longest incubation and nestling periods of Australian birds of prey with a maximum incubation period of 45 days, and maximum nestling periods of 85. The maximum nest occupation time for this species, from egg laying to departure, is around 130 days (~19 weeks).

For the next largest group of birds of prey (size wise), including species such as Little Eagle, Square-tailed Kite and Spotted Harrier, the incubation periods are around 40 days and nestling period around 60 days. The maximum nest occupation time for these species, from egg laying to departure, is around 100 days (~14 weeks).

Nest occupancy periods for smaller birds of prey from medium sized birds, such as Whistling Kites and Black Kites (~83 days), reduce progressively with size through the Pacific Baza and falcons, down to the smallest, represented by the Nankeen Kestrel, which has an incubation period of 29 days and a nestling period of 35 days, representing a total nest occupation time of 64 days (~9 weeks). The corvids will fall into a group that is smaller than the kites and largest falcons.

In the relatively recent IUCN *Wildlife and power lines Guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks* (Martin et al. 2022) it is stated for larger birds with the largest wingspans that:

"On higher-voltage structures the risk is reduced as phase clearances exceed the wingspan of these birds"

It is considered unlikely on this basis that electrocution is a risk factor for birds as even the largest birds are not likely to be electrocuted and the risk becomes even lower for smaller bird species.

From data derived from a range of studies, it is considered likely that EMF's may influence the physiology of birds nesting on proposed transmission line towers. However, the levels of those effects to each species under all different conditions is not easily quantifiable and there is currently no conclusive evidence that such effects would have a significant effect on the long-term viability of local bird populations.

I5.4 Mitigation of EMF impacts to birds

Mitigation for EMF impacts are best implemented by proposed transmission line tower designs that discourage birds from building nest on them. As it is an important priority for managers maintaining power transmission lines to make sure that nesting birds do not constitute a risk to power delivery, proposed transmission line towers being considered are currently designed to discourage their use by birds, which also reduces the numbers of birds which may be affected by EMFs to a minimum.

I6 Conclusions and recommendations

Based on the available research, the following conclusions on potential impacts have been reached:

- Electrocution is unlikely to be a factor due to phase clearances exceed the wingspan of all birds.
- The bird species considered to be at higher risk of collision include local birds that fall into guilds of larger and higher-flying birds, and which reside over larger territories. These birds include birds of prey, ravens and magpies, cockatoos and some parrots, waterbirds, and waterfowl.
- It is likely that EMF's may influence the physiology of birds nesting on proposed transmission line towers. However, the levels of those effects to each species under a range of different conditions is not easily quantifiable and there is currently no conclusive evidence to suggest that such effects would have a significant effect on the long-term viability of local bird populations.

Recommendations for management and mitigation consist of the following:

- line markers, otherwise known as "bird flappers" and "diverters" are well known throughout the world to be an effective mitigation strategy to warn birds of the presence of powerlines and may be included in the project design
- proposed transmission line towers would be designed to discourage nesting to reduce both potential collision and EMF impacts
- a monitoring program could be considered for implementation to assess the ongoing risk to fauna, particularly birds, from the project, but chances of significant risk to local birds is assessed to be low.

I7 Fauna strike risk assessment

Legend

		Records within 50 km of subject land	Sedentary = 1 Migratory/ dispersive = 1 Local dispersive = 2 Local wetland flights = 3	Not present = 0 Rare = 1 Moderate = 2 Common = 3	< Canopy height = 0 >Canopy <Powerline Height = 1 Powerline height = 3 +>Powerline height = 0	Low </= 3 Moderate = 4 – 5 High = >/=6	Plant community types (PCT's)

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Anthochaera phrygia	Regent Honeyeater	Y	1	1	0	2 – Low movements below canopy and limited to eastern lowlands and Hunter Valley floor of subject land, but limited to high quality woodland habitats	Species associated with PCT 3230, 3239, 3241, 3244, 3314, 3315, 3431, 3438, 3439, 3444, 3599, 3604, 3605, 3621, 3636, 4039, 4058, 4072 & 4073 according to the TBDC. Species polygon as per 'important habitat map'.
Ardeotis australis	Australian Bustard	N	–	–	–	No records within 50 km of the indicative disturbance area, species not present.	N/A

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Y	1	2	0	3 – low risk due to moderate population within area but reduced due to flight heights and relatively slow flight movements	Ecosystem credit species, PCT's not required
Burhinus grallarius	Bush Stone-curlew	Y	1	0	0	Unlikely to occur due to the very limited distribution of regional records – e.g. Port Stephens hinterland and Gosford population	Species associated with PCT 3150, 3152, 3230, 3237, 3239, 3242, 3244, 3250, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3604, 3605, 3617, 3620, 3621, 4015, 4039, 4058, 4072 & 4073 according to the TBDC.
Calidris ferruginea	Curlew Sandpiper	Y	1	0	0	Estuarine species with records regionally limited to the lower Hunter estuary and Hexham floodplain	N/A
Calidris melanotos	Pectoral Sandpiper	Y	1	0	0	Estuarine species with records regionally limited to the lower Hunter estuary and Hexham floodplain	N/A
Callocephalon fimbriatum	Gang-gang Cockatoo	Y	1	2	3	6 – Higher canopies on the edge of ranges may exceed powerline heights, species uses such habitats as part of their foraging range.	Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072 & 4073 according to the TBDC. Species recorded

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Calyptorhynchus lathami lathami	South-eastern Glossy Black-cockatoo	Y	1	2	3	6 – Higher canopies on the edge of ranges may exceed powerline heights, species uses such habitats as part of their foraging range.	Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072 & 4073 according to the TBDC. Species recorded
Chthonicola sagittata	Speckled Warbler	Y	1	2	0	3 – Low due to habits below woodland canopies	Ecosystem credit species, PCT's not required
Circus assimilis	Spotted Harrier	Y	1	1	0	2 – Low due to general scarcity and a general tendency to hunt for terrestrial prey.	Ecosystem credit species, PCT's not required
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Y	1	1	0	2 – Low due to general scarcity and habits limited to strata below, or just over, canopy top in woodlands associated with the subject land.	Ecosystem credit species, PCT's not required
Daphoenositta chrysoptera	Varied Sittella	Y	1	2	0	3 – Low due to habits below woodland canopies and slow flight speeds	Ecosystem credit species, PCT's not required
Ephippiorhynchus asiaticus	Black-necked Stork	N	–	–	–	1 – Records within 50 km of the subject land but associated with wetland habitats not occurring within the or adjacent to the alignment.	N/A

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Falco hypoleucos	Grey Falcon	N	1	0	1	3 – Low due to extreme rarity (rare stochastic possible) and a general tendency to hunt for terrestrial prey.	Ecosystem credit species, PCT's not required
Falco subniger	Black Falcon	Y	1	1	1	3 – Low due to general scarcity and a general tendency to hunt for terrestrial prey.	Ecosystem credit species, PCT's not required
Glossopsitta pusilla	Little Lorikeet	Y	1	1	1	3 – Low due to general scarcity and habits limited woodland canopies	Ecosystem credit species, PCT's not required
Grantiella picta	Painted Honeyeater	Y	1	1	1	3 – Low due to general scarcity and habits limited acacia woodlands	Ecosystem credit species, PCT's not required
Haliaeetus leucogaster	White-bellied Sea-Eagle	Y	1	1	3	5 – Moderate risk – may be at risk during movements between suitable habitats.	Species associated with PCT 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072 & 4073 according to the TBDC. Species recorded
Hamirostra melanosternon	Black-breasted Buzzard	N	1	1	3	No confirmed records within 50 km of the subject land	N/A

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Hieraaetus morphnoides	Little Eagle	Y	1	1	3	5 – Moderate risk due to flight heights but reduced due to familiarity with local habitat features.	Species associated with PCT 3087, 3150, 3152, 3237, 3239, 3241, 3242, 3244, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072, 4073 according to the TBDC.
Hirundapus caudacutus	White-throated Needletail	Y	1	2	0	3 – Low due to high flight heights.	Migratory species, PCT's not required
Lathamus discolor	Swift Parrot	Y	2	1	3 – but will depend on canopy heights	5 – Moderate risk. Although seasonal it is at increased risk due to the speed of flight and flocking tendencies, no breeding but landscape level movements may occur at powerline heights at high speeds.	Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072, 4073 according to the TBDC.
Leipoa ocellata	Malleefowl	Y	–	–	–	Does not occur within 50 km of subject land	N/A
Lophochroa leadbeateri	Pink Cockatoo	N	–	–	–	Does not occur within 50 km of subject land	N/A

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Lophoictinia isura	Square-tailed Kite	Y	1	1	3	5 – Moderate risk due to flight heights but reduced due to familiarity with local habitat features.	Species associated with PCT 3029, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072, 4073 according to the TBDC.
Melanodryas cucullata cucullata	Hooded Robin (southeastern form)	Y	1	1	0	2 – low due to low population, and flight height well under power lines	Ecosystem credit species, PCT's not required
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Y	1	1	1	3 – low due to low population, and flight height under power lines	Ecosystem credit species, PCT's not required
Neophema pulchella	Turquoise Parrot	Y	1	2	0	3 – low due to moderate population on valley floor in good habitat, and flight height under power lines – population does not occur in ranges or east of ranges.	Ecosystem credit species, PCT's not required

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Ninox connivens	Barking Owl	Y	1	1	0	2 – low due to low population, and flight height under power lines	Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072, 4073 according to the TBDC. Species recorded
Ninox strenua	Powerful Owl	Y	1	2	3 – due to tall forest habitats associated with ranges	6 – Higher risk due to flight heights in tall forest areas of the ranges, and common in the region.	Species associated with PCT 3029, 3087, 3150, 3152, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3599, 3604, 3605, 3617, 3620, 3621, 3636, 4015, 4039, 4058, 4072, 4073 according to the TBDC. Species recorded
Pachycephala inornata	Gilbert's Whistler	N	1	1	0	Does not occur within 50 km of subject land	N/A
Petroica boodang	Scarlet Robin	Y	1	2	0	3 – low due to moderate population, but flight height under power lines	Ecosystem credit species, PCT's not required
Petroica phoenicea	Flame Robin	Y	1	1	0	3 – low due to moderate population, but flight height under power lines	Ecosystem credit species, PCT's not required

Scientific name	Common name	Records within 50 km of subject land	Flight movement type	Population size occurrence average	Typical flight pattern	Likelihood of potential collision	PCT habitats
Polytelis swainsonii	Superb Parrot	N	1	0	3	Does not occur within 50 km of subject land	Ecosystem credit species, PCT's not required
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Y	1	2	0	3 – Low due to general scarcity and habits limited to strata below, or just over, canopy top in woodlands associated with the subject land.	Ecosystem credit species, PCT's not required
Stagonopleura guttata	Diamond Firetail	Y	1	1	0	2 – Low due to general scarcity and habits limited to strata below, or just over, canopy top in woodlands associated with the subject land.	Ecosystem credit species, PCT's not required
Tyto novaehollandiae	Masked Owl	Y	1	1	3	5 – Moderate due to Low population, but flight height includes elevations above the canopy and powerline elevations.	Species associated with PCT 3029, 3150, 3152, 3230, 3237, 3239, 3242, 3244, 3250, 3263, 3314, 3315, 3431, 3438, 3439, 3444, 3581, 3604, 3605, 3617, 3620, 3621, 4058, 4073 according to the TBDC. Species recorded
Tyto tenebricosa	Sooty Owl	Y	1	2	3 – due to tall forest habitats associated with ranges	6 – Higher risk due to flight heights in tall forest areas of the ranges, and common in the region.	Species associated with PCT 3025, 3029, 3087, 3150, 3230, 3237, 3239, 3241, 3242, 3244, 3250, 3263, 3581, 3605, 3617, 3621 according to the TBDC. Species recorded

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Appendix J

Examination of regional terrestrial habitat connectivity

J1 Impacts to regional habitat connectivity

J1.1 Introduction

The key impacts on terrestrial connectivity from the project will be associated with the construction requirements of disturbance area A, which refers to an area around the proposed transmission line towers, areas for stringing sites, laydown areas, switching stations, substation upgrades, construction support sites, new and upgraded access tracks and road upgrades in which vegetation would be removed during construction.

This disturbance would include vegetation (including tree) removal and potential sub-surface impacts through construction activities such as grading, excavation, and full tree removal. Except in areas where only temporary disturbance is required (i.e. temporary access tracks and stringing sites), this area would also be subject to ongoing maintenance during operation (i.e. removal to ground level) for operational and safety requirements (including bushfire risk management).

The remaining disturbance areas within the transmission line corridor (disturbance area B) will retain vegetation to a height of 2 metres.

The proposed operational corridor will effectively result in stepping stones of maintained vegetation within the outer areas of the proposed corridor which will specifically facilitate the movement of most terrestrial fauna species minimum gap requirements, including semi-mobile and sedentary species except for canopy dependent arboreal mammals (e.g. Squirrel Glider).

Furthermore, the retention of understorey vegetation within these zones is likely to further mitigate the potential for increased predation by opportunistic species along the corridor.

There are also many no clearing zones which are areas within the transmission line easement where vegetation removal is not required. These areas occur where there is sufficient separation of 10 metres or more between the maximum operating temperature conductor position and the existing vegetation. This area is excluded from the disturbance area. There are many of these no clearing zones spread throughout the mountainous parts (including Watagan mountains) of the alignment within Wyong and Yengo interim biogeographic regionalisation for Australia (IBRA) subregions, where deep gullies occur that can be completely spanned by the new powerlines. The width of these zones is variable depending on the topography of each spanning location.

The operational use of the easement post construction is expected to be minimal and not result in associated impacts of vehicle strike, noise and lighting that would permanently deter fauna movement or reduce further the majority of habitat values provided by the retain vegetation for connectivity.

J1.2 Co-locating the transmission line impacts on connectivity

Where possible the project has specifically incorporated into the alignment selection the co-location with existing transmission line and infrastructure corridors. The co-location of the infrastructure is a key consideration for minimisation of impacts across a range of environmental variables being considered within the EIS, including biodiversity. The key benefits for co-location for biodiversity include:

- minimising edge effects
- minimising edge to areas ratio of project
- consolidating disturbances to areas within existing known disturbances
- reduced fragmentation.

While there are considerable overall environmental benefits of the project's co-location with existing infrastructure it is acknowledged this will potentially exacerbate the terrestrial connectivity impacts and crossing distances in some PCTs.

J1.3 Target candidate species for mitigation

An effective approach to planning and designing strategies to reduce the negative effects of linear infrastructure on wildlife is to focus on a small number of 'target' species, rather than the hundreds of species that may occur there. This group of target species should reflect the broader assemblage of species in the area that are impacted by the linear infrastructure and represent the needs and requirements of all species. For example, target species should encompass a wide range of groups (e.g. birds, mammals, reptiles etc), include common and endangered species, and cover a range of modes of movement (e.g. flying and walking, terrestrial and arboreal) and gap-crossing abilities.

The threatened species, assessed in this biodiversity development assessment report (BDAR), encompass all mobility classes and subsequently were considered valuable for determining the ecological characteristics for provision of an equivalent or better ecosystem functionality of any alternative biodiversity corridor. However, whilst threatened species have been used for consideration of wildlife connectivity, it is necessary to emphasise that ecosystem functionality is not restricted to these species. Locally occurring non-threatened fauna, such as kangaroos and possums, would also require consideration for ecosystem functionality and connectivity.

Target species were selected from the threatened species list, which were those species identified as having a moderate or higher likelihood of occurrence in the existing corridor, based on the availability of potential habitat, recent records and the professional opinion. Target species were categorised based on their movement capabilities:

- Mobile species are either capable of defending themselves or evading predators in the open, nomadic by nature, or may inhabit open country areas solely or as part of the range of habitats they frequent. Therefore, mobiles species are not considered to be affected by gaps of less than 1000 metres.
- Semi-mobile species are those species with semi-mobile capability, and while large enough to traverse reasonably large gaps in forest vegetation, they are essentially woodland and forest animals that are dependent on cover or woodland trees for their movements. Many small-medium sized birds and small microbats fall into this category, establishing relatively small home ranges in their preferred habitat with a reluctance to move outside those territories, but nevertheless being equipped with the means to cross larger gaps when they are forced to. Semi-mobile species are considered unaffected by gaps less than 100 metres. However, gaps less than 100 metres that also contain traffic and other disturbances may represent a filter or barrier to their movement.
- Sedentary species (many species of amphibian, reptile, small mammals, some Mallee birds) often occur with small territories that they rarely leave, due to the necessity of familiar cover to protect them from predatory animals. Such species are highly dependent upon the integrity of corridor habitats to maintain contact between populations at either end of the corridor. As the key requirements for this group, the least mobile cohort of corridor animals, represent the fundamental components of forest and woodland structure, the same structural components will be utilised by those animals which are more mobile and less dependent upon the linkage function of the corridor. For example, Squirrel Glider, reptiles and some small bird species.

For the purposes of this report, mobile species are not considered further as this group are not likely to be dependent upon specific mitigation measures to overcome the transmission line barrier.

Table J.1 Candidate species impacted by terrestrial connectivity (semi-mobile and sedentary species)

Common name	Barriers	Estimated gap crossing	Use of mitigation approach
Semi-mobile species			
Woodland birds (Brown Treecreeper, Varied Sittella, Diamond Firetail)	Fragmented landscape with no matrix of paddock trees linking adjacent habitat.	Woodland birds considered unlikely to cross unvegetated gaps >100 m.	— Species would typically require habitat stepping-stones to facilitate dispersal — Use of no clearing zones underneath powerlines — Maintained vegetated understorey within B zone. — Maintained vegetated corridors <2 m in height.
Koala	Barriers to movement include roads and urban development. Although known to cross agricultural land with scattered trees, areas devoid of vegetation restrict dispersal.	Species assumed unlikely to cross unvegetated gaps >100 m	— Known to use culvert underpasses, open span bridges and land bridges with appropriate species-specific furniture. — Use of no clearing zones underneath powerlines — Maintained vegetated understorey within B zone. — Maintained vegetated corridors <2 m in height.
Terrestrial mammals (Long-nosed Potoroo, Brush-tailed Rock-wallaby, Parma Wallaby)	Barriers to movement include roads and urban development. Likely to be able to cross powerline easements.	Species assumed likely to cross unvegetated gaps >100 m	— Use of no clearing zones underneath powerlines — Maintained vegetated understorey within B zone. — Maintained vegetated corridors <2 m in height.
Sedentary species			
Arboreal mammals (Squirrel Glider, Eastern Pygmy Possum, Southern Greater Glider, Brush-tailed Phascogale)	These species are likely to be reluctant to come to the ground to cross gaps and crossing width depends on tree height on either side of the gap. Glides of 20 m – 30 m are typical for Squirrel Gliders and Southern Greater Gliders. Eastern Pygmy Possum and Brush-tailed Phascogale are required to cross on the ground.	Gaps >40 m likely to be prohibitive	— Known to use glider poles and canopy bridges over dual-carriageway highways, and likely to use under- transmission glider poles — Use of no clearing zones underneath powerlines — Maintained vegetated corridors <2 m in height.

Common name	Barriers	Estimated gap crossing	Use of mitigation approach
Reptiles (Hunter Valley delma)	Fragmentation of areas of Sand hill habitats and grassy woodlands	Species assumed unlikely to cross unvegetated gap >50 m	— Maintained vegetated understorey within B zone. — Maintained vegetated corridors <2 m in height.
Common native species important for ecosystem function			
Arboreal mammals (e.g. Sugar Glider, Common Brushtail Possum)	Barriers to movement include roads and urban development.	Gaps >40 m likely to be prohibitive	— Known to use glider poles and canopy bridges over dual-carriageway highways, and likely to use Under-Transition glider poles — Use of no clearing zones underneath powerlines — Maintained vegetated understorey within B zone. — Maintained vegetated corridors <2 m in height.
Terrestrial mammals (Kangaroos and Wallabies)	Eastern Grey Kangaroo is an open country species. Swamp Wallaby generally restricted to vegetated habitats.	Swamp Wallaby assumed unlikely to cross gaps >100 m	— Use of no clearing zones underneath powerlines — Maintained vegetated understorey within B zone. — Maintained vegetated corridors <2 m in height.

J1.3.1 Forestry areas management

An important consideration is that much of the alignment passes through operational State Forests such as Olney State Forest, Watagan State Forest, Pokolbin State Forest and Corrabare State Forest.

These operational State Forests are impacted on an ongoing basis by logging activities within smaller forestry coupes.

Installation of permanent connectivity structures within these locations is likely to still be achievable as forestry operations will generally be excluded from the transmission easements and can be used when forests regrow to a suitable size.

J1.3.2 No clearing zones

The no clearing zones that are located continuously along the alignment within Wyong and Yengo IBRA subregions will facilitate undisturbed contiguous corridors of wildlife connectivity for all fauna species. These are located primarily within Olney State Forest, Watagan State Forest, Pokolbin State Forest and Corrabare State Forest but also within area such as:

- Corrabare North Flora Reserve and
- private lands.

J1.3.3 Under-transmission line glider poles and/or glider / possum rope bridges

A novel approach to mitigate the barrier impacts of the transmission line for gliders and possums is the use of under-transmission glider poles and/or rope bridges which can include timber poles and/or retained tall tree stumps. It is proposed that these will be installed in areas of identified Squirrel Glider, Southern Greater Glider, Eastern Pygmy Possum and Brush-tailed Phascogale habitat (see Figure 14.7 and Figure 14.8 that illustrate areas of connectivity).

Locations for glider and possum connectivity measures have been identified through the nominated suitable habitat areas that are located within areas that do not contain regular or proximate no clearing zones within 1 kilometre of each other.

The intention is to retain a single row or ideally a 10–20 metre wide strip of tall tree stumps which allows gliders to traverse the gap. The use of 'natural' glider poles (i.e. retained tall tree stumps) offers a number of likely advantages over timber poles and the following points are relevant:

- They are wider than timber poles, providing a large landing surface.
- If the trees are resistant to decay and with the root system still intact, they should remain standing for at least 30 years, if not longer.
- The stumps will maintain bark for a number of years, and eventual decay of the wood will provide food for invertebrates, which in turn are food for Squirrel Gliders.
- If the tree survives pruning when the project is built above it and has coppice regrowth, this will provide additional shelter and food for gliders, and increase the standing life of the stump because the root system remains alive. Nevertheless, it is acknowledged that trees under the project will need to be maintained to safe operating height.
- Tree stumps will also provide habitat for a wide range of other species, including woodland birds, reptiles and other arboreal mammals.
- Chainsaw hollows can be installed into retained stumps if the stems are sufficiently large.
- Provided the tree has been sufficiently pruned and the weight of the canopy reduced, the risk of collapse and damage to the project structure will be minimal.
- Each tree to be retained as a stump should be inspected and pruned by a qualified arborist with a minimum Level 3 Certificate in Arboriculture or equivalent plus demonstrated experience in inspecting and pruning trees for habitat.

- The retained stumps should be located away from the project structure so that if they collapse, they do not damage the proposed transmission line tower. If the stumps, branches or coppice regrowth is within striking distance of the project, they should be inspected by a qualified arborist every few years to assess the extent of coppice growth and decay and residual risk. Coppice regrowth is poorly connected to the main stem and poses a higher incidence of failure than normal branches. A qualified arborist should advise on the required inspection frequency.
- The structural root zone of each retained stump should not be damaged because these are what will support the tree in the long term.
- The retained stumps should be relatively straight and vertical to reduce the risk of collapse and maximise standing longevity. Decay within the trunks is acceptable provided there are multiple stems within gliding range.
- Maintain as much canopy adjacent to the project structures where the stumps will be retained to provide connection to the stumps and provide shelter to the stumps from extreme wind to increase their standing lifespan.

Figure J.1 provides a conceptual diagram for under-transmission line glider poles. This is an example of what could be implemented, the heights of poles and distances between poles included in the diagram are examples only. The glider poles and/or rope bridges that would be implemented would be designed considering the project constraints including:

- clear access must be maintained to transmission infrastructure for operation and maintenance
- an exclusion zone of 30 metres applies from any part of a transmission line structure, and 17 metres from the centre of a transmission line
- a height limit of 4.3 metres applies for all structures and development activities
- all metal structures must be earthed
- structures must be designed so they don't encourage climbing (by people).

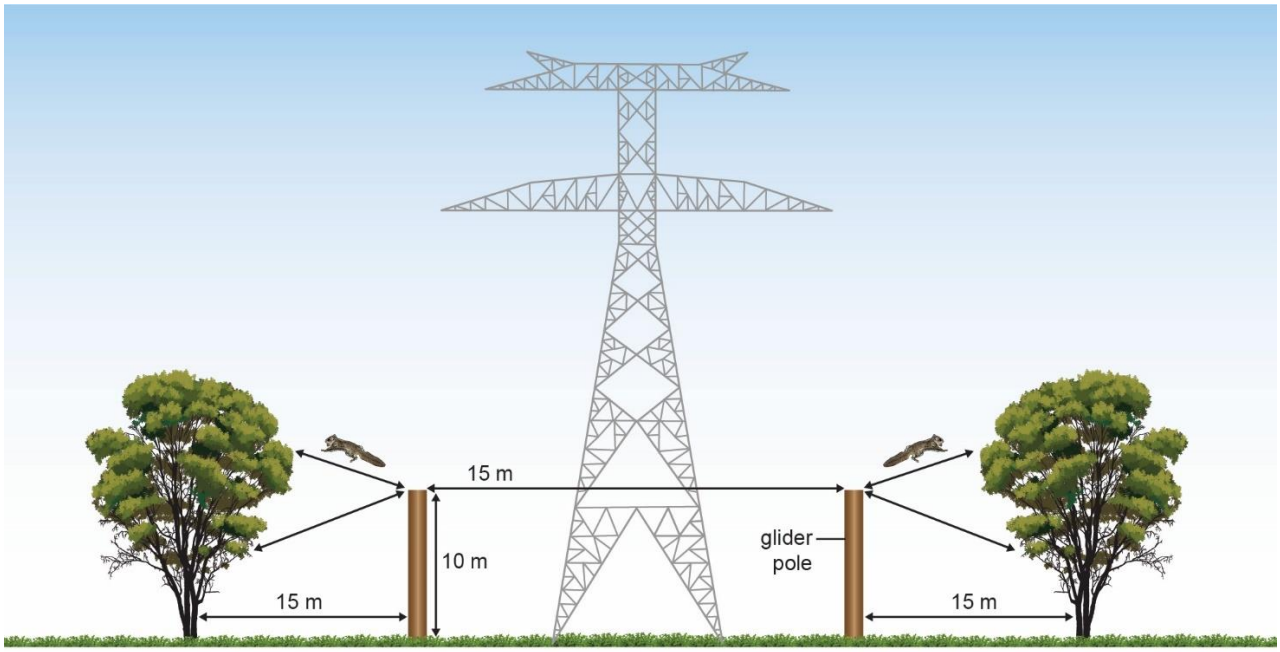

Figure J.1 Conceptual diagram of under-transmission glider poles (pole heights and distances to be determined during detailed design and in accordance with restrictions on structures within the easements)

Appendix K

Secretary's Environmental Assessment Requirements relating to biodiversity

Our ref: Hunter Transmission Project (SSI-70610456)

Ms Sophy Townsend
Strategic Advisor - Environment
Energy Corporation Of New South Wales
Level 19
20 Bond Street
Sydney New South Wales 2000

12/08/2024

Subject: Planning Secretary's Environmental Assessment Requirements

Dear Ms Townsend

Please find attached a copy of the Planning Secretary's environmental assessment requirements (SEARs) for the Hunter Transmission Project (SSI-70610456).

The SEARs have been prepared in consultation with relevant public authorities, based on the information you have provided. A copy of the advice from the public authorities is attached for your information.

Where relevant, the Planning Secretary may modify the SEARs to ensure the environmental assessment of the project covers all relevant matters and is consistent with contemporary assessment practice.

Your SEARs will expire two years from the date of issue (or the date they were last modified) unless the Planning Secretary has granted an extension. If you would like to seek an extension, you should contact the department at least three months prior to the expiry date.

If your application is not submitted within two years (or by the agreed extension date), you will need to make a new application for SEARs to progress your project.

Preparing your EIS

Your environmental impact statement (EIS) must be prepared having regard to the department's *State Significant Infrastructure Guidelines* – including the *Preparing an Environmental Impact Statement Guideline*. All relevant guides for State significant projects that are referenced in the SEARs are available at www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework.

During the preparation of your EIS, you are required to consult with various parties, including the department and relevant agencies, in accordance with *the Undertaking Engagement Guidelines for*

State Significant Projects. For more information, please visit the Prepare EIS page on the NSW planning portal. Agency contact details can be found at https://www.planningportal.nsw.gov.au/major-projects/assessment/guide-agency-directory.

You will need a Registered Environmental Assessment Practitioner (REAP) to declare that your EIS meets certain standards in relation to its completeness, accuracy, quality and clarity before it is submitted to the department, as per Division 5 of Part 8 of the Environmental Planning and Assessment Regulation 2021. A pro forma declaration can be found in Appendix B of the Preparing an Environmental Impact Statement Guideline.

Submitting your EIS

Once you submit your EIS, we will check it for completeness to confirm it addresses the requirements in Part 8 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation).

Information needed to determine the application fee

Your EIS will need to be accompanied by an Estimated Development Cost (EDC) supporting the estimated development cost for your project. You must ensure that the information in the report is consistent with the information provided in your EIS.

Once you submit your Estimated Development Cost Report, we will check it for completeness against the requirements of the EP&A Regulation and the relevant Planning Circular.

Public exhibition requirements

We will advise whether hard and/or electronic copies of the EIS will be required for public exhibition.

Matters of National Environmental Significance

Any development likely to have a significant impact on matters of National Environmental Significance will require approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to approvals required under NSW legislation.

It is your responsibility to contact the Australian Government Department of Climate Change, Energy, the Environment and Water to determine if you need approval under the EPBC Act (https://www.dcceew.gov.au/ or 6274 1111).

If you have any questions, please contact Lauren Clear on 02 8229 2974 or via email at lauren.clear@dpie.nsw.gov.au.

Yours sincerely,

Nicole Brewer
Director
Energy Assessments

as delegate for the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 5.16 of the *Environmental Planning and Assessment Act 1979*

Part 8 of the Environmental Planning and Assessment Regulation 2021

Application Number	SSI-70610456
Project	Hunter Transmission Project, which includes: • two new substations at Bayswater and Olney; • a new double circuit 500 kV overhead transmission line connecting the existing 500 kV line at Bayswater to the existing 500 kV transmission line in the Olney State Forest; and • associated works including upgrades to the existing Bayswater and Eraring substations, adjustments to existing transmission lines, road upgrades, access tracks, temporary construction facilities such as laydown areas, stringing sites, construction support sites and workers accommodation.
Location	Between Bayswater and Olney State Forest for a length of approximately 100 km, within the Muswellbrook, Singleton, City of Cessnock, Central Coast and City of Lake Macquarie Local Government Areas.
Proponent	EnergyCo
Date of Issue	12 August 2024
General Requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements as prescribed by Part 8 of the *Environmental Planning and Assessment Regulation 2021* (the Regulation) and must have regard to the *State Significant Infrastructure Guidelines*. In particular, the EIS must include: • a stand-alone executive summary; • a summary of the background to the project, including alternatives that were considered to the project; • a full description of the project, accompanied by suitable maps and plans, including the: - disturbance area; - physical layout of the project over time, including sections of key components; - key uses and activities to be carried out on site; - likely timing of the project including any stages, the key phases within each stage (site preparation, construction, commissioning, operation, decommissioning and rehabilitation) and the sequencing of these stages and phases; • the relevant strategic context for the project, having regard to: - State legislation, policies and guidelines including current initiatives to improve energy security and reliability in the National Electricity Market; - any other existing, approved or proposed projects that could result in cumulative impacts with the project;

	- an analysis of the feasible alternatives to carrying out the project, considering its objectives, including the consequences of not carrying out the infrastructure; • the relevant statutory context for the project, including: - the assessment pathway for the project under the *Environmental Planning and Assessment Act 1979*; - the approvals required before the project may be carried out; - any relevant matters for consideration; • a description of the engagement that was carried out during the preparation of the EIS, the key issues raised during this engagement and the proposed engagement strategy for the project if it is approved; • an assessment of the likely economic, social and environmental impacts of the project having regard to the requirements in any relevant Government legislation, policies and guidelines (see below), including: - the state of the existing environment; - community views; - the measures that would be implemented to avoid or minimise impacts, including a consolidated summary of the proposed mitigation measures for the project; - the predicted impacts of the project, including any cumulative impacts of the project with existing or proposed developments in the region taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the *Cumulative Impact Assessment Guideline* (DPIE); - actions proposed to deal with any uncertainties associated with the assessment; • a detailed evaluation of the merits of the project as a whole. **Estimated Development Cost and Employment** • Provide the estimated cost (EDC) of the project prepared in accordance with the relevant planning circular using the Standard Form of EDC Report. • Provide an estimate of the retained and new jobs that would be created during the construction and operational phases of the project, including details of the methodology to determine the figures provided. In addition the EIS must also be accompanied by a declaration from a Registered Environmental Practitioner that the EIS includes the information specified in the Department's Registered Environmental Assessment Practitioner Guidelines.
Key issues	The level of assessment of key matters must be proportionate to the likely significance of the impacts on the matter. In particular, the EIS must address the following specific matters: **Biodiversity:** • an assessment of the biodiversity impacts of the project, in accordance with the *Biodiversity Conservation Act 2016* (NSW), having regard to the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must: - be prepared using the approved BDAR template; - document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM; - assess any impacts to nearby conservation areas and nature reserves; • an assessment of the likely direct and indirect impacts of the project on listed aquatic threatened species, populations or ecological communities,

	scheduled under the Fisheries Management Act 1994, and a description of the measures to minimise and rehabilitate impacts; and • if an offset is required, details of the measures proposed to address the offset obligations**.** **Heritage:** • an assessment of the impact to Aboriginal heritage (cultural and archaeological), including test excavations, in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010); • evidence of consultation with Aboriginal parties in determining and assessing impacts, having regard to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010); • if the test excavations do not conform with the Code of Practice, then the excavations may only be carried out with the written endorsement of Heritage NSW following consultation with the Registered Aboriginal Parties; • assess the impact to historic heritage having regard to *Guidelines for preparing a statement of heritage impact* (DPE, 2023). **Water and Soils:** • an assessment of the impacts of the project on the quantity and quality of the region's surface water resources, including the Hunter River, having regard to NSW Water Quality Objectives; • details of water requirements, supply arrangements and wastewater disposal arrangements for construction and operation; • an assessment of the impacts of the project on groundwater aquifers and groundwater dependent ecosystems having regard to the *NSW Aquifer Interference Policy* and relevant Water Sharing Plans; • an assessment of the potential flooding impacts and risks of the project; • where the project involves works within 40 metres of the high bank of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI *Guidelines for Controlled Activities on Waterfront Land* (2018) and (if necessary) *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (DPI 2003); and *Policy & Guidelines for Fish Habitat Conservation & Management* (DPI, 2013); and • a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with *Managing Urban Stormwater: Soils & Construction* (Landcom 2004). **Land:** • an assessment of impacts of the project on soils and land capability of the site and surrounds; • assessment of impact of the project on agricultural land, land reserved under the National Parks and Wildlife Act 1974 including Watagans National Park and Jilliby State Conservation Area, Corrabare South and Corrabare North Flora Reserves, Crown lands including State Forests, travelling stock reserves, mineral resources and exploration licenses, rail reserves and pipeline corridors. **Contamination** • An assessment of the risk of soil contamination and disturbance of land (including associated with natural occurring asbestos, acid sulfate soils and salinity in the vicinity of the site; including:

- characterisation of the nature and extent of any contamination on the site and surrounding area;
- identification of any construction activities that could disturb or interact with any contaminated soil, groundwater or surface water, including PFAS;
- details of measures to manage contaminated impacted soils, groundwater or surface water that may be encountered during construction; and
- if required, a contaminated land report prepared by a certified consultant in accordance with guidelines made or approved by the EPA under s105 of the Contaminated Land Management Act 1997, the Regulation, and the State Environmental Planning Policy (Resilience and Hazards) 2021, including reference to the PFAS National Environmental Management Plan 2.0 (Heads of EPAs of Australia and New Zealand, 2020) (NEMP).

Transport:

- an assessment of the transport impacts of the project on the capacity, condition, safety and efficiency of the local and State road network and the rail network;
- a cumulative impact assessment of traffic from nearby developments (including mining operations); and
- details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from high risk heavy vehicles requiring escort traffic haulage routes), and any other traffic control measures, developed in consultation with the relevant road and / or rail authority
- details of the ongoing maintenance works required to service assets, outlining the measures to maintain the road.

Amenity:

- an assessment of the likely visual impacts of the project on surrounding residences, scenic or significant vistas, night lighting and road corridors in the public domain;
- an assessment of the construction, operational and road noise and vibration impacts of the project, including corona noise; and
- a description of the measures that would be implemented to avoid / mitigate visual and noise impacts.

Air Quality:

- an assessment of the air quality impacts of the project.

Hazards:

- a preliminary risk screening completed in accordance with Chapter 3 of Resilience and Hazard SEPP 2021 and Applying SEPP 33 (DoP, 2011);
- a Preliminary Hazard Analysis (PHA) prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011), should the preliminary risk screening indicate that the project is “potentially hazardous”.
- identify possible effects on telecommunications systems, assess impacts and mitigation measures to avoid potential disruptions to radio communication services, which may include the installation and maintenance of alternative sites;
- an assessment of potential hazards and risks associated with electric and magnetic fields (EMF) having regard to the latest advice of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA);

	• an assessment of the risks to public safety, paying particular attention to bushfire risks, emergency egress and evacuation, and potential impacts to high pressure gas pipelines; • describe the bushfire protection measures for the project, including the proposed approach to vegetation management in the transmission easement, having regard to the requirements in the Planning for bush fire protection guideline (RFS 2019) • assess potential impacts on aviation safety, including: - defined air traffic routes, aircraft operating heights, approach / departure procedures, radar interference, communication systems, navigation aids, use of emergency helicopter access, aerial baiting and culling in the National Parks, safe and efficient aerial application of agricultural fertilisers and pesticide, and aerial fire control; - identify aviation marking requirements; - identify certified aerodromes within 30 km of the transmission line and uncertified aerodromes and landing areas within 10 km of the transmission line, and consider the impact to nearby aerodromes and aircraft landing areas; and - address impacts on obstacle limitation surfaces. **Waste:** • identify, quantify and classify the likely waste streams to be generated throughout all stages of the project, and describe the measures to be implemented to reduce waste generation, manage, reuse, recycle and safely dispose of this waste (in consultation with any relevant waste facilities and Councils). **Social Impact:** • an assessment of the social impacts in accordance with Social Impact Assessment Guideline (DPIE) and consideration of construction workforce accommodation. **Economic:** • an assessment of the benefits of the project for the region and the State as a whole, including: - consideration of any increase in demand for community infrastructure and services, and details of how the construction workforce will be managed to minimise local impacts, including a consideration of the construction workforce accommodation; - an assessment of the impacts to State Forests; and - details of any proposed benefit sharing arrangements.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Part 8 of the Regulation. Provide these as part of the EIS rather than as separate documents. In addition, the EIS must include high quality files of maps and figures of the subject site and proposal.
Legislation, Policies & Guidelines	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. A list of some of the legislation, policies and guidelines that may be relevant to the assessment of the project can be found at: • https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework/Improving-assessment-guidance

	• https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines; and • https://www.dcceew.gov.au/environment/epbc/publications#assessments
Engagement	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups, affected landowners, Native Title holders, exploration licence holders, quarry operators and mineral title holders.
Expiry Date	If you do not lodge an EIS for the infrastructure within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.

Appendix L

Aquatic biodiversity impact assessment

EnergyCo

August 2025

Hunter Transmission Project

Aquatic Biodiversity Impact Assessment

Question today
Imagine tomorrow
Create for the future

Hunter Transmission Project
Aquatic Biodiversity Impact Assessment

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WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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Table of contents

Abbreviations v

Executive summary vi

1 Introduction 1

2 The Hunter Transmission Project 2

3 Assessment methodology 10

3.1 Government plans, policies and guidelines 10

3.2 Biodiversity study area 12

3.3 Desktop assessment 12

3.4 Field survey 13

4 Existing environment 16

4.1 Overview 16

4.2 Desktop assessment 16

4.3 Field survey results 39

5 Assessment of impacts 61

5.1 Assessment of potential construction impacts 61

5.2 Assessment of potential operational impacts 64

5.3 Residual risk assessment 64

6 Mitigation measures 67

7 Conclusion 68

7.1 Summary of results 68

8 Limitations 69

8.1 Permitted purpose 69

8.2 Qualifications and assumptions 69

8.3 Use and reliance 69

8.4 Disclaimer 70

9 References 71

List of tables

Table 1.1 HTP SEARs – Aquatic biodiversity impact assessment 1
Table 2.1 Project overview 2
Table 3.1 Likelihood of occurrence criteria for threatened flora and fauna species 13
Table 3.2 Watercourses assessed 14
Table 3.3 KFH classifications 15
Table 3.4 Classification of watercourses for fish passage 15
Table 4.1 Named watercourses crossed by the HTP 24
Table 4.2 Unnamed watercourse crossings within HTP 25
Table 4.3 Threatened aquatic species identified within 5-kilometre the HTP 32
Table 4.4 Water quality data for SW01 42
Table 4.5 Fish habitat sensitivity rating for SW01 42
Table 4.6 Classification of watercourse for SW01 43
Table 4.7 Water quality data for SW02 44
Table 4.8 Fish habitat sensitivity rating for SW02 45
Table 4.9 Classification of watercourse for SW02 45
Table 4.10 Water quality data for Wollombi Brook 48
Table 4.11 Fish habitat sensitivity rating for Wollombi Brook 48
Table 4.12 Classification of watercourse for Wollombi Brook 49
Table 4.13 Water quality data for Loder Creek 50
Table 4.14 Fish habitat sensitivity rating for Loder Creek 51
Table 4.15 Classification of watercourse for Loder Creek 51
Table 4.16 Water quality data for Monkey Place Creek 53
Table 4.17 Fish habitat sensitivity rating for Monkey Place Creek 54
Table 4.18 Classification of watercourse for Monkey Place Creek 54
Table 4.19 Water quality data for Congewai Creek 56
Table 4.20 Fish habitat sensitivity rating for Congewai Creek 57
Table 4.21 Classification of watercourse for Congewai Creek 57
Table 4.22 Water quality data for Watagan Creek 59
Table 4.23 Fish habitat sensitivity rating for Watagan Creek 59
Table 4.24 Classification of watercourse for Watagan Creek 60
Table 5.1 HTP impacts on threatened aquatic species 63
Table 5.2 Risk assessment matrix 64
Table 5.3 Risk ratings (before and after the implementation of mitigation measures) 66
Table 7.1 Assessment summary 68

List of figures

Figure 2.1 Project overview 5
Figure 2.2 Detailed project overview 6
Figure 4.1 Hunter-Central River sub-catchment 18
Figure 4.2 Location of assessed watercourse 26
Figure 4.3 Mapped key fish habitat 33
Figure 4.4 Location of field survey sites 40

List of photographs

Photo 4.1 Facing upstream 41
Photo 4.2 Facing downstream 41
Photo 4.3 Facing left bank 41
Photo 4.4 Facing right bank 41
Photo 4.5 Upstream riffle structure 41
Photo 4.6 Floodplain on left bank 41
Photo 4.7 Facing upstream 44
Photo 4.8 Facing downstream 44
Photo 4.9 Facing left bank 44
Photo 4.10 Facing right bank 44
Photo 4.11 Facing upstream 47
Photo 4.12 Facing downstream 47
Photo 4.13 Facing left bank 47
Photo 4.14 Facing “channel” right bank 47
Photo 4.15 Facing “bank full” right bank 47
Photo 4.16 Braided channel near culvert 47
Photo 4.17 Facing upstream 50
Photo 4.18 Facing downstream 50
Photo 4.19 Facing left bank 50
Photo 4.20 Facing right bank 50
Photo 4.21 Facing upstream 52
Photo 4.22 Facing downstream 52
Photo 4.23 Facing left bank 53
Photo 4.24 Facing right bank 53
Photo 4.25 Vehicle crossing 53
Photo 4.26 200 metres downstream of survey point 53
Photo 4.27 Facing upstream 55
Photo 4.28 Facing downstream 55
Photo 4.29 Facing left bank 56
Photo 4.30 Facing right bank 56
Photo 4.31 Facing upstream 58

List of photographs (continued)

Photo 4.32 Facing downstream 58
Photo 4.33 Facing left bank 58
Photo 4.34 Facing right bank 58

List of appendices

Appendix A Test of significance

Appendix B Likelihood of occurrence

Abbreviations

ALS	Australian Laboratory Service
BC Act	*Biodiversity Conservation Act 2016*
BMP	Best Management Practices
°C	Celsius
CEMP	Construction Environmental Management Plan
CSSI	critical State significant infrastructure
EIS	environmental impact statement
EP&A	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
GDE	Groundwater Dependant Ecosystems
HADD	Harmful Alteration, Disruption and Destruction
HTP	Hunter Transmission Project
HVO	Hunter Valley Operations
km	kilometre
kV	kilovolts
L	litre
MNES	Matters of National Environmental Significance
mg	milligrams
mm	millimetre
m	metre
NSW	New South Wales
NTU	Nephelometric Turbidity Unit
pH	potential of hydrogen
PMST	Protected Matters Search Tool
TSS	total suspended solids
µs	microsecond
WM Act	*Water Management Act 2000*

Executive summary

This Aquatic Biodiversity Impact Assessment has been prepared by WSP Australia Pty Ltd on behalf of EnergyCo for the proposed Hunter Transmission Project (HTP, the project). The purpose of this report is to assess the potential impacts the HTP may have on listed aquatic threatened species, populations or ecological communities. This Aquatic Biodiversity Impact Assessment has assessed the potential for the project to impact aquatic species listed on the NSW *Fisheries Management Act 1994* (FM Act).

The project is located within the Hunter-Central Rivers catchment and Hunter River sub-catchment. The HTP will cross 20 named watercourses as well as many unnamed lower order watercourses (90% being Strahler Order <2). Of these, a desktop assessment identified that 16 named watercourses and 48 unnamed watercourses were mapped as key fish habitat (KFH). Of these, four watercourses were determined to contain mapped habitat for Southern purple spotted gudgeon (*Mogurnda adspersa*), which is listed as endangered under the FM Act.

A field assessment was conducted over a three-day period, between 10–12 September 2024, at 7 key aquatic locations:

- Hunter River (2 locations)
- Wollombi Brook
- Loder Creek
- Monkey Place Creek
- Congewai Creek
- Watagan Creek.

All these watercourses are mapped as KFH, with two of them, Wollombi Brook and Congewai Creek, containing mapped Southern purple spotted gudgeon habitat.

The ecological importance of each surveyed watercourse was determined through the assessment of habitat characterisation, key fish habitat, riparian health and water quality. Each watercourse was assigned a watercourse type and watercourse class as outlined in *Policy and guidelines for fish habitat conservation and management* (NSW DPI, 2013). Watercourse type and class ratings determine habitat sensitivity and classification for habitat use.

Six of the seven survey areas were deemed to be a type 1 watercourse and 4 of the 7 were deemed to be class 1 watercourses. One watercourse, Loder Creek, was deemed to be a type 2 watercourse as it lacked type 1 habitat features and 3 of the 7 (Loder Creek, Monkey Place Creek and Watagan Creek) were deemed to be class 2, as they lacked a permanent flow during the site assessment.

As outlined in BDAR mitigation measure B12, a Riparian Vegetation Management Plan (RVMP) will be developed and implemented for the project to manage activities within vegetated riparian zones to minimise impacts to aquatic environments. The plan will be prepared prior to and implemented during any disturbance to a riparian area. This will be the primary aquatic mitigation measure.

The plan will identify the measures to be implemented to minimise impacts from construction activities (such as temporary and permanent waterway crossings) within riparian and aquatic environments. A schedule of works will be stipulated within the approved RVMP. Riparian areas subject to disturbance will be progressively stabilised and rehabilitated.

BDAR mitigation measure B4 also requires micro-siting of associated works and access tracks to minimise vegetation clearing and disturbance of watercourses within the biodiversity study corridor which will include:

- prioritising areas of low biodiversity value
- utilising existing access tracks, where feasible
- locating waterway crossings at narrow width locations
- minimising the quantity of cut and fill activities.

BDAR mitigation measure B16 relates to water quality, watercourse geomorphology and aquatic habitat and states that any watercourse crossings will be designed to minimise disturbance and harm within riparian corridors and rehabilitate aquatic habitat to achieve a 'no net loss' of habitat within the affected area and catchment as a whole, in accordance with the following guidelines:

- *Guidelines for controlled activities on waterfront land (NRA, 2018)*
- *Why do fish need to cross the road? Fish passage requirements for waterway crossings (Fairfull & Witheridge, 2003)*
- *Policy and guidelines for fish habitat conservation and management (DPI, 2013).*

Although no direct impacts to the surrounding aquatic environments (i.e. instream works, works within riparian area) are expected, there is still a risk that indirect impacts from construction of the project may impact local watercourses. To ensure that the surrounding aquatic habitats remain intact and healthy during the project works the following recommendations should be implemented:

- ongoing visual assessments at watercourse crossings to ensure no adverse impacts are observed during construction
- implementation of the Network Operator's construction contractor's Environmental Management Strategy (EMS), or the Network Operator's operational environmental management framework (or similar system).

There are two species listed on the FM Act with the potential to occur in the project impact area. These are the Southern purple spotted gudgeon and the Darling River hardyhead. The Darling River hardyhead is unlikely to occur because the project is outside of its known distribution range, but it has been included in the assessment as a precaution. The project has been determined as being unlikely to result a significant impact on either species.

Overall, with the implementation of the proposed mitigation measures, the project is not expected to result in adverse impacts on aquatic environments, ecological communities and species.

If any instream works are to be performed, appropriate approvals and permits are to be obtained under the FM Act and the WM Act.

The project has been determined as being unlikely to result a significant impact on listed aquatic threatened species, populations or ecological communities listed under the FM Act.

1 Introduction

The Hunter Transmission Project (HTP, the project) involves the construction of a new overhead 500 kilovolt (kV) double circuit transmission line of around 100 kilometres, connecting the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in Olney State Forest, near Eraring in the Hunter region of New South Wales (NSW).

The project requires approval from the NSW Minister for Planning and Public Spaces under Division 5.2, Part 5 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). Due to its strategic importance, the project has been declared as critical State significant infrastructure (CSSI) under section 5.13 of the EP&A Act.

Under this process, the Energy Corporation of NSW (EnergyCo, the proponent) is required to prepare an environmental impact statement (EIS) in accordance with the NSW Environmental Planning and Assessment Regulation 2021. Construction is expected to commence in 2027, subject to NSW Government and Commonwealth planning approvals, and be operational by mid 2030.

This Aquatic Biodiversity Impact Assessment accompanies the EIS for the HTP and addresses the Secretary's environmental assessment requirements (SEARs) issued on 13 August 2024, of which the relevant component is provided below in Table 1.1.

In addition to the SEARs, advice from several government agencies was received on the HTP. Agency advice relevant to and considered in this Aquatic Biodiversity Impact Assessment is provided on the Major Projects website maintained by the NSW Department of Planning, Housing and Infrastructure (DPHI).

Table 1.1 HTP SEARs – Aquatic biodiversity impact assessment

HTP SEARs:
— an assessment of the likely direct and indirect impacts of the project on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts.

2 The Hunter Transmission Project

The Hunter Transmission Project (HTP, the project) is critical State significant infrastructure (CSSI). The project must be built by mid-2030 to protect energy security in NSW as the remaining coal-fired power stations close.

The HTP involves:

- a new overhead 500 kilovolt (kV) double circuit transmission line of around 100 kilometres (the HTP corridor)
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments and upgrades to existing transmission lines
- property adjustment works to facilitate access to the transmission lines and switching stations
- utility adjustments required for the construction of the transmission network infrastructure
- ancillary works to support construction including road upgrades, establishment of new access tracks and upgrades to existing access tracks, construction support sites (some with temporary worker accommodation), and other construction facilities such as laydown areas.

The new transmission line would transport electricity generated in the Central-West Orana and New England Renewable Energy Zones (REZs). It would connect the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring. This will strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

The HTP involves development across 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie). Most of this development will be concentrated in and around the HTP.

An overview of the HTP is provided in Table 2.1 and shown in Figure 2.1.

The key project elements are shown in Figure 2.2.

Further details are provided in Chapter 4 (Project description) of the HTP environmental impact statement (EIS).

Table 2.1 Project overview

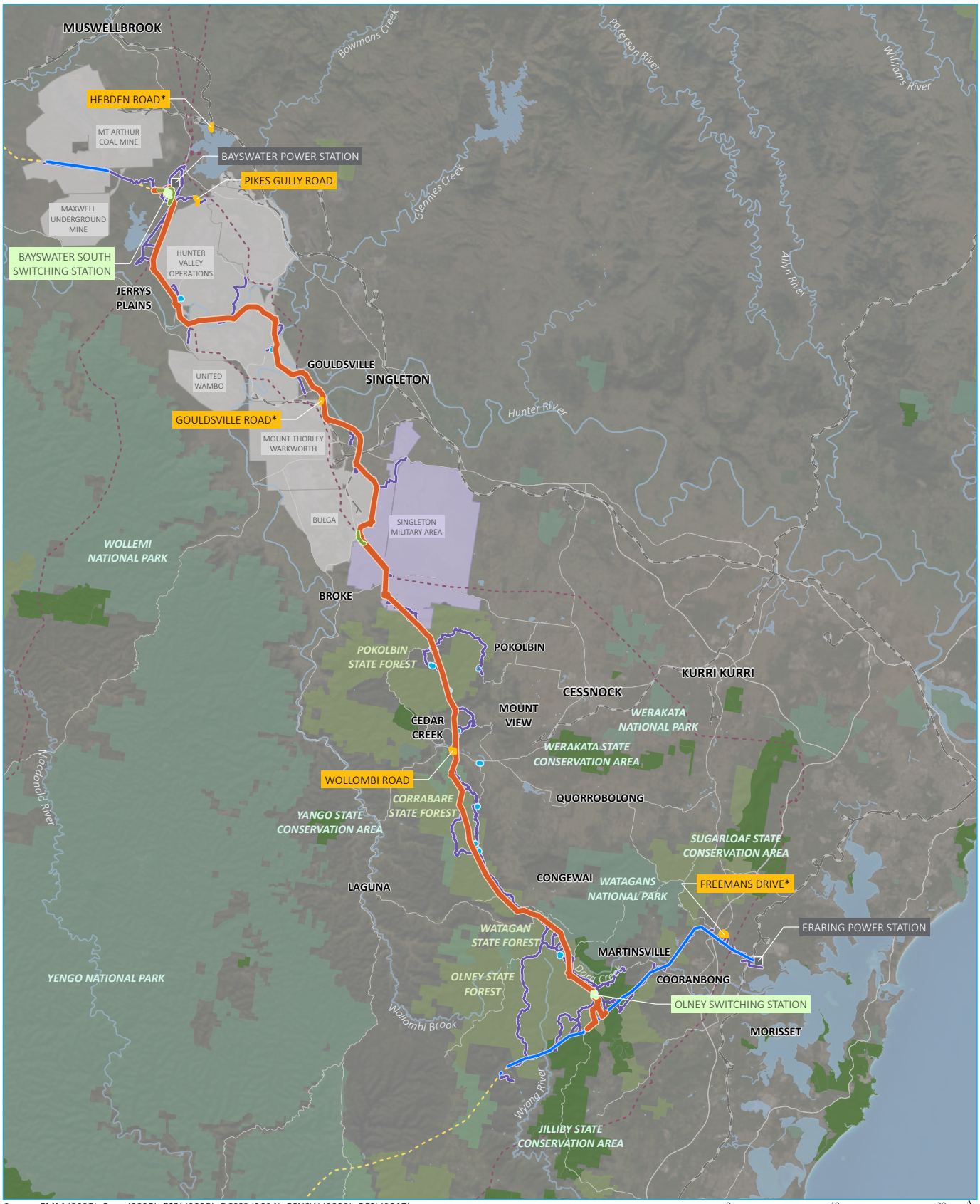
The project	— The critical State significant infrastructure application for the HTP covers 5 local government areas — Most development will be concentrated in and around the HTP corridor. Some ancillary development such as construction support sites and temporary worker accommodation, road upgrades and laydown areas would be outside the HTP corridor.
Project impact area	— The area that has been assumed for the purpose of this EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
Construction and operation	— Construction impact area around 2351 ha — Operation impact area around 1261 ha.
Subject land (referred to as Disturbance area in the EIS)	— Disturbance area around 1266 ha — Disturbance area A around 683 ha — Disturbance area A (centreline) around 214 ha — Disturbance area B around 367 ha — Disturbance area HZ around 1.84 ha.

New transmission line and transmission towers	— Overhead 500 kV double circuit transmission line of around 110 km between Bayswater South 500 kV switching station and Olney 500 kV switching station — Steel lattice towers up to 85 m high and that are spaced anywhere between 75 m to around 1.3 km apart (typically between 300 m and 600 m) — 500 kV transmission lines with a minimum vegetation clearance of 13.5 m — Ancillary infrastructure such as earth wire and communications systems — Construction easement of around 140 m wide — Operational easement around 70 m wide.
Switching stations/ substation works	— New Bayswater South 500 kV switching station – construction impact area around 26.6 ha — Modifications at the existing Bayswater 330 kV/500 kV substation within the existing footprint — New Olney 500 kV switching station – construction impact area around 20 ha — Augmentation and modifications at the existing Eraring 330 kV/500 kV substation, including installation of 2 new 1500 MVA transformers.

Adjustments/ upgrades and crossings – existing transmission lines	— Adjustments to existing double circuit 500 kV transmission line at Bayswater:
	  — Line 5A1 and 5A2: Eraring – Kemps Creek 500 kV at Ravensdale to connect to the new Olney 500 kV switching station
	  — Line 5A3: Bayswater – Mt Piper 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station
	  — Line 5A4: Bayswater – Wollar 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station.
	— Adjustments to existing double circuit 330 kV transmission lines:
	  — Line 31: Bayswater – Regentville 330 kV
	  — Line 32: Bayswater – Sydney West 330 kV
	  — Line 81: Newcastle – Liddell 330 kV.
	— Crossing of existing double circuit 330 kV transmission lines:
	  — Line 31: Bayswater – Regentville 330 kV at Bayswater
	  — Line 32: Bayswater – Sydney West 330 kV at Bayswater
	  — Line 81: 330 kV: Newcastle – Liddell 330 kV at Lemington and again at the Singleton Military Area
	  — Line 82: 330 kV: Tomago – Liddell 300 kV at Warkworth and again at the Singleton Military Area.

Upgrades – existing transmission lines and towers	— Upgraded earth wire on Line 5A3 and Line 5A4 — Upgraded earth wire and communications systems on Line 5A1 and Line 5A2 — Tower strengthening on various existing towers on Line 5A1, Line 5A2, Line 5A3 and Line 5A4.
Road works	— Modifications to the existing public road network — New and upgraded access tracks for construction and operation.
Construction support sites	— Five construction support sites: Hebden Road, Pikes Gully Road, Gouldsville Road, Wollombi Road and Freemans Drive — Helicopter pads (helipads) indicatively at: Hebden Road, Pikes Gully Road, Gouldsville Road and Freemans Drive.

Ancillary works	— Laydown areas, which would be established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites.
Utility adjustments	— Third party utility works including gas, telecommunications, water, sewer and stormwater.
Timing	— Construction to start in 2027 — Operational by mid 2030.



Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); DFSI (2017)

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KEY

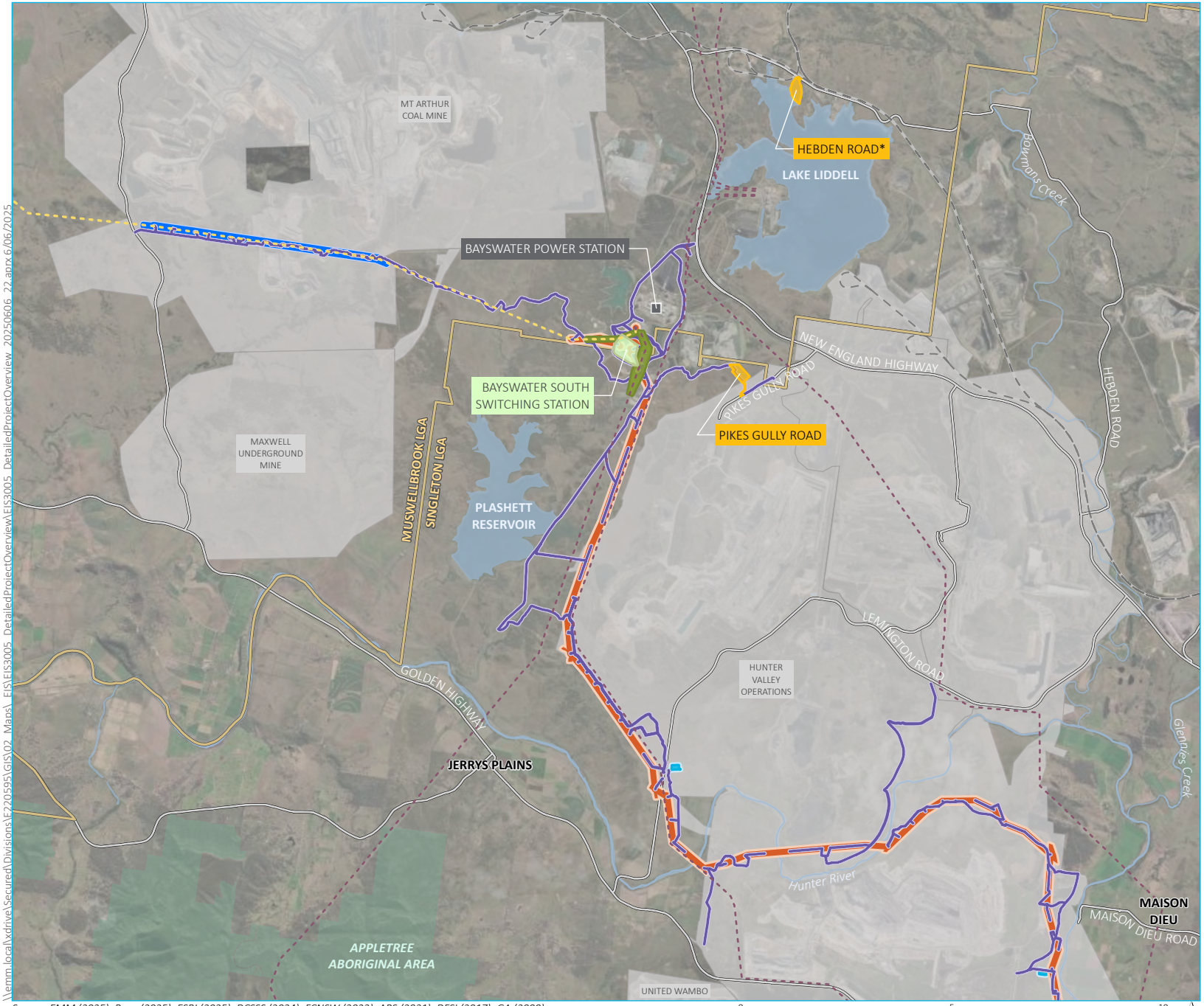
Project impact area
- HTP corridor
- Switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Adjustment to existing transmission line
- Upgrades to existing transmission line
- Access track

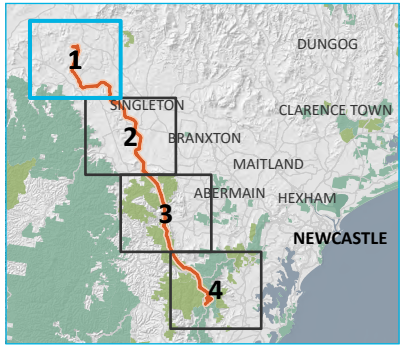
Existing environment
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Defence
- Mining

Project overview

Hunter Transmission Project
Environmental Impact Statement
Figure 2.1

EMM
creating opportunities





KEY

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- Mining
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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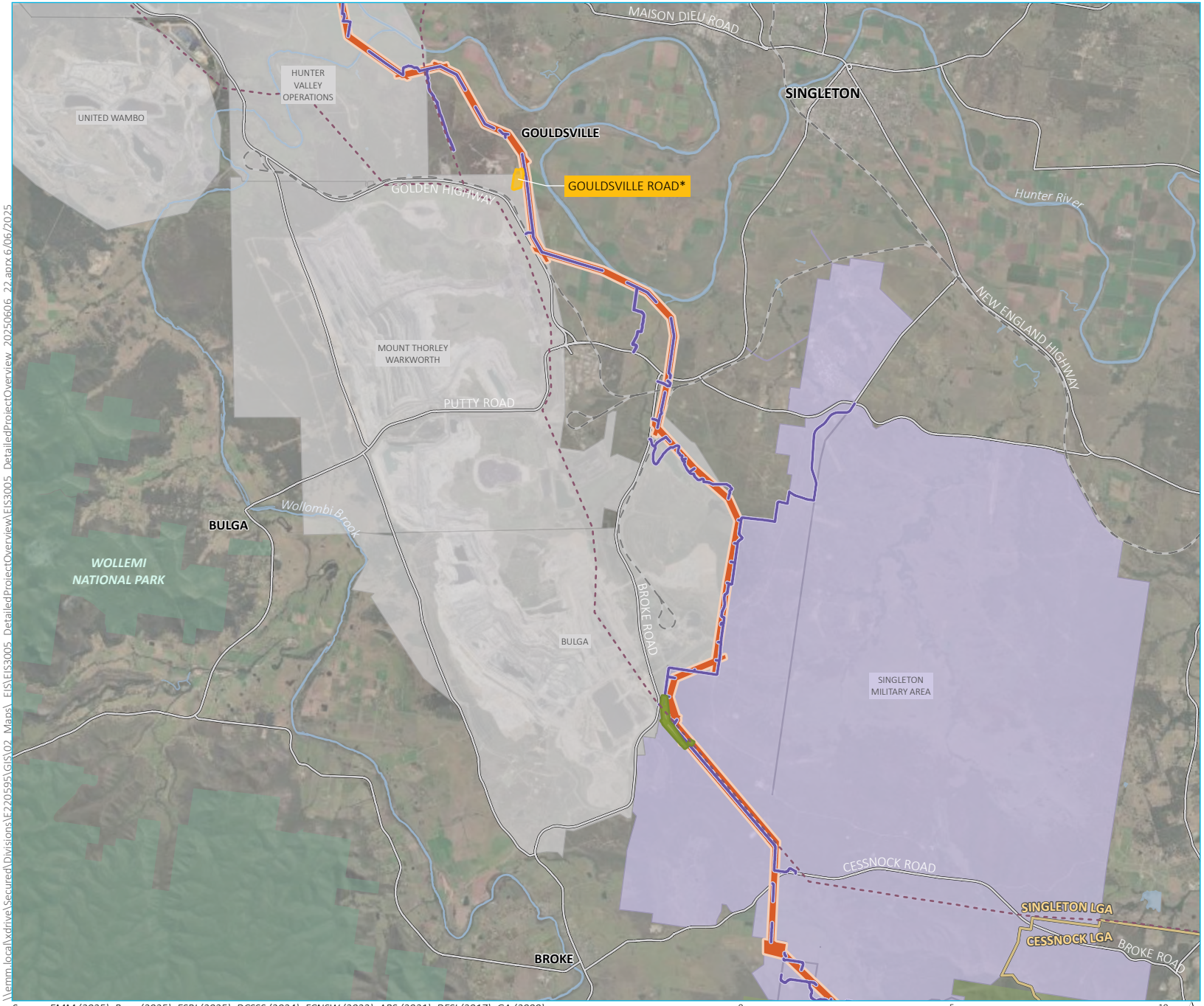
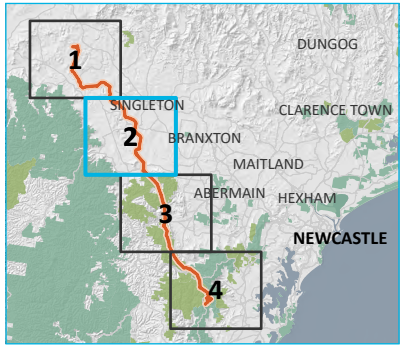
Detailed project overview
Map 1 of 4

Hunter Transmission Project
Environmental Impact Statement
Figure 2.2

EMM
creating opportunities





KEY

Project impact area

- HTP corridor
- Construction support site (*with temporary worker accommodation)
- Adjustment to existing transmission line (line 81)
- Access track

Existing environment

- 330 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Defence
- Mining
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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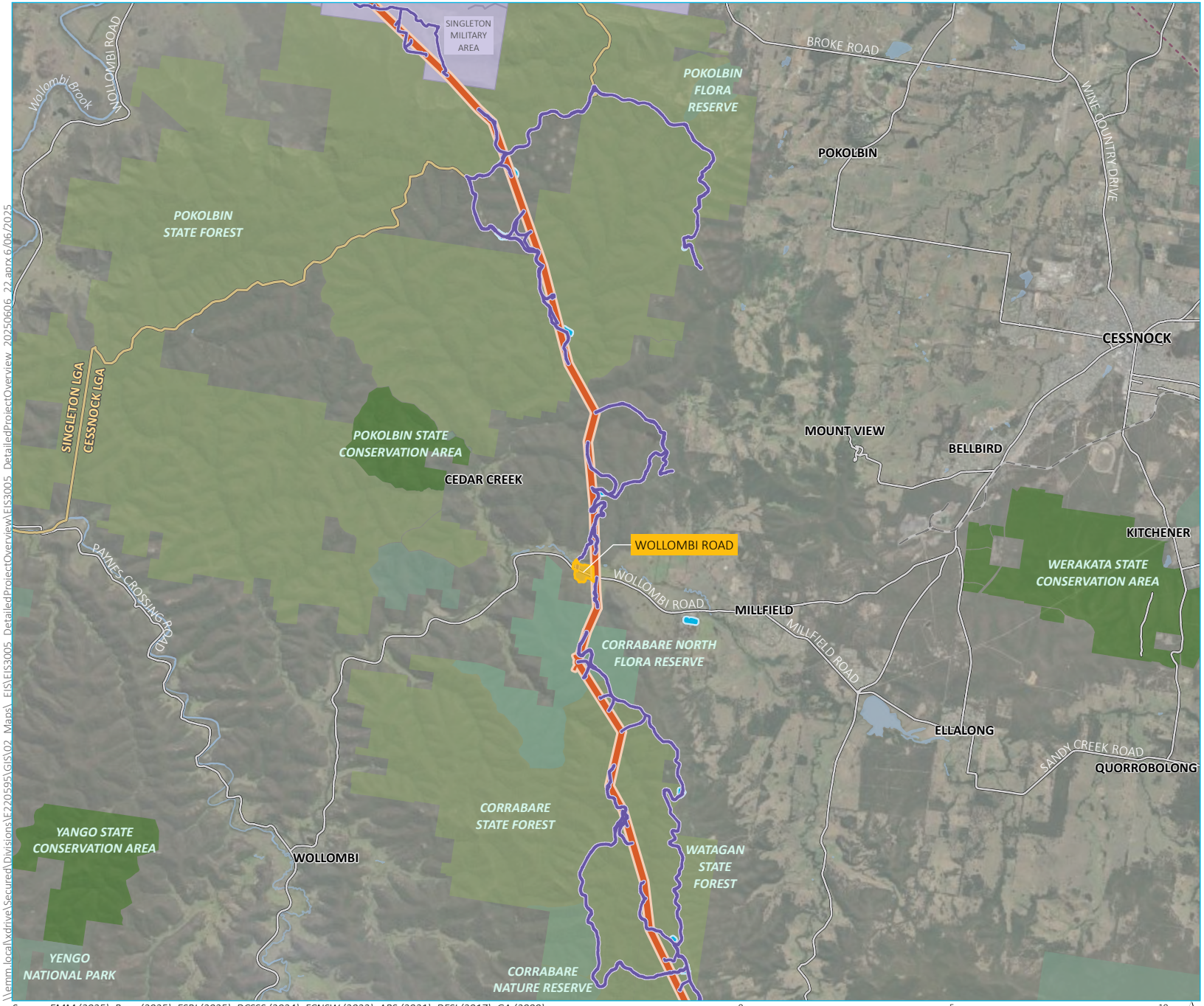
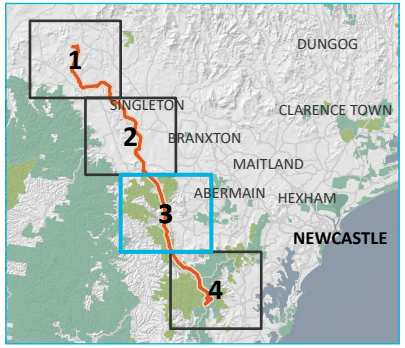
Detailed project overview
Map 2 of 4

Hunter Transmission Project
Environmental Impact Statement
Figure 2.2

EMM
creating opportunities





KEY

Project impact area

- HTP corridor
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Access track

Existing environment

- 330 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Defence
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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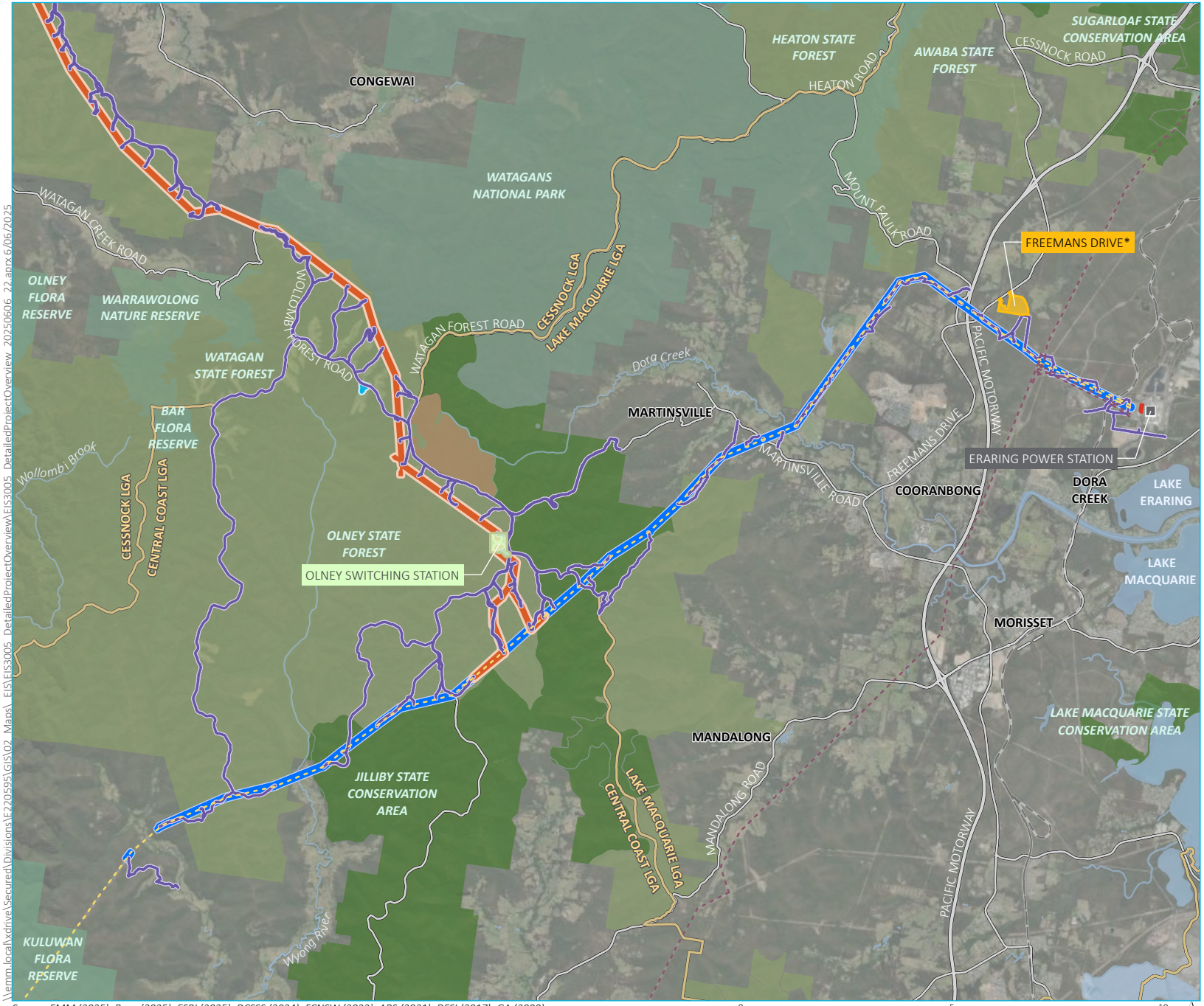
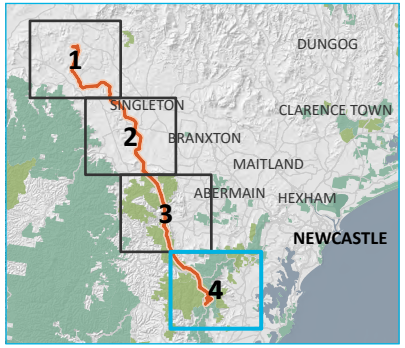
Detailed project overview
Map 3 of 4

Hunter Transmission Project
Environmental Impact Statement
Figure 2.2

EMM
creating opportunities





KEY

Project impact area
- HTP corridor
- Olney switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Recreation area
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

0 5 10 km

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Detailed project overview
Map 4 of 4

Hunter Transmission Project
Environmental Impact Statement
Figure 2.2

EMM
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3 Assessment methodology

3.1 Government plans, policies and guidelines

This aquatic biodiversity impact assessment has been prepared with reference to the following plans/policies/guidelines:

- *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW DPI, 2013)
- *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Watercourse Crossings* (Fairfull & Witheridge, 2003)
- *Aquatic Ecology in Environmental Impact Assessment – EIA Guideline* (NSW Department of Planning, 2003).

In addition to the listed policies and guidelines, the legislative requirements were also considered during the assessment (see sections 3.1.1 and 3.1.2).

3.1.1 Australian legislation

3.1.1.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance (MNES). There are 9 MNES to which the EPBC Act applies. These are:

- world heritage sites
- national heritage places
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- listed threatened species and ecological communities
- migratory species
- commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

A 'significant impact' is defined under the EPBC Act as 'an impact that is important, notable, or of consequence, having regard to its context or intensity' (Department of the Environment, 2013). A search of EPBC listed aquatic species within the biodiversity study area was completed, however, no listed species are likely to inhabit the project impact area as outlined in Appendix B.

The Australian Government Department of Climate Change, Energy, the Environment and Water declared the HTP (EPBC 2024/09874) to be a controlled action on 13 August 2024 in accordance with the EPBC Act due to likely impacts on species and ecological communities and Commonwealth land.

3.1.2 State legislation

3.1.2.1 Fisheries Management Act 1994 (FM Act)

The NSW *Fisheries Management Act 1994* (FM Act*)* is the primary piece of legislation to conserve important aquatic values and develop NSW fishery resources. This Act has 8 main objectives, however, the following 3 are the most pertinent to this project and assessment:

- conserve fish stocks and key fish habitats (KFH)
- conserve threatened species, populations and ecological communities of fish and marine vegetation
- promote ecologically sustainable development, including the conservation of biological diversity.

Part 7 of the FM Act relates to the protection of fish and aquatic habitats with the objective of conserving the biodiversity of fish and aquatic vegetation.

Schedule 4, 4A and 5 of the FM Act list the threatened aquatic species, communities and populations have been considered in this assessment.

3.1.2.2 Water Management Act 2000

The NSW *Water Management Act 2000* (WM Act) is the main piece of legislation used to manage water in NSW. The main objective of the WM Act is to protect water resources for the State to benefit both short and long-term water use. The objectives that are related to the management of aquatic ecosystems include:

- to apply the principles of ecologically sustainable development
- to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality
- to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,
- to encourage best practice in the management and use of water.

The WM Act underpins approvals related to water management. The approvals are listed in part 3 of the WM Act. The WM Act aims to protect the health of aquatic environments, therefore if there are any adverse impacts to water quality, this could result in the decrease of available aquatic habitat.

3.1.2.3 Environmental Planning and Assessment Act 1979 (EP&A Act)

The NSW *Environmental Planning Act 1979* (EP&A Act) provides the statutory controls that establish a framework governing what development is permitted or prohibited, and the processes for how assessment and gaining approval for development is undertaken in NSW. It is supported by the Environmental Planning and Assessment Regulation 2000 which provides additional detail and gives effect to the legislation.

Of relevance to the project, part 5 of the EP&A Act deals with infrastructure and environmental impact assessment. Division 5.2 of part 5 sets out the requirements for the assessment and approval of critical State significant infrastructure (CSSI). The Minister for Planning and Public Spaces has declared the project to be a CSSI project under section 5.13 of the EP&A Act.

3.2 Biodiversity study area

The biodiversity study area for the aquatic biodiversity impact assessment includes watercourses that cross the project impact area and are known to contain KFH. A desktop assessment included a 5-kilometre buffer search surrounding the project impact area to determine the potential for threatened species to occur within the crossed watercourses.

Surveyed watercourses were selected if they contained potential habitat for a threatened species or were more likely to be impacted by the project, as identified in the desktop assessment. The final selection for the survey locations was determined by which watercourses were accessible (i.e. land access, safety). The watercourses assessed extended from Lemington Road to Watagan National Park (Figure 4.2).

3.3 Desktop assessment

To determine the need for an EPBC Act or FM Act threatened aquatic species assessment, a desktop study was undertaken. The study included a 5-kilometre buffer search surrounding the biodiversity study area.

3.3.1 Threatened species identification

To identify the nationally threatened aquatic fauna protected under the EPBC Act and the FM Act a search of the biodiversity study area using the Protected Matters Search Tool (PMST), Fisheries NSW spatial data portal and Atlas of Living Australia was conducted in September 2024 (DCCEEW, 2024; DPI, 2024; Atlas of Living Australia, 2024). Only the species that are likely or known to occur within the biodiversity study area were assessed against the likelihood of occurrence (Table 3.1).

3.3.2 Identification of key fish habitat and watercourse information

To identify the KFH a search of the biodiversity study area using the Fisheries NSW spatial data portal was conducted in September 2024 (DPI, 2024). This publicly available data provides information of the location of both KFH and threatened species-specific habitat.

3.3.3 Strahler order

The Strahler order is a classification system used to describe the hierarchy of a watercourse. Each watercourse is assigned an order, which is determined by the number of tributaries that flow into that watercourse. Larger watercourses have a higher Strahler order as more tributaries feed into that system (NSW DPI, 2025). To identify the Strahler order of the watercourses within the biodiversity study area, the SEED database was accessed (NSW DCCEEW, 2022).

3.3.4 Policy review

The aquatic habitats within the biodiversity study area were assessed against the following policy and guidelines for fish habitat conservation and management:

- *Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013)* (NSW DPI, 2013)
- *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Watercourse Crossings* (Fairfull & Witheridge, 2003)
- *Aquatic Ecology in Environmental Impact Assessment – EIA Guideline* (NSW Department of Planning, 2003).

Guidance within these policies was used to suggest mitigation and management measures for the project based on the quality of the watercourses assessed in the desktop assessment.

3.3.5 *Likelihood of occurrence assessment*

The likelihood of occurrence of threatened aquatic species, ecological communities and populations was determined based on the criteria outline in Table 3.1. This method considers the habitat requirements of the species, outcomes of an on-site habitat assessment, the state of habitat connectivity, records of historical and recent presence as identified in the desktop assessment.

Relevant databases were searched in September 2024 for records of threatened aquatic flora and fauna species and significant aquatic habitat (i.e. KFH). This review was used to prepare a list of threatened or migratory aquatic species and any significant habitat previously recorded or predicted to occur in the biodiversity study area. The likelihood of occurrence assessment was subsequently updated based on the field assessment results.

Table 3.1 Likelihood of occurrence criteria for threatened flora and fauna species

Likelihood	Description
Low	Species considered to have a low likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria: — have not been recorded previously in the biodiversity study area and for which the biodiversity study area is beyond the current distribution range — rely on specific habitat types or resources that are not present in the biodiversity study area — are considered locally extinct.
Moderate	Species considered to have a moderate likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria: — have infrequently been recorded previously in the biodiversity study area — use habitat types or resources that are present in the biodiversity study area, although generally in a poor or modified condition — are unlikely to maintain sedentary populations, however, may seasonally use resources within the biodiversity study area opportunistically during variable seasons or migration.
High	Species considered to have a high likelihood of occurrence include species not recorded that fit one or more of the following criteria: — have frequently been recorded previously in the biodiversity study area — use habitat types or resources that are present in the biodiversity study area, that are abundant and/or in good condition within the biodiversity study area — are known or likely to maintain resident populations within the biodiversity study area — are known or likely to visit the biodiversity study area during regular seasonal movements or migration.

3.4 Field survey

Following the desktop assessment, 8 survey sites located along 7 watercourses intersecting the project impact area were selected for adetailed field assessment of aquatic biodiversity values. Of these sites, one (Jilliby Creek), was unable to be accessed due to health and safety risks. The assessment of Jilliby Creek was therefore completed using desktop research.

Watercourses were selected as they were deemed to either contain habitat for a threatened species, were more likely to be impacted by the project (i.e. access road crossings) or were a major watercourse known to have ecological importance. The watercourses assessed during the field survey is identified in Table 3.2 (shown in Figure 4.2).

The field survey assessment was conducted over a 3-day period, between 10–12 September 2024 by Tia Gabruch (aquatic ecologist) who has more than 10 years experience working in freshwater ecology.

Table 3.2 Watercourses assessed

Site (SW ID)	Watercourse	Location	Stream Order
01	Hunter River	-32.516961, 150.937268	9
02	Hunter River	-32.511382, 150.976753	9
05	Wollombi Brook	-35.554303, 151.029558	8
07	Loader Creek	-32.621022, 151.121591	4
8a	Monkey Creek	-32.751977, 151.172002	5
11/12	Congewai Creek	-32.878187, 151.219330	6
13c	Watagan Creek	-33.029977, 151.319049	4

Macroinvertebrates or aquatic vertebrates were not collected as a part of this assessment and only incidental observations were recorded.

Habitat characterisation, KFH assessment, riparian health and water quality were assessed at each location to determine the ecological importance of each watercourse (see section 4.3) The results were used to determine the likelihood of aquatic species occurrence/presence.

3.4.1 Habitat assessment

During the survey the habitat characteristics of each surveyed watercourse was identified. The presence, absence and/or quality of each habitat characteristic determined the overall quality of the aquatic ecosystem. Broad measurement and descriptions of the following habitat characteristics were recorded to determine the quality of attributes of the local ecosystem:

- riparian vegetation condition, including cover and presence of introduced plants and weeds
- morphological description of the stream (i.e. stream gradient, channel morphology)
- instream features (i.e. snags, aquatic vegetation, rocks, woody debris)
- description of bank features (i.e. stability, morphology)
  - the banks of the watercourse are defined as right or left relative to a view downstream
- watercourse measurements (i.e. wetted and bank full width, flow velocity)
- identification of sensitive habitat features as described by Department of Primary Industries (2013)
- identification of fish habitat features
- fish passage barriers.

A reach of around 400 metres at each survey site was assessed. This varied for Loader Creek and Congewai Creek due to access constraints. For these sites, 1 upstream location and 2 downstream locations were assessed. The upstream location acts as a reference point for the project, whereas the downstream sample points were used to determine the extent of potential impacts from the project on the watercourse.

Photographs were taken at all sites to provide a record of habitat conditions (Table 3.2).

3.4.2 Key fish habitat

The *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW DPI, 2013) defines fish habitat sensitivity as “importance of the habitat to the survival of fish”. The watercourse class and sensitivities of fish habitat are determined by the functionality of the watercourse as fish passage (NSW DPI, 2013). Using the characteristics outlined in Table 3.3 and Table 3.4, each watercourse was assigned a sensitivity ranking (watercourse type) and water classification (watercourse class).

The combination of the type and class of each watercourse assigned to the surveyed watercourses has informed the impact assessment and identification of the required mitigations and/or potential design changes that will be required to ensure KFH is protected and maintained as per the requirements of the FM Act.

Table 3.3 KFH classifications

Fish habitat sensitivity	Characteristics of watercourse type (freshwater only)
Type 1 – Highly Sensitive	— Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia — Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants — Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act.
Type 2 – Moderately Sensitive	— Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1 — Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse.
Type 3 – Minimal Sensitive	— Unstable or unvegetated sand or mud substrate — Freshwater habitats not included in Types 1 or 2 — Ephemeral aquatic habitat not supporting native aquatic or wetland vegetation.

Source: DPI, 2013

Table 3.4 Classification of watercourses for fish passage

Classification	Characteristics of watercourse class
Class 1 – Major KFH	Marine or estuarine watercourse or permanently flowing or flooded freshwater watercourse habitat of a threatened or protected fish species or 'critical habitat'.
Class 2 – Moderate KFH	Non-permanently flowing stream, creek or watercourse with clearly defined bed and banks with semi-permanent to permanent waters in pools or is connected wetland areas. Freshwater aquatic vegetation is present. Type 1 and 2 habitats present.
Class 3 – Minimal KFH	Named or unnamed watercourse with intermittent flow and sporadic refuge, breeding or feeding areas for aquatic fauna. Semi-permanent pools form within the watercourse or adjacent wetlands after a rain event. Otherwise, any minor watercourse that interconnects with wetlands or other class 1–3 fish habitats.
Class 4 – Unlikely KFH	Watercourse (generally unnamed) with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free-standing water or pools post rain events (e.g. dry gullies or shallow floodplain depressions with no aquatic flora present).

Source: DPI, 2013

3.4.3 Water quality

In-situ water quality measurements were taken at each survey location using a handheld YSI ProDSS. Water quality measurements were obtained at around 2/3 of the watercourses' depth and recorded turbidity (NTU), dissolved oxygen (%), pH, temperature (°C) and conductivity (µs/cm). These measurements were used to determine if the water quality at each survey site could support fish and other aquatic species.

4 Existing environment

4.1 Overview

The HTP corridor runs mostly through power station, mining and government land between Bayswater and Broke in the upper Hunter region. It then traverses the Pokolbin, Corrabare, Watagan and Olney State Forests in the lower Hunter region (see Figure 4.2).

The proposed new transmission line would connect the new the Bayswater South switching station to the existing 500 kV transmission line near the Bayswater power station and the new Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek.

The project is located within the Hunter-Central Rivers catchment and Hunter River sub-catchment. The project will cross 20 named watercourses as well as many unnamed lower order watercourses (90% being Strahler Order <2). Of these, 4 were determined to contain mapped habitat for aquatic Southern purple spotted gudgeon, which is listed as endangered under the FM Act.

This Aquatic Assessment is limited to assessing impacts to FM Act species. Assessments pertaining to groundwater dependant ecosystems (GDE) and threatened semi-aquatic fauna are discussed in the Biodiversity Development Assessment Report (BDAR).

4.2 Desktop assessment

4.2.1 Catchment and drainage

The HTP is located within the Hunter River and the Tuggerah Lakes and Lake Macquarie catchments, which form part of the Hunter-Central Rivers catchment. This area encompasses around 37,000 km^2 of the east coast of NSW (NSW DPIRD, n.d.). For management purposes the Hunter-Central Rivers catchment is further divided into 3 sub-catchments:

- **Tuggerah Lakes and Lake Macquarie sub-catchment**: includes the north coast bioregion including the Port Stephens – Great Lakes Marine Park, and Myall Lakes Ramsar wetlands.
- **Hunter sub-catchment:** includes the Hunter River and all tributaries.
- **Hawkesbury sub-catchment**: extends to the southern outskirts of Newcastle in the north and to Brisbane Water along the coast.

The majority of the watercourses (including the field surveyed watercourses) assessed are located within the Hunter sub-catchment, while all watercourses in the south eastern extent are in the Tuggerah Lakes and Lake Macquarie sub-catchment (see Figure 4.1 and Figure 4.3).

All potential watercourses within the Tuggerah Lakes and Lake Macquarie sub-catchment tend to have a lower Strahler order.

Water and habitat quality of the Hunter sub-catchment is impacted by various industries within the region particularly agricultural and mining activities and to a lesser extent, infrastructure developments, forestry works and urban development. These anthropogenic activities have modified the natural aquatic environment substantially, including major infrastructure developments, roads, rail and agriculture. As a result, the catchment contains several poor (low water quality and habitat value) to good (high water quality and habitat value) quality watercourses that will be crossed by the HTP.

Most tributaries within the Hunter sub-catchment terminate at the Hunter River, which then eventually flows into the Tasman Sea. The surveyed watercourses directly connected to the Hunter River are Loder Creek and Wollombi Brook and land use surrounding these watercourses are highly modified and/or disturbed as a result of agricultural activity, mining activities or urban development. The watercourses in this area have the potential to have modified banks, riparian vegetation inundated with invasives, poor water quality from agricultural and mining run-off and be subjected to seasonal flooding, which impacts the suitability for good aquatic habitat.

Wollombi Brook is a high order watercourse that is fed by a number of tributaries, including surveyed watercourses Watagan Creek, Monkey Place Creek and Congewai Creek. Monkey Place Creek and Congewai Creek consist of gently sloping rural land that is largely cleared. The land use in the project impact area from the northwest end to the southeast before Pokolbin State Forest consists mostly of cleared rural properties and coal mines. Very few patches of remnant bushland occur within this section of the catchment area. The project impact area is dominated by surface runoff from rainfall which concentrates into defined watercourse catchments. Watagan Creek is located within national, State and conservation parks, that are used for both public recreation and forestry industries. The watercourses within this area remain largely intact as they are not as influenced by anthropogenic activities.

Dora Creek is a watercourse located at the southeast end of the project impact area. Unlike the rest of the watercourses within the project impact area, Dora Creek and associated tributaries terminates at Lake Macquarie and is therefore part of the Tuggerah Lakes and Lake Macquarie sub-catchment (NSW DPI, 2006).

Historic records of rainfall and flood events indicate that runoff is typically confined to the main channels within the Hunter sub-catchment and quickly flows down to the lower portions of the catchments in the project impact area. Water quality, quantity and velocity of flows within the project impact area are influenced by agricultural activities. Vegetation removal, agriculture, de-snagging, and construction of in-stream dams has affected the physical stability of the watercourses within the project impact area and streambank erosion is common, particularly in the north of the project impact area.

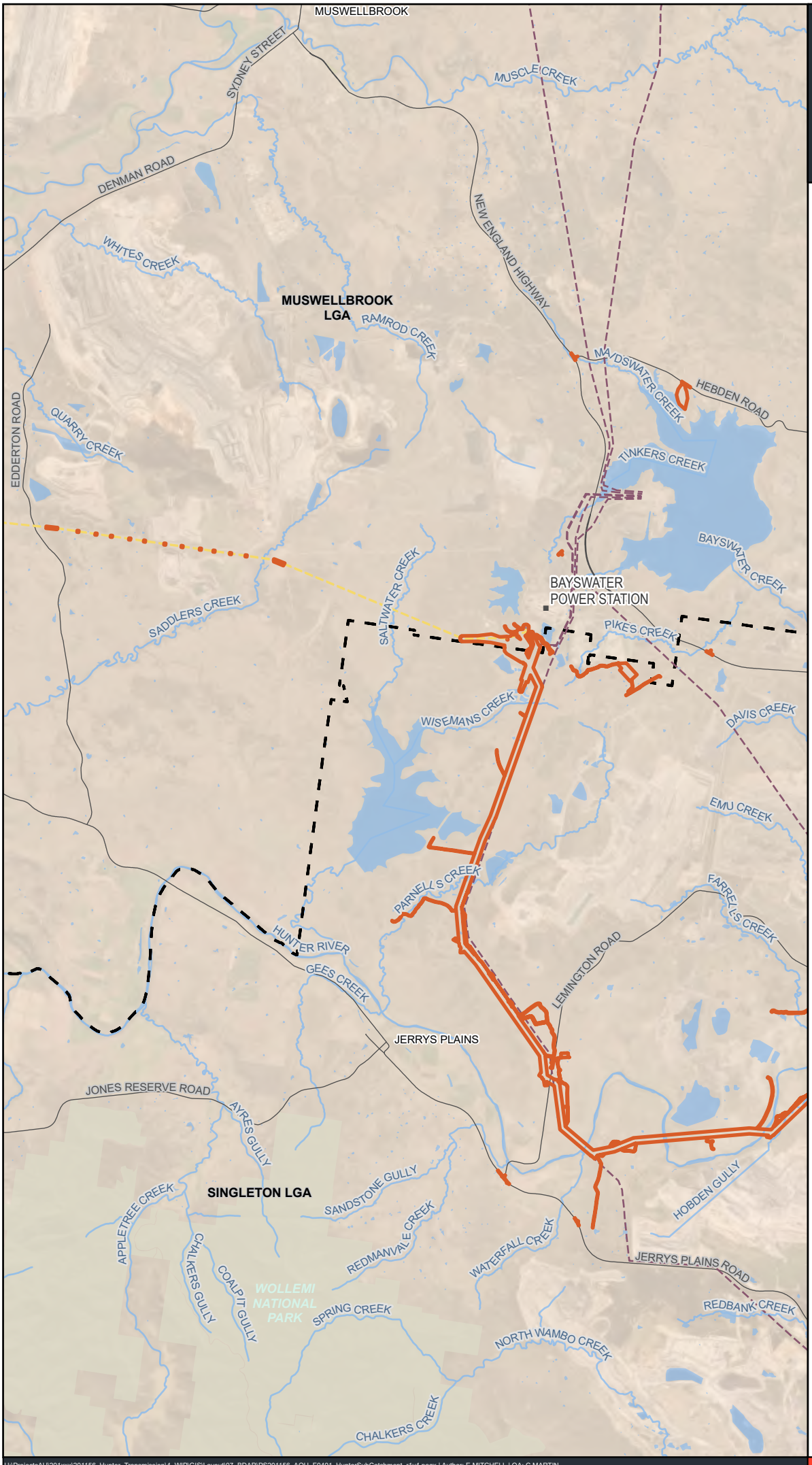
Watercourses throughout HTP are mapped as KFH, indicating that the Hunter River and associated tributaries provide habitat for fish and is likely to support a healthy and stable fish population (see section 3.4.2).

4.2.2 Aquatic biodiversity in Hunter-Central Rivers

The Hunter-Central Rivers catchment spans a large area and contains waterbodies varying in size, health and habitat characterisation throughout its extent. This variety gives rise to an area that can support high biodiversity, particularity of water dependant fauna. Aquatic fauna tends to be extremely sensitive to changes in water quality and health, therefore a plethora of species can indicate a healthy aquatic ecosystem.

Fifty-eight species of frogs are known to inhabit the Hunter-Central Rivers catchment along with a number of semi-aquatic reptiles (i.e. water dragons and turtles) and semi-aquatic mammals (i.e. platypus (*Ornithorhynchus anatinus*), water rats (*Hydromys chrysogaster),* and swamp rats (*Rattus lutreolus*)) (NSW DPI, 2006). Information specific to such semi-aquatic species (amphibians, reptiles, birds and mammals) has been discussed in the BDAR (WSP, 2025).

Watercourses within the Hunter River region contain mapped KFH inhabited by a number of protected marine, estuarine and freshwater species such as black cod (*Epinephelus daemelii*), weedy seadragon (*Phyllopteryx aeniolatus*), southern purple spotted gudgeon and the Darling River hardyhead (*Craterocephalus amniculus)* (NSW DPI, 2006). As such, fauna indicators suggest this catchment is a healthy and diverse aquatic ecosystem.



Hunter Transmission Project
Biodiversity Development Assessment Report

Figure 4.1
Hunter-Central River Sub-Catchments

Legend

- Biodiversity study area

Existing environment

- Road
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
- State forest
- Local government area

Hunter/Central river subcatchments

- HUNTER

0 1 2
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020

1:125,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Earthstar Geographics

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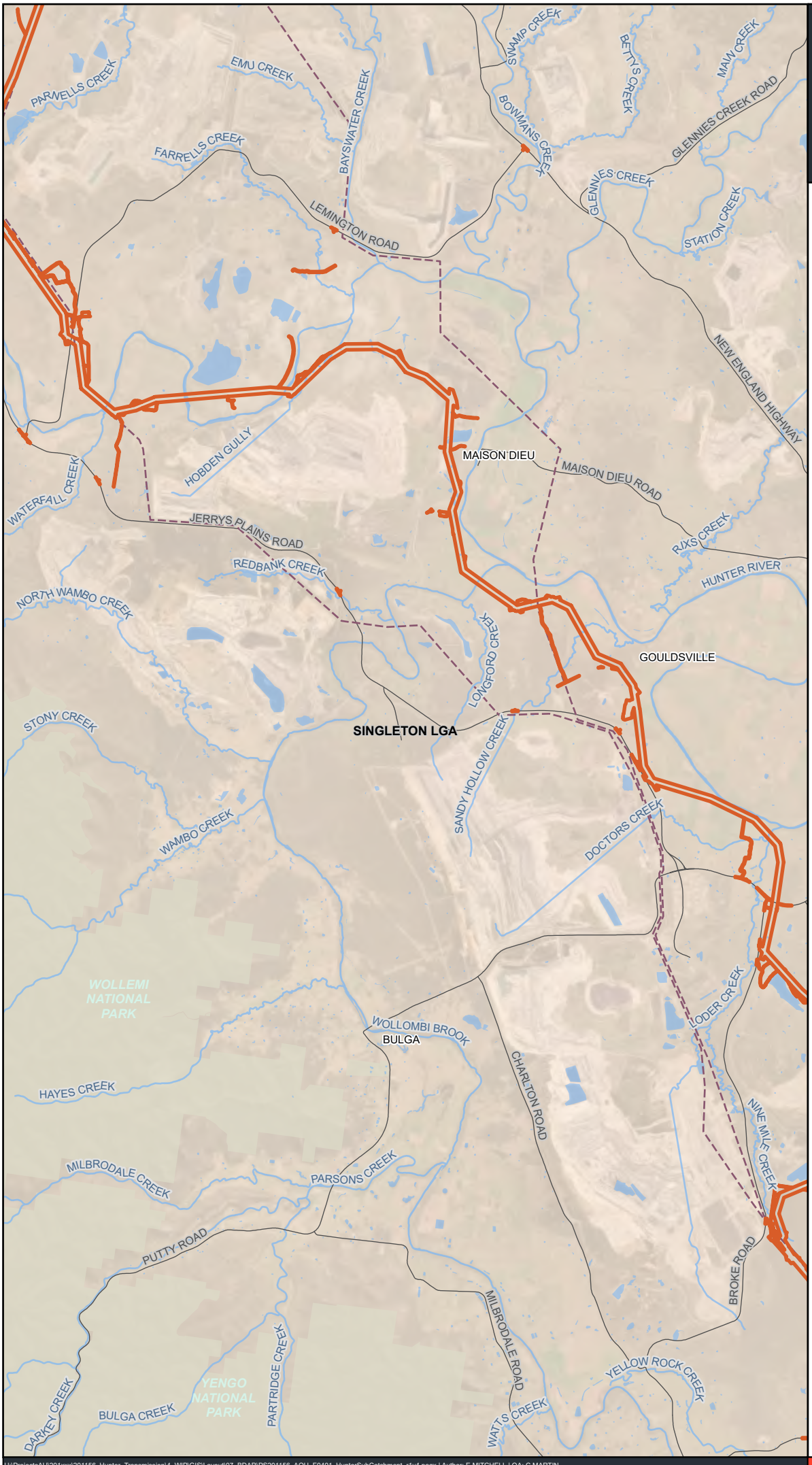

Hunter Transmission Project
Biodiversity Development Assessment Report

Figure 4.1
Hunter-Central River Sub-Catchments

Legend

- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
- Local government area

Hunter/Central river subcatchments

- HUNTER

0 1 2
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020

1:125,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Earthstar Geographics

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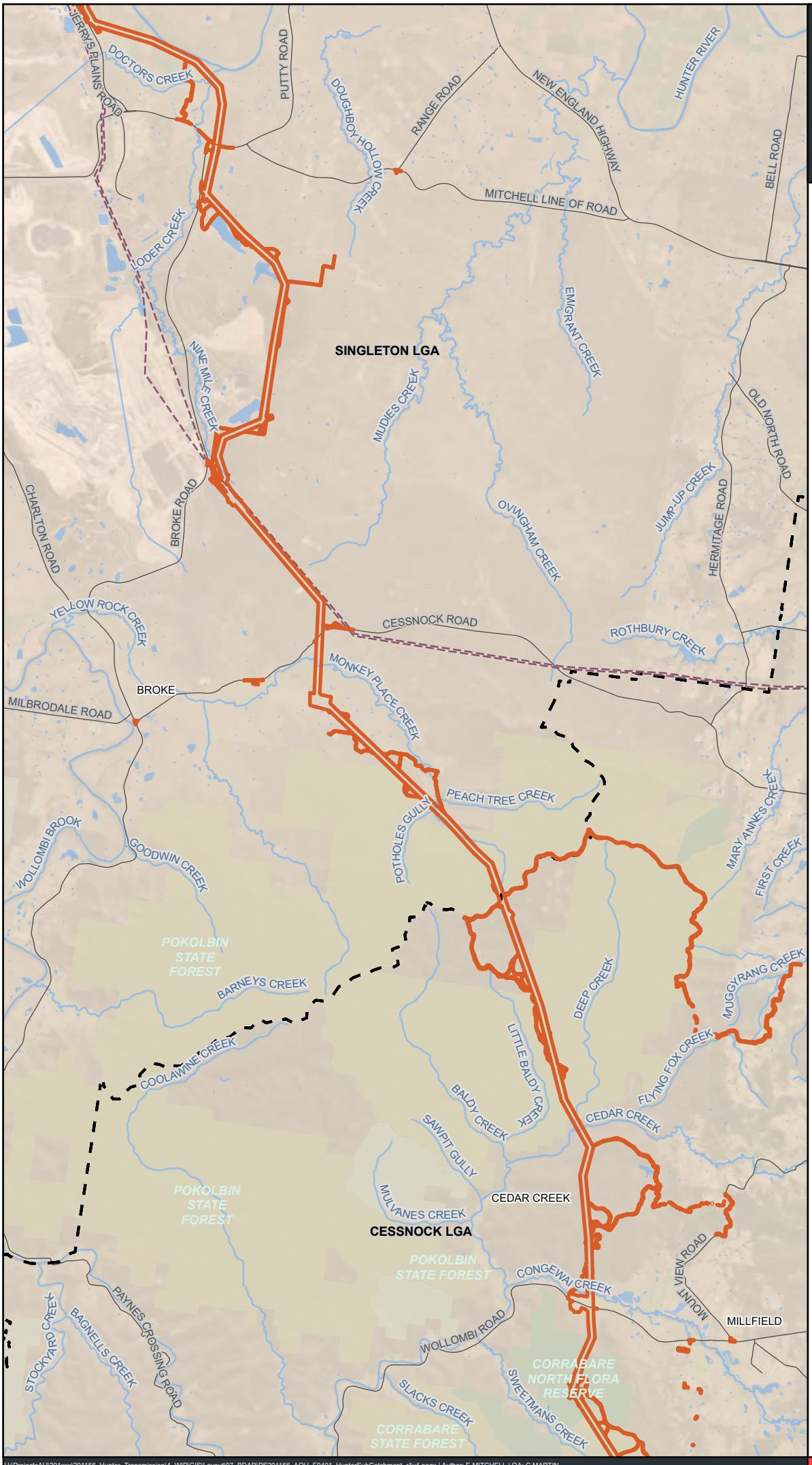

Hunter Transmission Project
Biodiversity Development Assessment Report

Figure 4.1
Hunter-Central River Sub-Catchments

Legend

- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
- Flora reserve
- State forest
- Local government area

Hunter/Central river subcatchments

- HUNTER

0 1 2
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020

1:125,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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Hunter Transmission Project
Biodiversity Development Assessment Report

Figure 4.1
Hunter-Central River Sub-Catchments

Legend

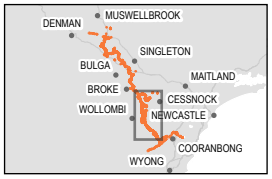
- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
- State conservation area
- Flora reserve
- State forest
- Local government area

Hunter/Central river subcatchments

- HUNTER
- LAKE.MACQUARIE/ TUGGERAH.LAKES



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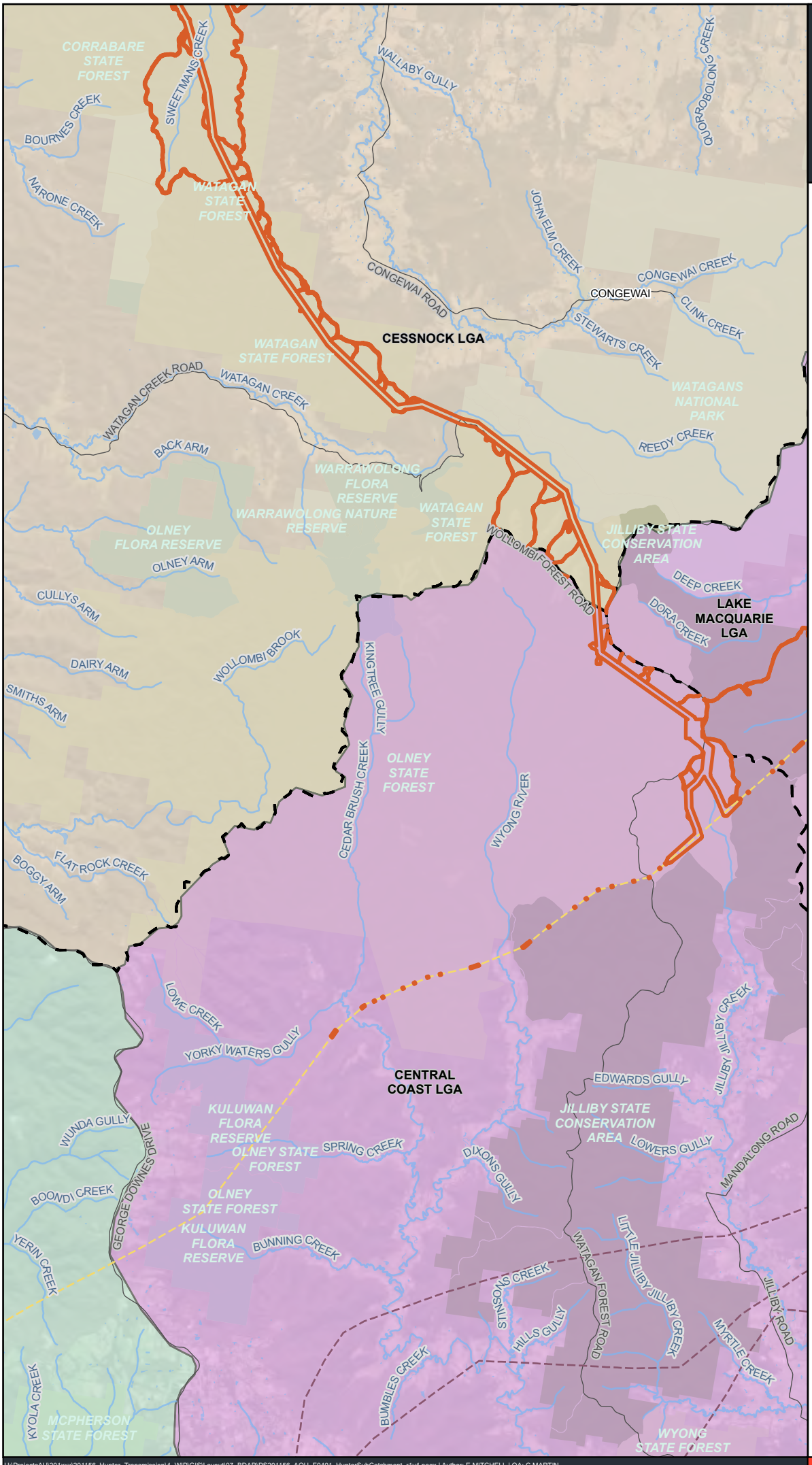

Hunter Transmission Project
Biodiversity Development Assessment Report

Figure 4.1
Hunter-Central River Sub-Catchments

Legend

- Biodiversity study area

Existing environment

- Road
- 330 kV transmission line
- 500 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
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- Flora reserve
- State forest
- Local government area

Hunter/Central river subcatchments

- HAWKESBURY
- HUNTER
- LAKE.MACQUARIE/ TUGGERAH.LAKES

0 1 2
Kilometres

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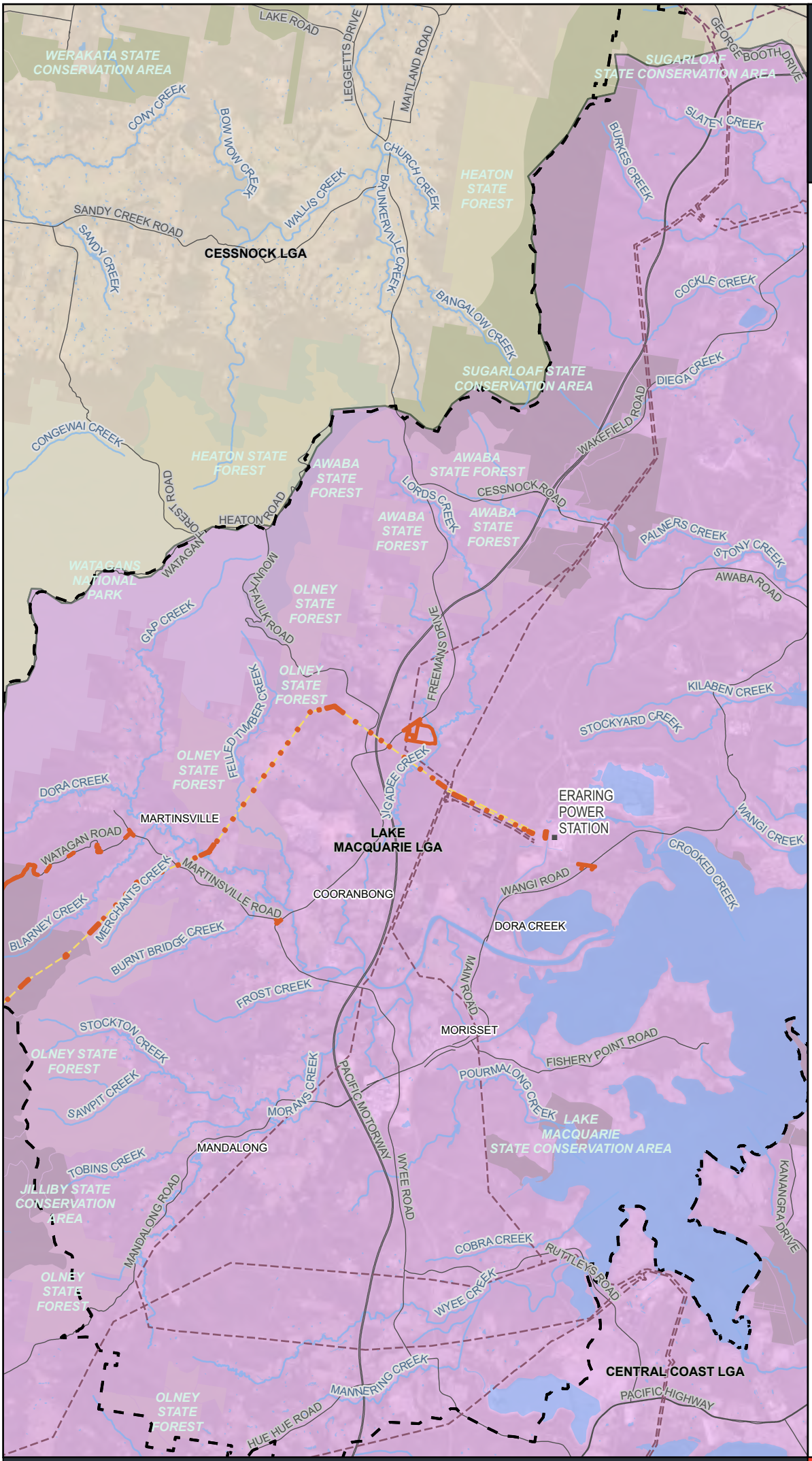

Hunter Transmission Project Biodiversity Development Assessment Report

Figure 4.1
Hunter-Central River Sub-Catchments

Legend

- Biodiversity study area

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- HUNTER
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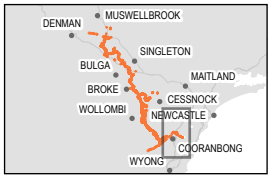

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4.2.3 *Fish habitat and crossed watercourses*

4.2.3.1 Crossed watercourses

There are several named and unnamed watercourses intersecting the HTP which contain KFH. A total of 20 named watercourses, 16 of which contain KFH, are expected to be crossed by the HTP (see Table 4.1 and Figure 4.2).

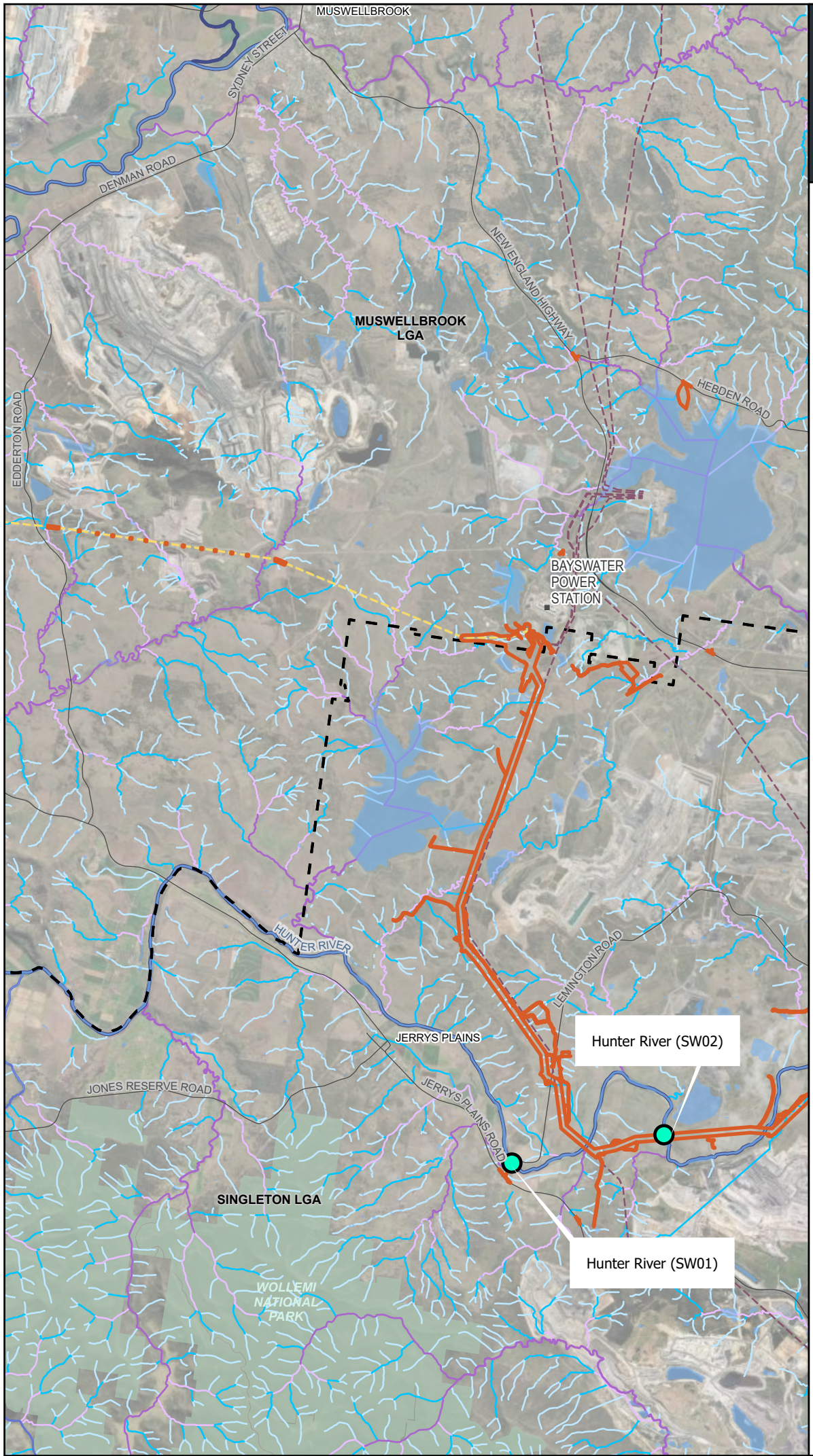
Table 4.1 Named watercourses crossed by the HTP

Watercourse name	Strahler order	Key fish habitat present	Indicative distribution of threatened species	Number of crossings	Crossing type (no. of times crossed)
Black Creek	5	Yes	Southern purple spotted gudgeon	1	Access road
Cedar Creek	5	Yes	None	1	Transmission line
Congewai Creek	6	Yes	Southern purple spotted gudgeon	1	Transmission line
Deep Creek	5	Yes	None	1	Transmission line
Doctors Creek	2	Yes	None	1	Transmission line
Hobden Gully	2	Yes	None	8	Transmission line (3) and access road (5)
Hunter River	9	Yes	None	3	Transmission line
Loder Creek	4	Yes	None	4	Transmission line
Monkey Place Creek	5, 4 and 3	Yes	Southern purple spotted gudgeon	5	Transmission line (3) and access road (2)
Nine Mile Creek	2	No	None	3	Transmission line (1) and access road (2)
Parnells Creek	3	Yes	None	3	Transmission line and access road
Peach Tree Creek	4	Yes	None	1	Access road
Pikes Creek	1	No	None	1	Access road
Pokolbin Creek	3	No	None	1	Access road
Potholes Gully	3	Yes	None	1	Transmission line
Sandy Hollow Creek	3	Yes	None	2	Transmission line and access road
Sweetmans Creek	4, 3	Yes	None	2	Transmission line
Wiseman Creek	2	No	None	1	Transmission line
Wollombi Brook	8	Yes	Southern purple spotted gudgeon	1	Transmission line
Watagan Creek	4	Yes	None	1	Transmission line

Around 355 crossings of unnamed watercourses and drainage lines are expected, of theses, 48 contain mapped KFH (see Table 4.2). Although these unnamed watercourses are not major tributaries, they still have the potential to provide potential habitat.

Table 4.2 Unnamed watercourse crossings within HTP

Number of crossings	Strahler order	Key fish habitat present
Two unnamed watercourse crossing	4	Yes
One unnamed watercourse crossing	4	No
Nineteen (19) unnamed watercourse crossing	3	Yes
Two unnamed watercourse crossing	3	No
Thirteen (13) unnamed watercourse crossing	2	Yes
Forty-seven (47) unnamed watercourse crossing	2	No
Fourteen (14) unnamed watercourse crossing	1	Yes
Two hundred and fifty-eight (258) unnamed watercourse crossing	1	No



Hunter Transmission Project Biodiversity Development Assessment Report

Figure 4.2
Location of Assessed Watercourses

Legend

- Biodiversity study area

Existing environment

- Road
- Power station
- 330 kV transmission line
- 500 kV transmission line
- River
- Waterbody
- NPWS reserve
- State forest
- Local government area
- Assessed watercourse

Strahler stream order

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 8
- 9

0 1 2
Kilometres

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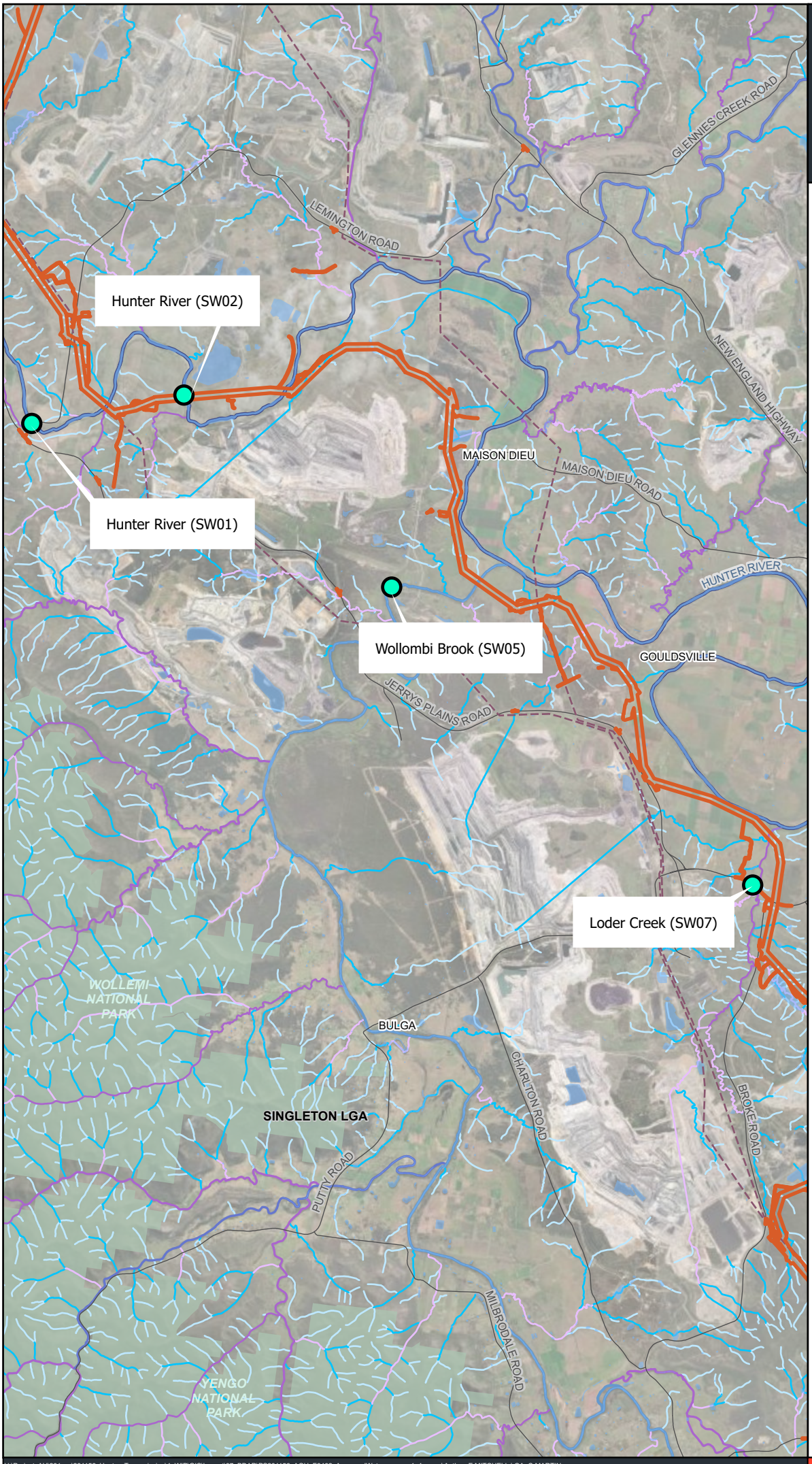

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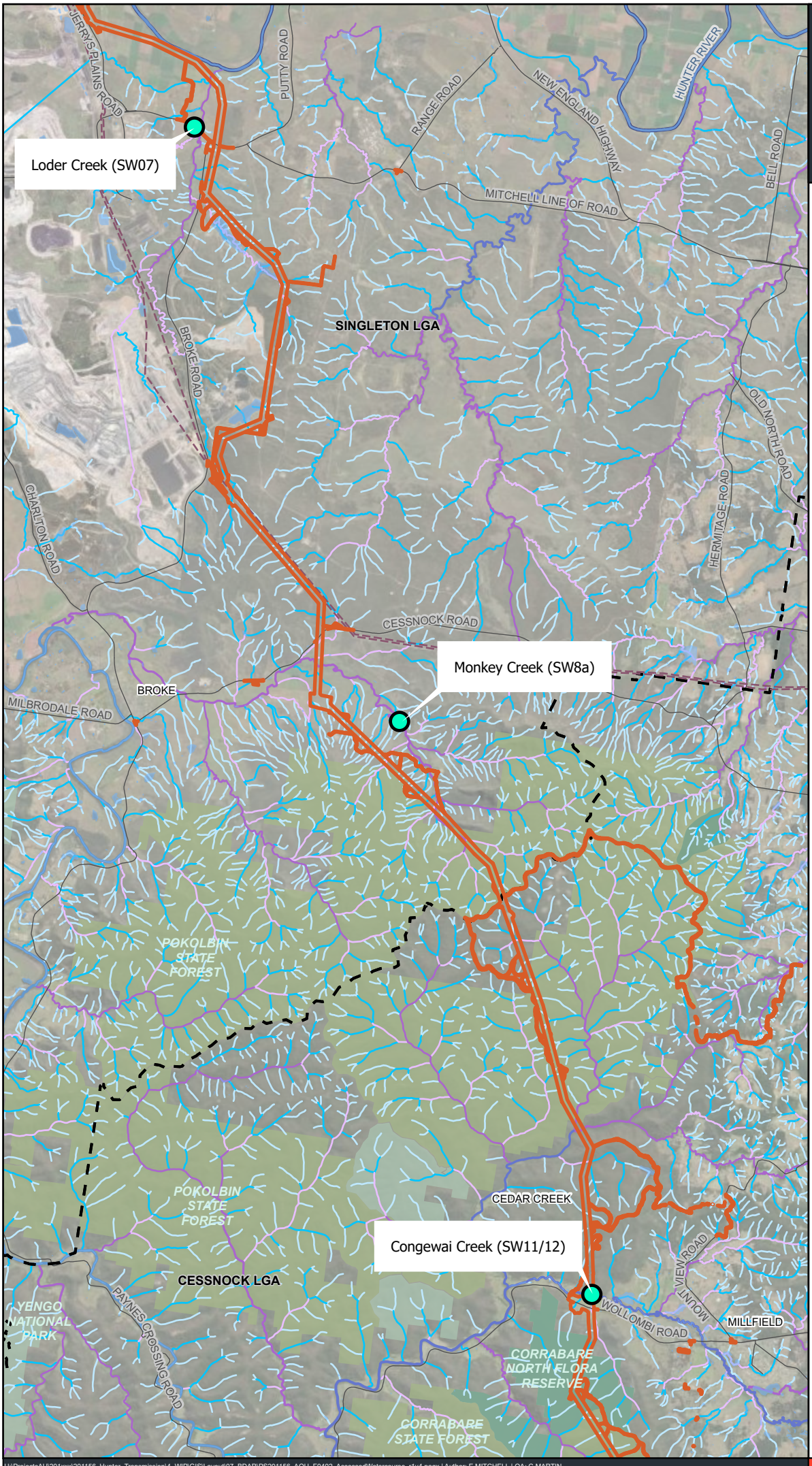

Hunter Transmission Project Biodiversity Development Assessment Report

Figure 4.2
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Strahler stream order

- 1
- 2
- 3
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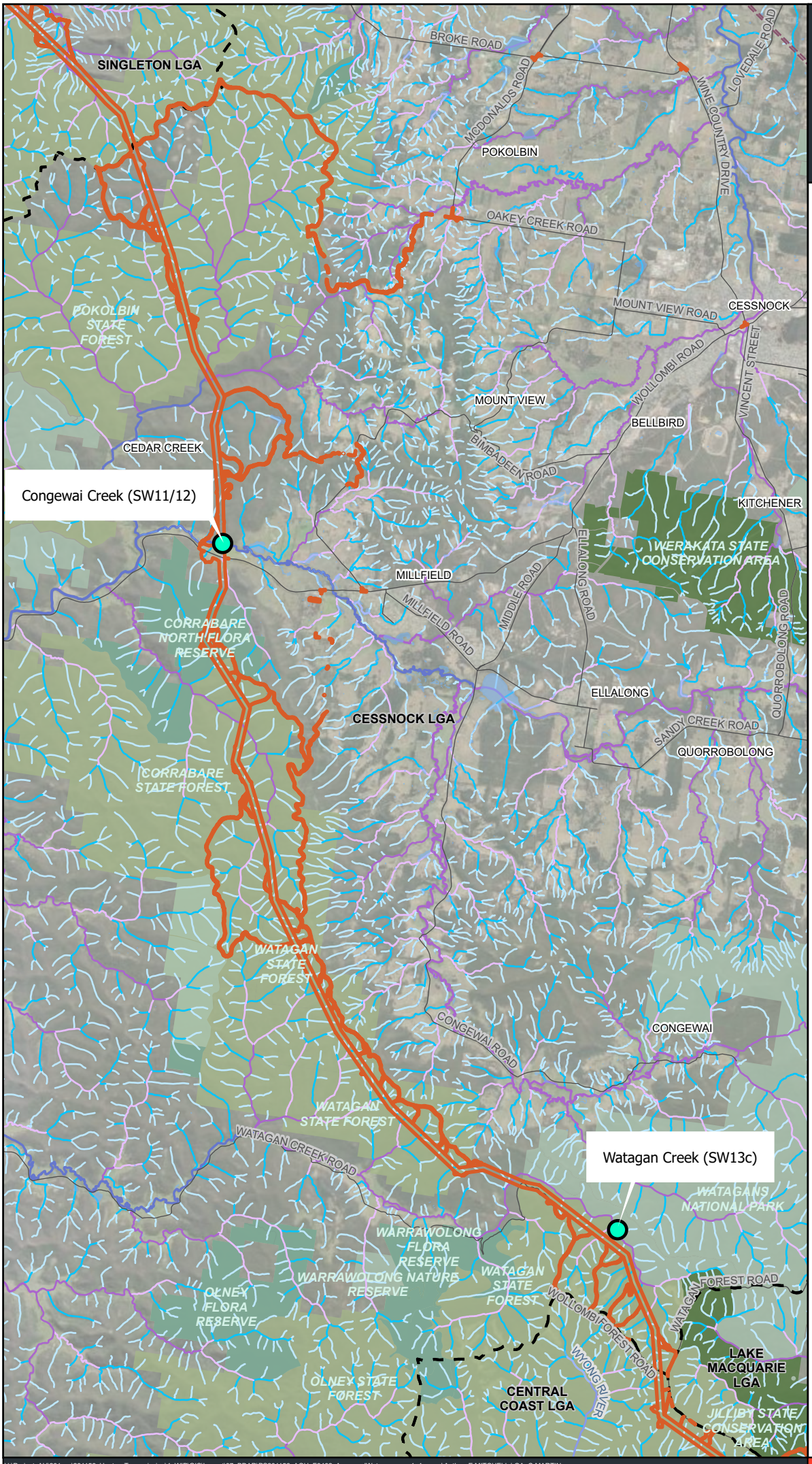

Hunter Transmission Project
Biodiversity Development Assessment Report

Figure 4.2
Location of Assessed Watercourses

Legend

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Strahler stream order

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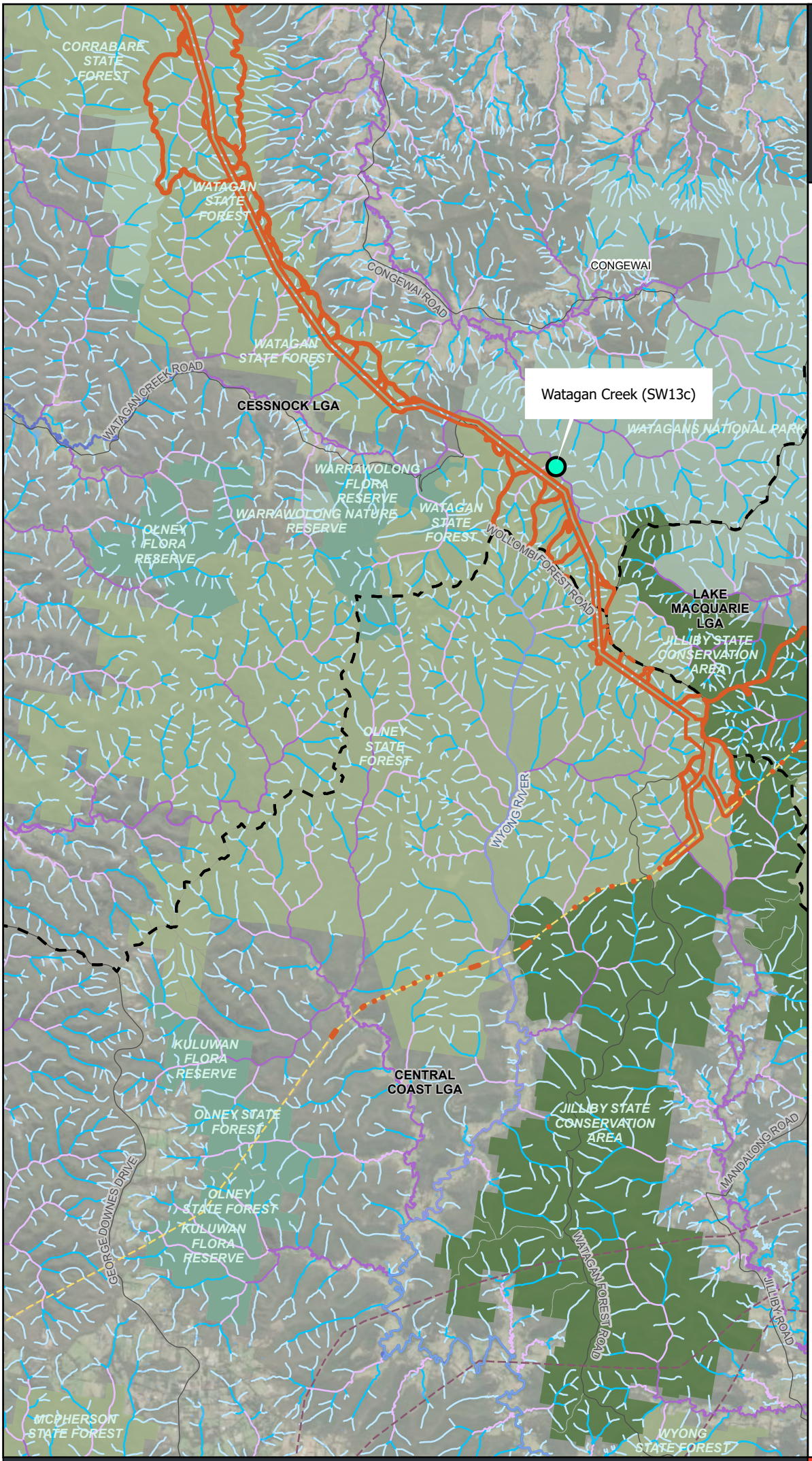

Hunter Transmission Project Biodiversity Development Assessment Report

Figure 4.2
Location of Assessed Watercourses

Legend

- Biodiversity study area

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Strahler stream order

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- 2
- 3
- 4
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- 6

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Figure 4.2
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Strahler stream order

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- 1
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- 4
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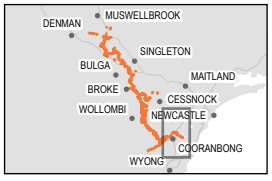

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4.2.3.2 Mapped key fish habitat

The KFH and associated sensitivity classification scheme is demonstrated in Table 1 of the *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW DPI, 2013). Under this scheme any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act is defined as "type 1 – highly sensitive key fish habitat". Sixteen named watercourses and 48 unnamed watercourse crossings within the project impact area are mapped as being KFH and of these 4 were mapped to be key habitat for the Southern purple spotted gudgeon.

According to the Fisheries NSW Spatial Data Portal, the biodiversity study area contains mapped habitat for Southern purple spotted gudgeon, which is listed as endangered under the FM Act. The mapped habitat occurs throughout various tributaries of the Hunter River including areas within Black Creek, Monkey Place Creek, Congewai Creek and Wollombi Brook, which intersect with the HTP corridor (see Figure 4.3).

An assessment of the likelihood of occurrence of aquatic species identified was undertaken to determine the potential for these species to occur within the HTP (see Table 4.3). It was determined that one species is highly likely, and one is moderately likely to inhabit the identified watercourses within the HTP.

Neither the Darling River hardyhead or Southern purple spotted gudgeon are currently listed under the EPBC Act.

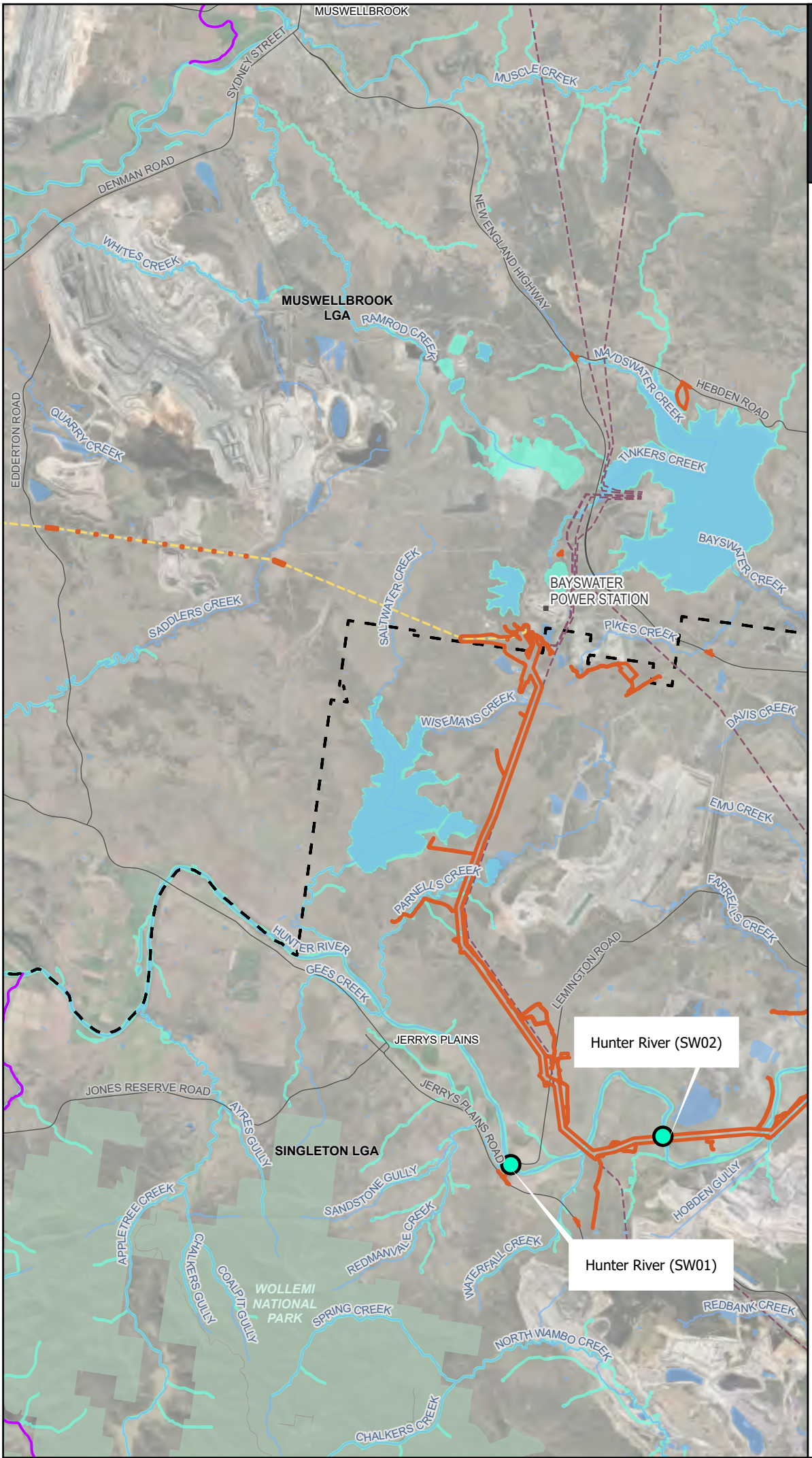
4.2.3.3 Threatened aquatic species

A desktop search of the biodiversity study area was conducted in April and September 2024 using the protective matters search tool (PMST), Fisheries NSW Spatial Data Portal (DCCEEW, 2024) and Atlas of Living Australia. The search results yielded that a total of 2 threatened fish species may inhabit the biodiversity study area. Both species, Southern purple spotted gudgeon and Darling River hardyhead are listed as endangered under the FM Act and the Darling River hardyhead is listed as an endangered population under the FM Act (see Table 4.3).

Table 4.3 Threatened aquatic species identified within 5-kilometre the HTP

Common name	Scientific name	EPBC Act	FM Act	Habitat description	Likelihood of occurrence
Craterocephalus amniculus	Darling River hardyhead (Hunter River catchment population)	–	EP	The Darling River hardyhead is found in the upper tributaries of the Darling River near the Queensland and New South Wales border. The Hunter River population is the only known occurrence of the species in an eastward flowing river. They are usually found in slow flowing, clear, shallow waters or in aquatic vegetation at the edge of such waters. The species has also been recorded from the edge of fast flowing habitats such as the runs at the head of pools.	Moderate – recorded within Bowman creek (tributary to Hunter River) in 1976
Mogurnda adspersa	Southern purple spotted gudgeon	–	E	The Southern purple spotted gudgeon occurs in the Murray-Darling basin as well as parts of coastal northern NSW and Queensland. The species can be found in a variety of habitats such as rivers, creeks, and billabongs with slow-flowing or still waters. Cover in the form of aquatic vegetation, overhanging vegetation from riverbanks, leaf litter, rocks or snags are important for the species.	High – mapped habitat located within the project impact area

V = Vulnerable, E = Endangered, CE= Critically Endangered M = Migratory, EP = Endangered Population



Hunter Transmission Project Biodiversity Development Assessment Report

Figure 4.3
Mapped Key Fish Habitat

Legend

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Existing environment

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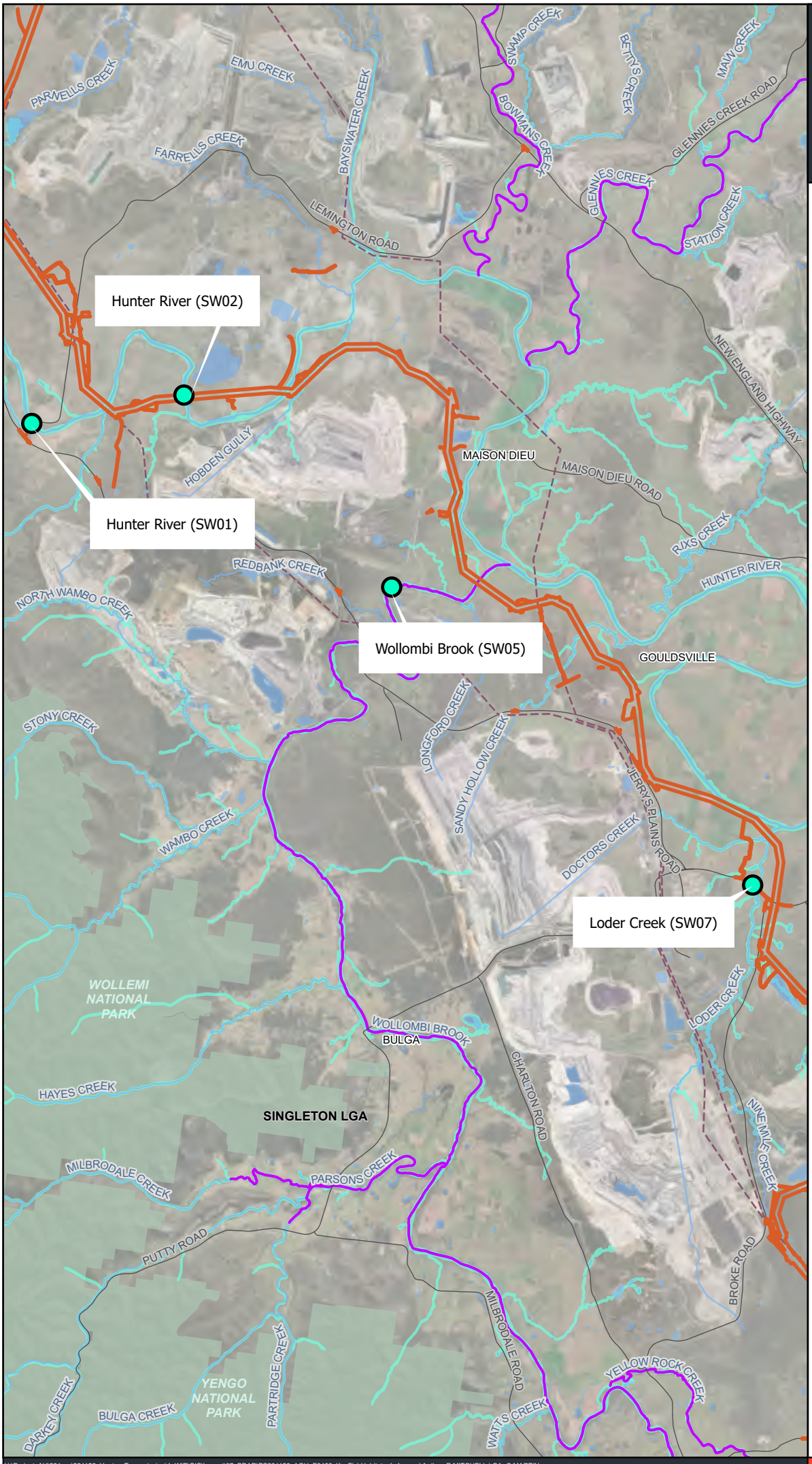

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Figure 4.3
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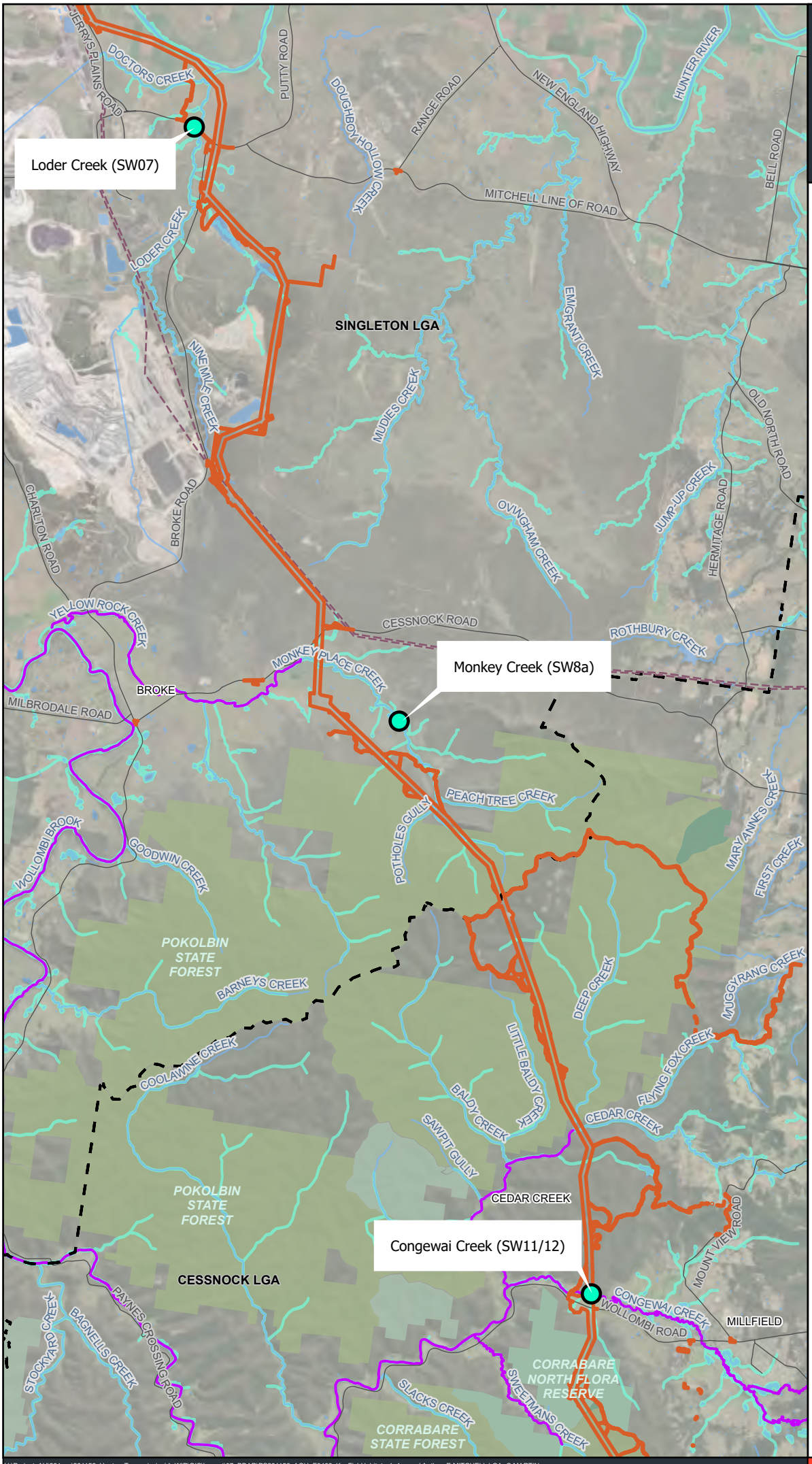

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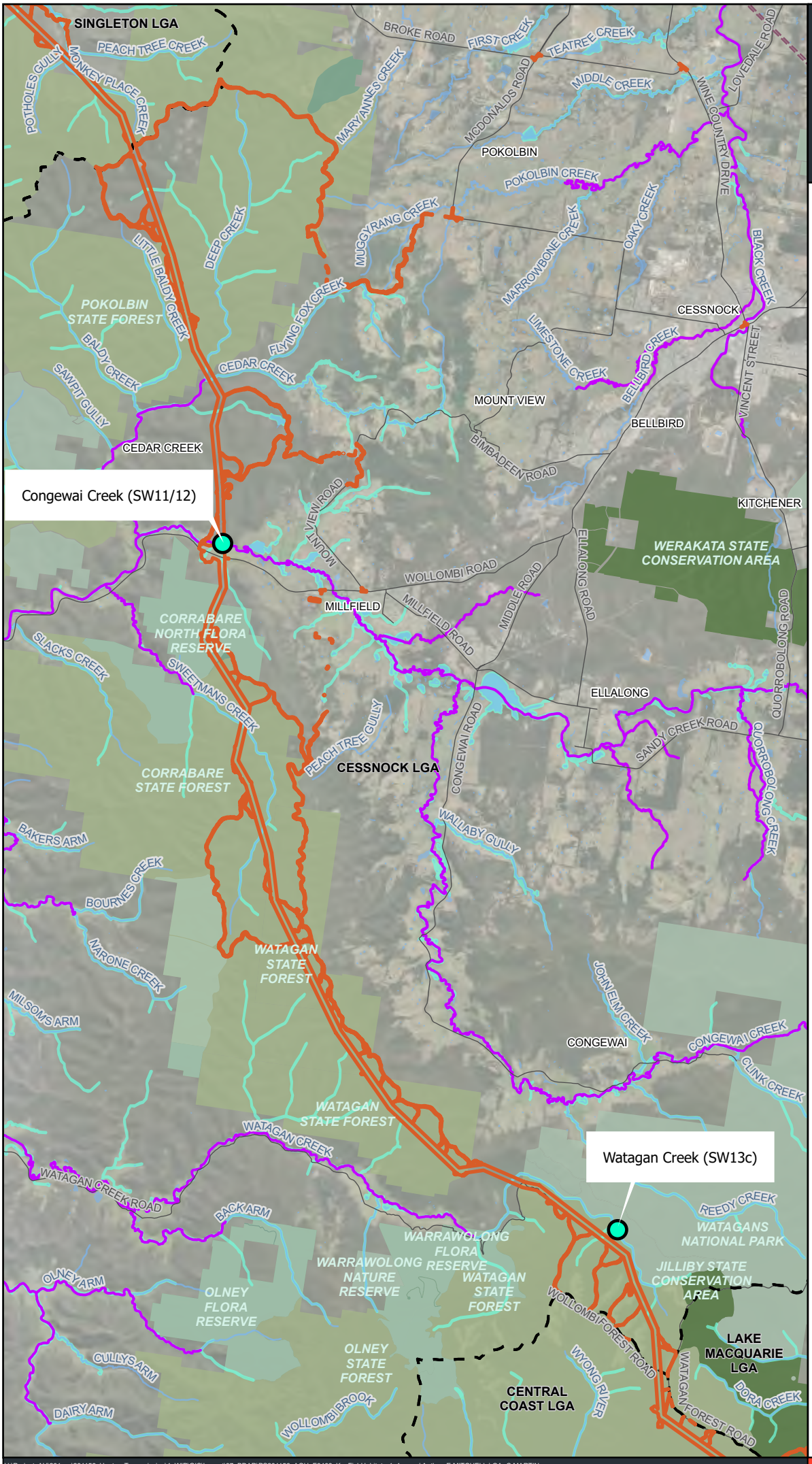

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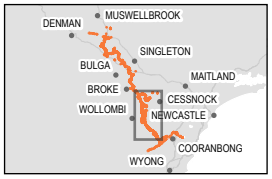
- Key fish habitat
- Assessed watercourse



0 1 2
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020 1:125,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Earthstar Geographics

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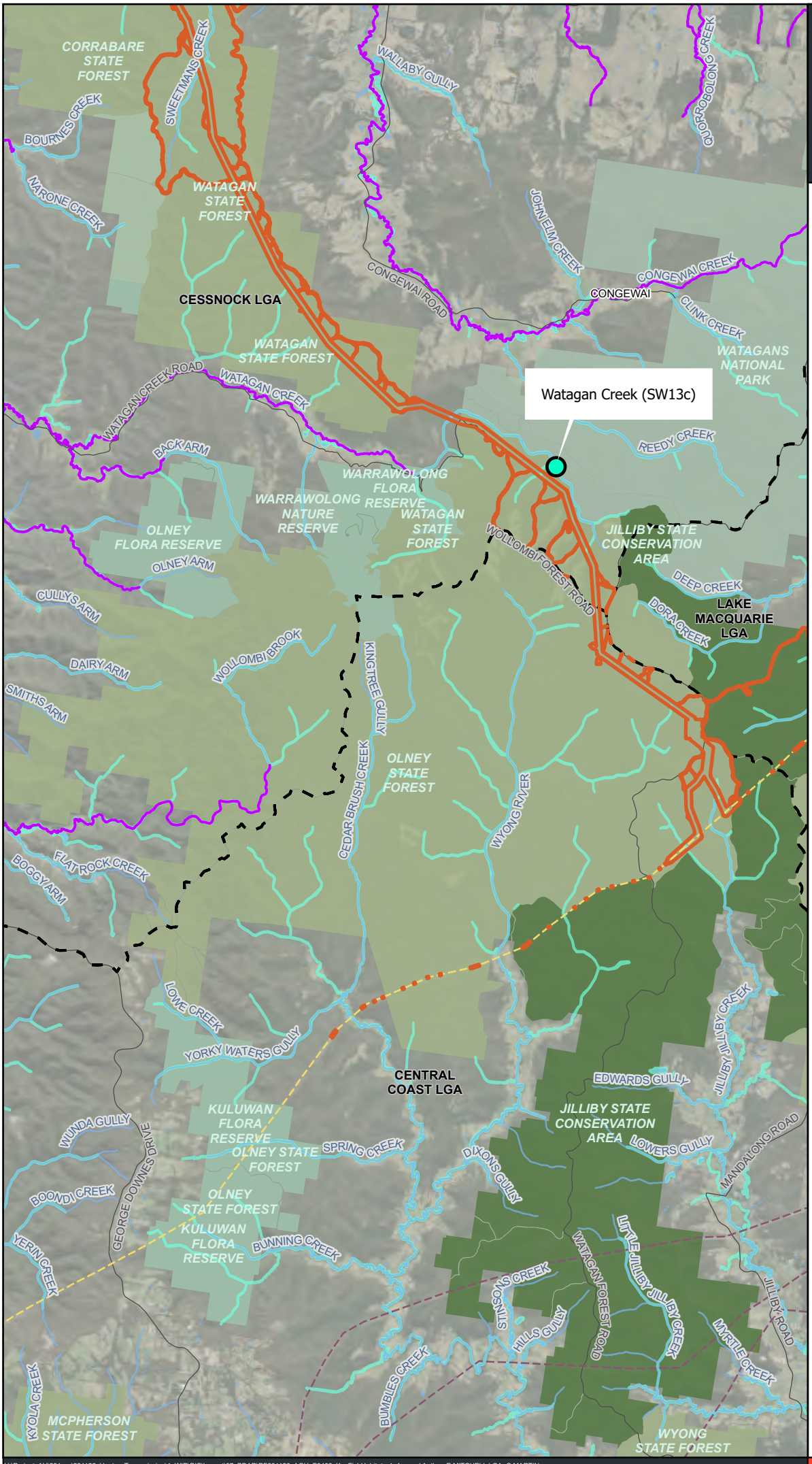

Hunter Transmission Project Biodiversity Development Assessment Report

Figure 4.3
Mapped Key Fish Habitat

Legend

- Biodiversity study area
- Existing environment
- Road
- 330 kV transmission line
- 500 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
- State conservation area
- Flora reserve
- State forest
- Local government area
- Southern Purple Spotted Gudgeon Indicative Distribution
- Key fish habitat
- Assessed watercourse

0 1 2
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020

1:125,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Earthstar Geographics

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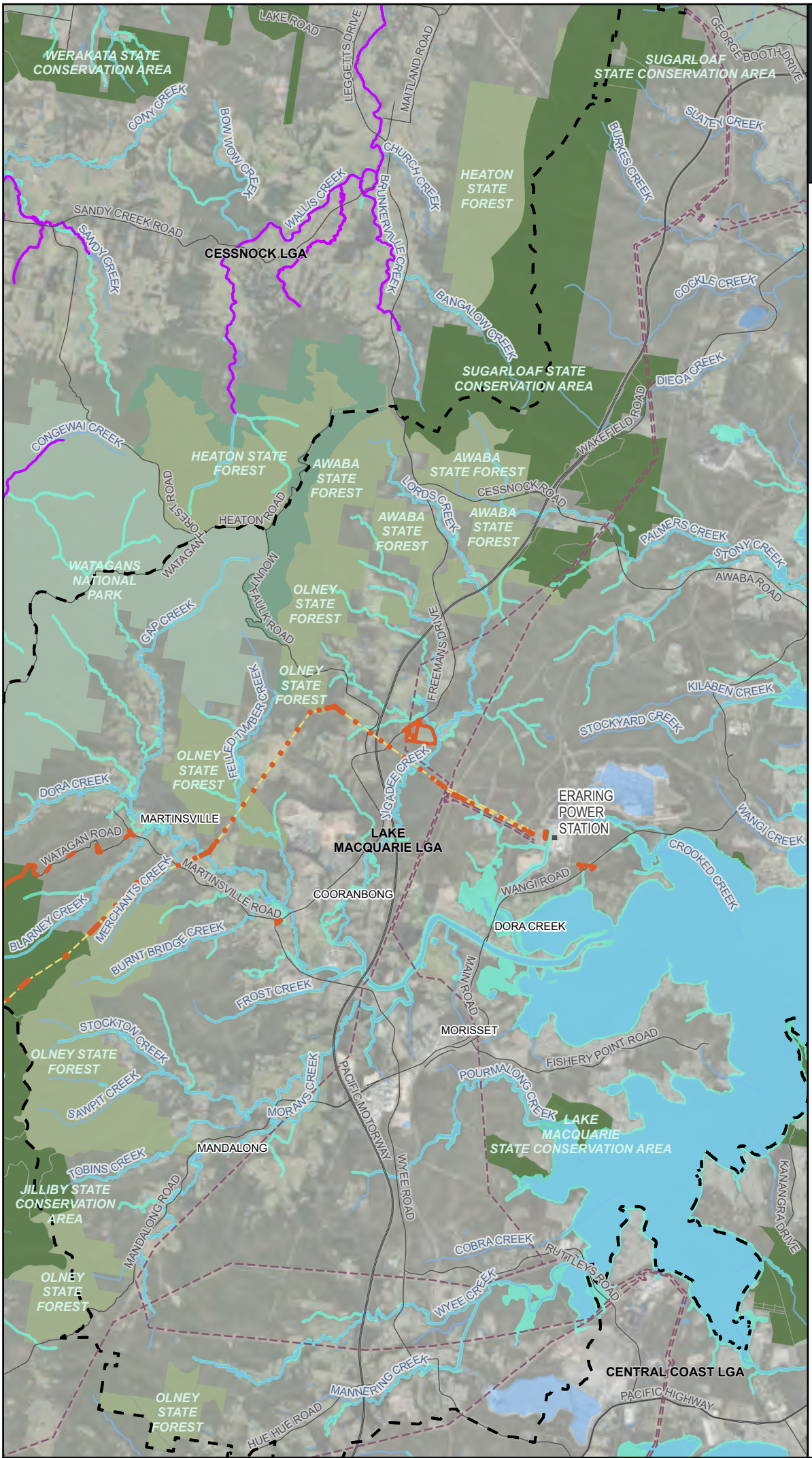


Hunter Transmission Project
Biodiversity Development Assessment Report

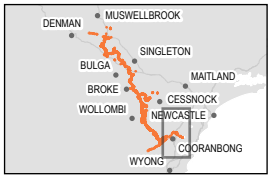
Figure 4.3
Mapped Key Fish Habitat

Legend

- Biodiversity study area

Existing environment

- Road
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Named watercourse
- Waterbody
- NPWS reserve
- State conservation area
- Flora reserve
- State forest
- Local government area
- Southern Purple Spotted Gudgeon Indicative Distribution
- Key fish habitat



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Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020

1:125,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Earthstar Geographics

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4.3 Field survey results

Figure 4.4 shows the location of assessed watercourses with accompanying photo plates.

4.3.1 Hunter River

The Hunter River is a permanent watercourse that begins in the Mount Royal ranges in the Barrington Tops and extends 460 kilometres to where it drains into the Pacific Ocean at Newcastle (NSW Government , 2024). The Hunter River supports various types of aquatic habitats along its footprint, and it is known to contain important species of fish and their associated habitat. During the field survey, fish were observed leaping out of the water at both SW01 and the SW02 and an unidentified species of freshwater turtle was observed at SW01 (likely eastern long-necked turtle).

4.3.2 Hunter River (SW01)

4.3.2.1 Habitat characterisation

This survey location is at the Lemington Road crossing (see Figure 4.4). This reach of the Hunter River (about 400 metres) exhibited a sinuous channel morphology, where the flow appears to slightly favour the right bank with a 0.83 m/s flow. This reach exhibited a 1% gradient giving rise to the upstream (about 50 metres) and downstream (about 100 metres) riffle habitat structure (Photo 4.5). Photos 4.1–4.4 picture the run – pool structure that followed the upstream and preceded the downstream habitat structure. The substrate within the watercourse was determined to be comprised of around 70% sand, 20% cobble and 10% gravel. Note that a sediment sample was unable to obtained from the main channel within the watercourse due to safety reasons. Instead, a sample was obtained around 1 metre off the bank and consequently may not represent the true substrate composition of this reach. Stream cover observed at this reach primarily consisted of woody debris (10%), instream vegetation (2%) and overhanging vegetation (2%) which fish can use as a refuge area. This reach of the Hunter River remains highly connected and had no immediate signs of fish passage obstructions.

The right bank was steep and, in some areas, transitioned to be vertical or undercut. The steep area of the right bank was highly vegetated and consisted of mainly grasses and exotic plant species. Where the right bank was vegetated, the soil appeared to be stable, however, in the areas the bank was undercut and/or vertical the bank did not appear to be stable and during high flow is likely to be subjected to erosion and to potentially collapse. In contrast the left bank was highly vegetated, gently sloped and very stable. Both banks contained native and exotic vegetation. The native vegetation was dominated by various grasses, shrubs and trees (she-oaks) and constituted 50% of the total riparian area and exotic species such as tobacco bush (*Solanum mauritianum*) and fireweed (*Senecio madagascariensis*) constituted 30% of the total riparian area.

At the time of the survey, the wetted width within the reach ranged from 16.8 metres – 18.5 metres whereas the bank full width was estimated to be between 28.0 metres – 31.0 metres. However, there is evidence that at this reach the river breaches the left bank and flows into the surrounding floodplain during periods of high flows. The floodplain located on the left bank displays evidence of woody debris, health impacts to vegetation and evidence of cobble deposits, which would have been deposited during a flooding event. The scarring on the right bank suggests that during time of high flow, the river exhibited very high velocity. These characteristics are shown in Photos 4.1 to 4.6.

Hunter Transmission Project
Figure 4.4

Location of Field Survey Sites

Hunter River (SW01)

Wollombi Brook (SW05)

Loder Creek (SW07)

Monkey Creek (SW8a)

Congewai Creek (SW11/12)

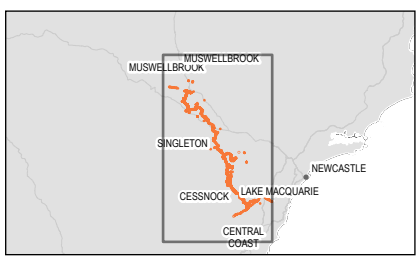
Watagan Creek (SW13c)

Legend

- Field survey sites
- Biodiversity study area

Existing environment

- Road
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Local government area
- River
- Waterbody
- NPWS reserve
- State conservation area
- Flora reserve
- State forest



0 5 10
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:320,000 Date: 2/06/2025

Data sources: EMM, Geoscience Australia, NSW State Government, WSP
World Topographic Map: Esri Community Maps Contributors,

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Photo 4.1 Facing upstream

Photo 4.2 Facing downstream

Photo 4.3 Facing left bank

Photo 4.4 Facing right bank

Photo 4.5 Upstream riffle structure

Photo 4.6 Floodplain on left bank

4.3.2.2 Water quality

In situ water samples were taken at the survey area (see Table 4.4). Visually, the water appeared to be slightly turbid, however, the bottom of the stream was visible during the survey. Based on the water quality measurements it can be confirmed that this reach of the Hunter River has water quality that can support fish.

Table 4.4 Water quality data for SW01

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	11.20 NTU	0–3000 NTU	Y
pH	8.23	6.5–9[+]	Y
Dissolved Oxygen	61% (5.8 mg/L[^])	>5 mg/L[*]	Y
Conductivity	883 µs/cm	–	Y
Temperature	18.8°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org); + (Wurts & Durborow, 1992).

4.3.2.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined in Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.5 and Table 4.6. SW01 contained various habitat features that are commonly used as fish refuge which included large woody debris (snags) that exceeded 3.0 metres in length and 300 millimetre in width, instream vegetation and areas containing gravel beds. These habitat structures are habitat characteristic of a type 1 watercourse. Based on the information collected from the survey, it was determined that SW01 is rated as a type 1 and class 1 watercourse.

Table 4.5 Fish habitat sensitivity rating for SW01

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Present
Any known or expected protected or threatened species habitat or area of declared ‘critical habitat’ under the FM Act	Absent
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 1**

Table 4.6 Classification of watercourse for SW01

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Present
Class 2 – Moderate KFH	Absent
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 1**

4.3.3 Hunter River (SW02)

4.3.3.1 Habitat characterisation

This survey location is within private property around 5 kilometres east of SW01 (see Figure 4.4). This reach of the Hunter River (about 400 metres) exhibited a straight to sinuous channel morphology with a 1% gradient, where the flow appears to slightly favour the middle of the watercourse. Neither the depth nor the flow of the watercourse were measured during the survey. The substrate within the watercourse was determined to be comprised of around 70% silt and 30% sand. A sediment sample was unable to be obtained from the main channel within the watercourse due to safety reasons, instead a sample was obtained around 0.5 metres off the bank and consequently may not represent the true substrate composition of this reach. Stream cover observed at this reach primarily consisted of woody debris (5%), instream vegetation (<0.1%) and overhanging vegetation (0.1%) which fish can use as a refuge area. This reach of the Hunter River remains highly connected and had no immediate signs of fish passage obstruction.

The right bank was steep and highly vegetated and consisted of mainly grasses, shrubs trees and exotic plant species. Although the right bank was highly vegetated, it did not appear to be completely stable as there was evidence of erosion of the bank. The vegetation on this bank was in poor to fine condition exhibiting signs of stress (i.e. falling limbs, highly exposed roots, exposed limbs) and was inundated with exotic species such as tobacco bush and fireweed making up 40% of the vegetation composition. Due to access issues, the left bank was unable to be accessed therefore, a visual assessment was completed from the right bank. The left bank was highly vegetated, moderately sloped and appeared to be very stable. Due to the distance from the left bank, it was hard to observe the vegetation composition, however, it appeared to be more intact, of healthier condition and less inundated by exotic species. These characteristics are shown in Photos 4.7 to 4.10.

At the time of the survey, the wetted width within the reach was around 48.0 metres, whereas the bank full width was estimated to be between 65.0 metres – 89.0 metres There is potential that at this reach the river breaches the left bank and flows into the surrounding floodplain during periods of high flows, however, this was not confirmed during the survey.

Photo 4.7 Facing upstream

Photo 4.8 Facing downstream

Photo 4.9 Facing left bank

Photo 4.10 Facing right bank

4.3.3.2 Water quality

In situ water samples were taken at the survey area (see Table 4.7). Visually, the water appeared to be very turbid, and the bottom of the stream was not visible during the survey. Based on the water quality measurements it can be confirmed that this reach of the Hunter River has water quality that can support fish.

Table 4.7 Water quality data for SW02

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	13.79 NTU	0–3000 NTU	Y
pH	8.18	6.5–9+	Y
Dissolved Oxygen	61.4% (6.1 mg/L^)	>5 mg/L*	Y
Conductivity	867 µs/cm	–	Y
Temperature	18.1°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org) ; + (Wurts & Durborow, 1992).

4.3.3.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined in Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.8 and Table 4.9. SW02 contained various habitat features that are commonly used as fish refuge which included large woody – debris (snags) that exceeded 3.0 metres in length and 300 millimetre in width and instream vegetation. These habitat structures are habitat characteristic of a type 1 watercourse. Due to the inability to collect sediment samples it cannot be confirmed or discounted that this reach of the Hunter River contains gravel beds. Based on the information collected from the survey, it was determined that SW01 is rated at a type 1 and class 1 watercourse.

Table 4.8 Fish habitat sensitivity rating for SW02

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Present
Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act	Absent
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 1**

Table 4.9 Classification of watercourse for SW02

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Present
Class 2 – Moderate KFH	Absent
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 1**

4.3.4 *Wollombi Brook (SW05)*

Wollombi Brook is a permanent tributary of the Hunter River. It is a highly productive watercourse and provides KFH for Southern purple spotted gudgeon and has a high GDE potential. The survey at Wollombi Brook was conducted on 11 September 2024. No aquatic fauna was observed during the survey.

4.3.4.1 Habitat characterisation

This reach of the Wollombi Brook (about 400 metres) exhibited a braided channel morphology near a culvert crossing and a meandering morphology upstream and downstream of the culvert crossing. It can be assumed that the installation of the culverts resulted in the local morphological change to Wollombi Brook as it would have naturally been a single channel. The flow appears to slightly favour the right bank with a 0.04 m/s flow and a 0.1% gradient. The substrate within the watercourse was determined to be comprised of around 70% sand, 10% cobble and 20% gravel. Stream cover observed at this reach primarily consisted of woody debris (5%), instream vegetation (2%) and overhanging vegetation (5%) which fish can use as a refuge area.

This reach of the Wollombi Brook remains highly connected and had no immediate signs of fish passage obstruction. However, if the culverts at the road crossing become blocked or perched (result of erosion), this would result in fish passage obstruction.

The banks of Wollombi Brook directly downstream of the culverts can be defined as having a main channel comprising a defined bank ("channel" bank) and a separately defined larger channel that would identify the bank full width of the watercourse ("bank full" bank). The "channel" bank is defined as a channel where the water flows most of the time (this bank is defined by distinct scour marks along the banks), whereas the "bank full" bank is defined as the bank during high flow. Both will collectively be discussed as the "banks".

The left banks are mainly vegetated with native grasses, shrubs and trees (she-oaks) which all appear to be in fair to good condition. The right banks were less vegetated than the left bank and mostly contained medium to large she-oaks and grasses with their condition being poor to fair. Although these banks are vegetated, the soil is extremely sandy, and is prone to erosion, especially during high volume and velocity flows. Exotic species such as Willows (*Salix* spp.*)* and fireweed were observed throughout Wollombi Brook. Many Willows were within the watercourse and along the stream edge, as this species is tolerant to being waterlogged for long periods of time. Overall, native vegetation constituted 70% of the total riparian area and exotic species constituted 15% of the total riparian area.

At the time of the survey, the wetted width within the reach ranged from 9.2 metres – 31.0 metres whereas the bank full width was estimated to be between 64.0 metres – 75.0 metres. Directly downstream of the culverts, Wollombi Brook appears to breach the right "channel" bank (Photo 4.14) but remains contained to a channel by the right "bank full" bank (Photo 4.15). During the survey it was observed that there were areas between the "channel" bank and the "wetted" bank that have been heavily disturbed, deposited woody debris and cobble substrate and where upland vegetation has been unable to establish, suggesting that water levels of Wollombi Brook often exceed the "channel" bank. This is further vindicated as the upstream and downstream wetted width is closer to the "bank full" width of the reach. As suggested above this discrepancy likely results from the anthropogenic changes (culvert) at the road crossing. These characteristics are shown in Photos 4.11 to 4.16.

Photo 4.11 Facing upstream

Photo 4.12 Facing downstream

Photo 4.13 Facing left bank

Photo 4.14 Facing “channel” right bank

Photo 4.15 Facing “bank full” right bank

Photo 4.16 Braided channel near culvert

4.3.4.2 Water quality

In situ water samples were taken at the survey area (see Table 4.10). Visually, the water appeared to be clear, and the bottom of the watercourse was clearly visible during the survey. Based on the water quality measurements it can be confirmed that Wollombi Brook has water quality that can support fish.

Table 4.10 Water quality data for Wollombi Brook

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	9.0 NTU	0–3000 NTU	Y
pH	7.25	6.5–9[+]	Y
Dissolved Oxygen	62% (6.1 mg/L[^])	>5 mg/L[*]	Y
Conductivity	505 µs/cm	–	Y
Temperature	15.7°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org) ; + (Wurts & Durborow, 1992).

4.3.4.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined in Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.11 and Table 4.12. Wollombi Brook contained various habitat features that are commonly used as fish refuge which included large woody-debris (snags) that exceeded 3.0 metres in length and 300 millimetre in width and instream vegetation. These habitat structures are habitat characteristic of a type 1 watercourse. Additionally, Wollombi Brook is mapped habitat for Southern purple spotted gudgeon. Based on the information collected from the survey it was determined that Wollombi Brook is rated as a type 1 and class 1 watercourse.

Table 4.11 Fish habitat sensitivity rating for Wollombi Brook

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Present
Any known or expected protected or threatened species habitat or area of declared ‘critical habitat’ under the FM Act	Present
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 1**

Table 4.12 Classification of watercourse for Wollombi Brook

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Present
Class 2 – Moderate KFH	Absent
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 1**

4.3.5 Loder Creek (SW07)

Loder Creek appears to be a permanent to semi – permanent (during drought portions of the watercourse may "dry up") tributary of the Hunter River. Loader Creek has been mapped as KFH (NSW DPI, 2013). The survey at Loder Creek was conducted on 12 September 2024 but due to access issues, areas upstream and downstream of the survey point could not be assessed.

No aquatic fauna was observed during the survey.

4.3.5.1 Habitat characterization

This reach of Loder Creek (about 10 metres) exhibited a meandering channel morphology, where the water is nearly stagnant with a gradient of <0.1%. The substrate within the watercourse was determined to be comprised of around 25% sand, 20% clay and 5% silt. Stream cover observed at this reach primarily consisted of woody debris (2%), instream vegetation (10%) and overhanging vegetation (2%) which fish can use as a refuge area. In addition, algae was observed on the surface of the watercourse covering 10% of the surface. This reach of Loder Creek appears to be relatively connected and had no immediate signs of fish passage obstruction, however, downstream of the bridge was low flowing and may dry in the summer months, resulting in the temporary fragmentation of the watercourse.

The right bank was a steeply sloped, stable and was highly vegetated whereas the left bank was moderately sloped and highly vegetated, and very stable. Both banks contained native and exotic vegetation that were in poor to good condition. The native vegetation was dominated by various grasses and shrubs and constituted 15–25% of the total riparian area and exotic species such as tobacco bush and fireweed constituted 65% of the total riparian area. Upstream and downstream of the survey point the banks contained larger trees (she-oaks) and appeared to be less inundated with exotic plant species. Instream vegetation was observed during the site survey which included native aquatic grasses and exotic species such as Horsetail (*Equisetum* spp.*)*. The banks were littered with branches as woody debris that was likely deposited there during periods of high flow.

At the time of the survey, the wetted width was 5.5 metres, whereas the bank full width was estimated to be 17.0 metres The watercourse appears to be relatively confined with flows breaching the bank being uncommon. These characteristics are shown in Photos 4.17 to 4.20.

Photo 4.17 Facing upstream

Photo 4.18 Facing downstream

Photo 4.19 Facing left bank

Photo 4.20 Facing right bank

4.3.5.2 Water quality

In situ water samples were taken at the survey area (see Table 4.13). Visually, the water appeared to be clear, and the bottom of the stream was visible during the survey. Based on the water quality measurements it can be confirmed that this reach of Loder Creek has water quality that can support fish. However, the conductivity is higher than expected which could result in osmotic stress to fish although the exact responses that freshwater fish have to conductivity remain relatively unclear (Zhang, et al., 2019).

Table 4.13 Water quality data for Loder Creek

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	5.6 NTU	0–3000 NTU	Y
pH	7.76	6.5–9 +	Y
Dissolved Oxygen	58.5% (6 mg/L^)	>5 mg/L*	Y
Conductivity	7330 µs/cm	–	Y
invasive fish species hunter Temperature	13.8°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org); + (Wurts & Durborow, 1992).

4.3.5.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined in Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.14 and Table 4.15. At the survey point, Loder Creek did not contain any fish habitat listed in type 1; however, it did contain alternative habitats such as woody debris (snags), instream exotic vegetation, and a deep pool. All these habitat features can be used by fish as a refuge follow the habitat requirements of a type 2 watercourse. Based on the information collected from the survey it was determined that Loder Creek is rated as a type 2 and class 2 watercourse.

Table 4.14 Fish habitat sensitivity rating for Loder Creek

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Absent
Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act	Absent
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate,	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 2**

Table 4.15 Classification of watercourse for Loder Creek

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Absent
Class 2 – Moderate KFH	Present
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 1**

4.3.6 Monkey Place Creek (SW08a)

Monkey Place Creek is a semi-permanent watercourse that is a tributary of Yellow Rock Creek and Wollombi Brook. Monkey Place Creek has been mapped as KFH (NSW DPI, 2013). The survey at Monkey Place Creek was conducted on 10 September 2024. Note that downstream of the sample point was dry and contained no water.

Around 20 tadpoles (species unidentified) were observed during the survey.

4.3.6.1 Habitat characterization

This reach of the Monkey Place Creek (about 400 metres) exhibited a meandering channel morphology, where the flow appears to slightly favour the left bank with a 0.01 m/s flow with a 0.25% gradient. Monkey Place Creek does not appear to be permanently wetted, as the areas assessed downstream of the survey point did not contain water nor exhibit a defined channel.

The substrate within the watercourse was determined to be comprised of around 70% sand, 10% cobble,10% gravel and 10% silt. Stream cover observed at this reach primarily consisted of large woody debris (1%), anthropogenic debris (2%) and overhanging vegetation (2%) which fish can use as a refuge area. Roughly 20 metres downstream from the survey location there was a vehicle crossing where the substrate has been slightly raised (Photo 4.25). This vehicle crossing, along with the semipermanence of this watercourse, result in fragmentation and likely create fish passage obstruction.

The right bank was gently sloped, stable and was highly vegetated whereas the left bank was moderately to steeply sloped and highly vegetated, and very stable. Both banks contained native and exotic vegetation that were in poor to good condition. The native vegetation was dominated by various grasses, shrubs and trees (predominately she-oaks) which constituted 75% of the total riparian area and exotic species constituted 20% of the total riparian area.

At the time of the survey, the wetted width within the reach ranged from 1.5 metres – 1.8 metres, whereas the bank full width was estimated to be between 4.5 metres – 8.1 metres The channel of the watercourse was defined upstream of the survey point and extended 150 metres downstream of the survey location. Further downstream the channel became undefined and expanded into a floodplain (Photo 4.26). Vegetation was established within the “channel” and there was no debris (i.e. woody debris, cobbles or boulders) visible which suggests this reach of Monkey Place Creek experienced long durations of being dry. These characteristics are shown in Photos 4.21 to 4.26.

Photo 4.21 Facing upstream

Photo 4.22 Facing downstream

Photo 4.23 Facing left bank

Photo 4.24 Facing right bank

Photo 4.25 Vehicle crossing

Photo 4.26 200 metres downstream of survey point

4.3.6.2 Water quality

In situ water samples were taken at the survey area (see Table 4.16). Visually, the water appeared to be very clear, and the bottom of the stream was visible during the survey. Based on the water quality measurements it can be confirmed that while Monkey Place Creek has many water quality characteristics that can support fish, the pH measurement is slightly outside of the range known to comfortably support fish. Fish blood has a pH of 7.4, and due to the close contact fish blood has with the water via the blood vessel of the gills, the surrounding water should be close to this pH to limit physiological stress to the fish (Wurts & Durborow, 1992). Although not ideal, studies have indicated that fish can live in the pH range of 4.0–6.5, therefore, it is still possible fish could inhabit this reach of Monkey Place Creek (Wurts & Durborow, 1992).

Table 4.16 Water quality data for Monkey Place Creek

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	2.3 NTU	0–3000 NTU	Y
pH	6.38	6.5–9+	Possible
Dissolved Oxygen	63% (6.3 mg/L^)	>5 mg/L*	Y
Conductivity	496 µs/cm	–	Y
Temperature	14.8°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org) ; + (Wurts & Durborow, 1992).

4.3.6.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined in Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.17 and Table 4.18. Monkey Place Creek contained various habitat features that are commonly used as fish refuge which included large woody debris (snags) that exceeded 3.0 metres in length and 300 millimetre in width and instream vegetation. These habitat structures are habitat characteristic of a type 1 watercourse. Based on the information collected from the survey it was determined that Monkey Place Creek is rated as a type 1 and class 2 watercourse.

Table 4.17 Fish habitat sensitivity rating for Monkey Place Creek

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Present
Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act	Absent
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate,	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 1**

Table 4.18 Classification of watercourse for Monkey Place Creek

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Absent
Class 2 – Moderate KFH	Present
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 2**

4.3.7 *Congewai Creek (SW 11/12)*

Congewai Creek is a permanent watercourse that is a tributary of Wollombi Brook, which eventually connects to the Hunter River. It is also mapped as Southern purple spotted gudgeon habitat and KFH. The survey at Congewai Creek was conducted on 10 September 2024.

Around 5 tadpoles (species unidentified) and 10 Eastern Water Dragons (*Physignathus lesueurii*) were observed during the survey.

4.3.7.1 Habitat characterisation

This reach of Congewai Creek (about 300 metres) exhibited a sinuous channel morphology with a 0.05 m/s flow and a 0.1% gradient. The substrate within the watercourse was determined to be comprised of around 80% sand, 15% silt and 5% organics. Note that a sediment sample and flow measurement was unable to be obtained from the main channel of the watercourse due to safety reasons. Instead, a sample was obtained around 0.5 metres off the bank and consequently may not represent the true substrate composition of this reach. Stream cover observed at this reach primarily consisted of leaf litter (15%), woody debris (5%), instream vegetation (5%) and overhanging vegetation (2%) which fish can use as a refuge area. This reach of the Congewai Creek remains highly connected and had no immediate signs of fish passage obstruction.

Due to access issues the right bank was unable to be accessed for a detailed assessment. The right bank was steeply sloped and highly vegetation and appeared to be moderately stable with minimal signs of erosion. The left bank was steeply sloped and, in some areas, transitioned to be vertically sloped or undercut. The highly sloped area of the left bank was sparsely vegetated and consisted of mainly grasses, shrubs and exotic plant species. The exposed soil on the left bank appeared to be less stable and during high flow is likely to be subjected to erosion and a potential collapse in some areas where the bank is extremely undercut. Vegetation inhabiting the right bank appeared to be good condition, and from a distance appeared to be mostly native (80%), with some exotic species present (i.e. fireweed and willows). The left bank was sparsely vegetated, and the top of bank was located on agricultural land. A large majority of the vegetation of the left bank was exotic grasses and shrubs. Being a water-tolerant species, Willows were established within the watercourse and along the stream edges. Overall, the native vegetation of the left bank constituted 35% of the total riparian area and exotic species constituted 15% of the total riparian area.

At the time of the survey, the wetted width within the reach ranged from 14.8 metres – 24.4 metres, whereas the bank full width was estimated to be between 21.2 metres – 36.6 metres This watercourse is confined to a single channel surrounded by tall (7.0 metres – > 10.0 metres) steep banks, and it is unlikely that water will breach the banks during a typical high flow event. These characteristics are shown in Photos 4.27 to 4.30.

Photo 4.27 Facing upstream

Photo 4.28 Facing downstream

Photo 4.29 Facing left bank

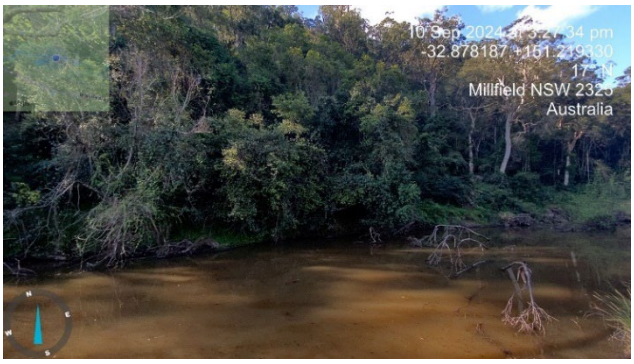

Photo 4.30 Facing right bank

4.3.7.2 Water quality

In situ water samples were taken at the survey area (see Table 4.19). Visually, the water appeared to be very turbid, and the bottom of the stream was not visible during the survey. Based on the water quality measurements it can be confirmed that this reach of Congewai Creek has water quality that can support fish.

Table 4.19 Water quality data for Congewai Creek

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	26.0 NTU	0–3000 NTU	Y
pH	6.75	6.5–9+	Y
Dissolved Oxygen	63% (6.2 mg/L^)	>5 mg/L*	Y
Conductivity	536 µs/cm	–	Y
Temperature	15.6°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org) ; + (Wurts & Durborow, 1992).

4.3.7.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.20 and Table 4.21. Congewai Creek contained various habitat features that are commonly used as fish refuge which included large woody-debris (snags) that exceeded 3.0 metres in length and 300 millimetre in width and instream vegetation. These habitat structures are habitat characteristic of a type 1 watercourse. Due to the inability to collect sediment samples it cannot be confirmed or discounted that this reach of Congewai Creek contains gravel beds. Based on the information collected from the survey it was determined that Congewai Creek is rated as a type 1 and class 1 watercourse.

Table 4.20 Fish habitat sensitivity rating for Congewai Creek

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Present
Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act	Present
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate,	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 1**

Table 4.21 Classification of watercourse for Congewai Creek

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Present
Class 2 – Moderate KFH	Absent
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 1**

4.3.8 Watagan Creek (SW13c)

This reach of Watagan Creek is a semi-permanent watercourse and is a tributary to Wollombi Brook, that is mapped as KFH. Around 5 kilometres downstream of the survey area, Watagan Creek contains mapped Southern purple spotted gudgeon habitat. The survey at Watagan Creek was conducted on 12 September 2024.

No aquatic fauna was observed during the survey.

4.3.8.1 Habitat characterisation

This reach of Watagan Creek (about 400 metres) exhibited a meandering channel morphology with a 2.8% gradient. At the time of the survey Watagan Creek was not flowing, however, exhibited many pools (0.25 metres – 1.0 metres in depth) along the stream bed, suggesting this watercourse is semi-permanent. The substrate within the watercourse was determined to be comprised of around 30% sand, 30% gravel, 20% cobble, 15% boulder and 5% organics. Stream cover observed at this reach primarily consisted of woody debris (10%), boulder (15%) and leaf litter (40%) which fish can use as a refuge area.

Both right and left bank ranged from moderately sloped and, in some areas, transitioned to be vertically sloped or undercut. Both banks appeared to be quite stable as they primarily consisted of large boulders or soil that was well established by large trees. The riparian vegetation remained in good condition and relatively intact as minimal exotic species were recorded.

At the time of the assessment, the wetted width within the reach ranged from 4.2 metres – 7.1 metres, whereas the bank full width was estimated to be between 7.2 metres – 22.4 metres. This watercourse is confined to a single channel surrounded by tall (4.4 metres – 7.0 metres) steep banks, and it is unlikely that water will breach the banks during a typical high flow event. These characteristics are shown in Photos 4.31 to 4.34.

Photo 4.31 Facing upstream

Photo 4.32 Facing downstream

Photo 4.33 Facing left bank

Photo 4.34 Facing right bank

4.3.8.2 Water quality

In situ water samples were taken at the survey area (see Table 4.22). Visually, the water appeared to be slightly turbid, however, the bottom of the stream was visible during the survey. Based on the water quality measurements it can be confirmed that this reach of Watagan Creek exhibits water quality characteristics that can support fish. However, the pH measurement is slightly outside of the range know to comfortably support fish. Fish blood has a pH of 7.4, and due to the close contact fish blood has with the water via the blood vessel of the gills, the surrounding water should be close to this pH to limit physiological stress to the fish (Wurts & Durborow, 1992). Although not ideal, studies have indicated that fish can live in the pH range of 4.0–6.5, therefore, it is still possible fish could inhabit Watagan Creek (Wurts & Durborow, 1992)

Table 4.22 Water quality data for Watagan Creek

Measurement	Value	Values that can support fish	Fish supported (Y/N)
Turbidity	13.13 NTU	0–3000 NTU	Y
pH	6.02	6.5–9+	Possible
Dissolved Oxygen	57% (6.1 mg/L^)	>5 mg/L*	Y
Conductivity	223 µs/cm	–	Y
Temperature	12.3°C	–	Y

* (Bozorg-Haddad, et al., 2021); ^ converted to mg/L using: dosaturation.pdf (mostreamteam.org) ; + (Wurts & Durborow, 1992).

4.3.8.3 Key fish habitat

The findings during the site survey were assessed against the sensitivity and class ratings outlined in Table 3.3 and Table 3.4 to determine the final watercourse type and class. The assessment of findings is outlined in Table 4.23 and Table 4.24. Watagan Creek contained various habitat features that are commonly used as fish refuge which included large woody-debris (snags) that exceeded 3.0 metres in length and 300 millimetre in width, boulders greater than 500 millimetre in 2 dimensions and gravel beds. These habitat structures are habitat characteristic of a type 1 watercourse. Based on the information collected from the survey, it was determined that Watagan Creek is rated as a type 1 and class 2 watercourse.

Table 4.23 Fish habitat sensitivity rating for Watagan Creek

Freshwater KFH characteristics	Present or Absent
TYPE 1	
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in 2 dimensions, snags greater than 300 mm in diameter or 3 m in length, or native aquatic plants	Present
Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act	Absent
TYPE 2	
Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in type 1	Present
Weir pools and dams up to full supply level where the weir or dam is across a natural watercourse	Absent
TYPE 3	
Unstable or unvegetated sand or mud substrate,	Present
Freshwater habitats not included in types 1 or 2	Absent
Wetlands recognised under international agreements wetlands listed in the Directory of Important Wetlands of Australia	Absent
Final Determination	**TYPE 1**

Table 4.24 Classification of watercourse for Watagan Creek

Freshwater KFH characteristics	Present or Absent
Class 1 – Major KFH	Absent
Class 2 – Moderate KFH	Present
Class 3 – Minimal KFH	Absent
Class 4 – Unlikely KFH	Absent
Final Determination	**CLASS 2**

5 Assessment of impacts

5.1 Assessment of potential construction impacts

The construction of the HTP is not expected to directly impact any aquatic receptors, as no instream works or removal of riparian vegetation is anticipated. All vegetation removal is expected to occur above the top of bank. If any vegetation removal within the riparian area is required, it will be limited to canopy vegetation. While this may reduce localised shade cover over the watercourse, it is not expected to cause long-term impacts on aquatic habitat or receivers.

During certain construction activities (i.e. stringing conductors across watercourses, constructing transmission towers near riparian zones, refuelling/leakage of equipment, etc.) there is potential for indirect impacts on aquatic receivers. The aquatic receivers that may be potentially impacted include:

- key fish habitat (KFH)
- aquatic invertebrates
- water quality
- aquatic vertebrates
- native plants inhabiting the riparian zone (i.e. removal or introduction of invasives).

Although HTP will interact with 16 named watercourses and cross 48 unnamed watercourses that are deemed to contain KFH, the project is unlikely to result in harmful alteration, disruption and destruction to fish habitat. However, potential indirect impacts to fish and KFH from the project are possible and may include:

- introduction of invasive species
- removal of riparian vegetation
- riparian vegetation die-off as a result of tree removal or pruning during line transmission line installation
- change in sediment concentrations into the stream from clearing, grubbing, excavation and equipment and vehicles near the watercourse and or connecting drainages
- an increase in total suspended solids (TSS) may occur from construction activities as a result of sedimentation and run-off
- a change in food supply resulting from the increase of organic debris (i.e. leaves entering water from pruning and or tree disturbance) entering the watercourse during transmission line installation
- generation of dust and run-off from stockpiles
- change in nutrient concentrations from application of fertilizers during revegetation of areas near watercourses and or drainages
- breach of water quality requirements because of run-off from laydown areas, construction areas and construction support sites
- contamination and interaction with groundwater and surface water during construction
- change in contaminant concentration from deleterious substances that may enter the stream such as oil, gas, or other fluids from construction vehicles and equipment
- direct impact to watercourse banks and streambeds vehicle or equipment entering the watercourse (either accidentally or intentionally)
- fluctuations in water levels resulting from water extraction for project use (i.e. watercarts)
- inappropriate disposal of waste (including grey water, and potable water) into drainages and excavations that interact with groundwater)
- inappropriate disposal of household and industrial waste during construction that may eventually enter nearby watercourses.

5.1.1 Threatened species likelihood of occurrence assessment

The project impact area contains mapped habitat for one FM Act listed endangered species, the Southern purple spotted gudgeon (*Mogurnda adspersa*) (see section 4.2.3). The lowest extent of mapped habitat for the FM Act listed endangered Hunter River population of Darling River hardyhead (*Craterocephalus amniculus*) is slightly upstream of the project impact area, and the HTP's interaction with the Hunter River and associated tributaries is generally below the lowest extent of known habitat for the Hunter population of Darling River hardyhead. Despite being outside of its known distribution, this species is considered further in this assessment on a precautionary basis as potential habitats that can support this species were identified during the field survey.

The likelihood of occurrence assessment completed for threatened fish species under the FM Act determined that the Southern purple spotted gudgeon had a 'high' likelihood of occurrence, while the Darling River hardyhead had a 'moderate' likelihood of occurrence (see Appendix B). To assess what impacts the project may have on these 2 species a test of significance for the Southern purple spotted gudgeon and the Darling River hardyhead was conducted (see Appendix A).

The test of significance determined that the likelihood of impacts to these species will be minimised through restriction of direct impacts to the watercourses that contain mapped and potential species habitat. The implementation of the project mitigation and management measures (see Chapter 6) would prevent any direct or indirect impacts to these watercourses and their habitats. It is considered unlikely that temporary impacts associated with the construction of the project would result in any long-term degradation of mapped KFH areas. Existing watercourse crossings would be prioritised for use during construction. If additional watercourse crossings are required, they would be designed in accordance with all relevant guidelines (see section 3.3.4).

Both species are sensitive to water quality changes associated with fluctuation in water levels, sedimentation, nutrient run-off and loss of native riparian habitat. Not much is known about the instream habitat preferences of Darling River hardyhead as studies have noted this species inhabit a large range of habitats from slow-flowing, shallow, clear waterways to large, turbid fast-flowing waterways (Fisheries Scientific Committee, 2014). Similar to Darling River hardyhead, Southern purple spotted gudgeon inhabits a variety of watercourse types, however, this species is known to be dependent on complex instream habitat features including, overhanging vegetation, leaf litter, rocks or woody debris (NSW DPI, n.d.). Due to both species inhabiting a wide range of watercourse types, all watercourses containing instream features should be treated as if these species have the potential to inhabit them, especially if it is in, or close to KFH. Table 5.1 outlines the impacts that may occur at each watercourse that was surveyed.

Table 5.1 HTP impacts on threatened aquatic species

Watercourse	Southern purple spotted gudgeon habitat present	Darling River hardyhead habitat present	Impact the project may have on threatened fish species
Hunter River	Yes	Yes	**Habitat destruction** — Establishment of invasive aquatic or riparian vegetation — Destabilization of banks as a result of vegetation removal from top of bank — Pruning of overhanging tree canopies — Removal of instream features (i.e. woody debris). **Impacts to water quality** — Soil erosion resulting from vegetation removal will result in increased turbidity of the water — Breach of water quality requirements because of run-off, contamination and bank disruption — Change in sediment concentrations into the stream from clearing, grubbing, excavation and equipment and vehicles near the watercourse and or connecting drainages. **Impacts to fish passage** — Fluctuations in water levels resulting from water extraction for project use (i.e. watercarts) — Establishment of inappropriate access roads (i.e. ford crossing) for the type and class of watercourse (NSW DPI, 2013).
Hunter River	Yes	Yes	
Wollombi Brook	Yes	Yes	
Loder Creek	Yes	Yes	
Monkey Place Creek	Yes	Yes	
Congewai Creek	Yes	Yes	
Watagan Creek	Yes	Yes	

The most likely impact the project will have on Darling River hardyhead and Southern purple spotted gudgeon could be a temporary disruption of water quality, removal of vegetation near top of bank and establishment of invasive species. With the implementation of appropriate management measures, the extent of impact to waterbodies, water quality, and hydrological processes is expected to be minor.

The riparian area is to be protected by limiting vegetation removal and installing sediment and erosion measure, implement management plans to avoid weed establishment and nutrient leaching. As a result, the risk of impacts on aquatic threatened species is considered minor and there is no need for targeted threatened aquatic species surveys or further standalone assessment as part of the EIS.

5.2 Assessment of potential operational impacts

Operational activities, including maintenance of the project infrastructure, are not expected to interact with the aquatic environment and/or riparian vegetation along the HTP corridor therefore direct impacts are not expected. Operational activities will require minimal works near watercourses, however, indirect impacts to aquatic receivers are possible. Potential indirect effects to fish and fish habitat from operational activities include:

- introduction of invasive species via vehicle movements during transmission tower inspections and maintenance
- change in sediment concentrations into the stream from permanent access tracks
- change in contaminant concentration from deleterious substances that may enter the stream such as oil, gas, or other fluids from operational maintenance vehicles and equipment
- riparian vegetation die-off as a result of tree removal or pruning during maintenance.

With the implementation of the mitigation measures, these impacts are considered unlikely to occur.

5.3 Residual risk assessment

This aquatic risk assessment was completed to identify potential risks to species listed on the FM Act and their habitat, assess their intensity, likelihood, consequence, and ultimately their overall significance. This assessment is performed considering potential impacts before and after the implementation of appropriate mitigation measures. The initial step is to identify a list of environmental aspects and impacts, a corresponding mitigation strategy, and risk ranking for each activity (see Table 5.2).

The potential impacts associated with the construction activities were evaluated and ranked based on a consideration of the consequence and likelihood of each impact, before and after the application of operational controls (i.e. mitigation measures). Table 5.3 outlines the results of this project risk assessment. It is important to note that instream works in habitat that supports threatened species, along with the disturbance and /or removal of riparian vegetation are not expected, therefore the impacts are likely to be indirect and minimal.

Table 5.2 Risk assessment matrix

	Consequence				
	Catastrophic	**Major**	**Moderate**	**Minor**	**Insignificant**
Almost certain	Extreme	Extreme	Extreme	High	High
Likely	Extreme	Extreme	High	High	Medium
Possible	Extreme	High	High	Medium	Low
Unlikely	High	High	Medium	Medium	Low
Rare	High	Medium	Low	Low	Low
Consequence	**Degree of environmental impact**				
Catastrophic	Very serious environmental effects. Long term widespread effects on significant environment.				
Major	Serious environmental effects. Relatively widespread, medium-long term impacts.				
Moderate	Moderate effects. Short-medium term, widespread impacts.				
Minor	Minor effects. Short-medium term damage to small area of limited significance.				
Insignificant	Limited damage to minimal area of low significance.				

Likelihood	Frequency of event occurring
Almost certain	Consequence is expected to occur in most circumstances.
Likely	Consequence will probably occur in most circumstances.
Possible	Consequence should occur at some time.
Unlikely	Consequence could occur at some time.
Rare	Consequence may only occur in exceptional circumstances.
Category	**Risk ranking**
	Extreme
	High
	Medium
	Low

Table 5.3 Risk ratings (before and after the implementation of mitigation measures)

Impacts from the project	Receiver impacted (RED IS IMPACTED)					Initial impact	Proposed avoidance/mitigation measure	Implementation of mitigation measures
	Key fish habitat	Aquatic invertebrate	Aquatic vertebrates	Water quality	Riparian vegetation			
Increased rubbish in the area						Medium	— Ensure all rubbish is properly disposed of and ample waste disposal facilities are available on-site.	Low
Sedimentation from erosion and run-off of disturbed soils						High	— Establishment of erosion and sediment control (ESC) measures — Aim to complete works during dry periods.	Low
Pollution of surface and groundwater from chemical spills						Medium	— Refuel equipment and store chemicals 100 m from any watercourse or drainage — Store chemicals in a secondary containment that is at least 130% the total volume of spillable volume.	Low
Generation of dust and run-off from stockpiles						Medium	— Cover stockpiles during rain and high wind events — Establish ESC measures.	Low
Introduction of invasive species						High	— Ensure vehicles and personal protective gear (PPE) is clean and free of weeds — Ensure all seeds obtained for rehabilitation efforts are of the native variety and free of weed — Ensure all fill is weed free — Do not release invasive aquatic species into watercourses or drainages.	Medium
Removal of riparian vegetation						Low	— Erect ‘No-Go Zones’ around the riparian zone when working in proximity of watercourses.	Low
Interaction with groundwater via excavation						Medium	— If interaction with groundwater occurs stop works immediately.	Low
Contamination of groundwater						Medium	— Ensure contaminated groundwater is removed and disposed.	Low
Disturbance of watercourse banks and streambeds						Low	— Under no circumstance is a vehicle or equipment allowed to enter the watercourse.	Low
Inappropriate disposal of waste (including grey water, and potable water) into drainages and excavations that interact with groundwater.						Low	— Appropriately dispose of wastes and do not intentionally dispose of waste in any drainages.	Low

6 Mitigation measures

As outlined in BDAR mitigation measure B12, a Riparian Vegetation Management Plan (RVMP) will be developed and implemented for the project to manage activities within vegetated riparian zones to minimise impacts to aquatic environments. The plan will be prepared prior to and implemented during any disturbance to a riparian area. This will be the primary aquatic mitigation measure.

The plan will identify the measures to be implemented to minimise impacts from construction activities (such as temporary and permanent waterway crossings) within riparian and aquatic environments. A schedule of works will be stipulated within the approved RVMP. Riparian areas subject to disturbance will be progressively stabilised and rehabilitated.

BDAR mitigation measure B4 also requires micro-siting of associated works and access tracks to minimise vegetation clearing and disturbance of watercourses within the biodiversity study corridor which will include:

- prioritising areas of low biodiversity value
- utilising existing access tracks, where feasible
- locating waterway crossings at narrow width locations
- minimising the quantity of cut and fill activities.

BDAR mitigation measure B16 relates to water quality, watercourse geomorphology and aquatic habitat and states that any watercourse crossings will be designed to minimise disturbance and harm within riparian corridors and rehabilitate aquatic habitat to achieve a 'no net loss' of habitat within the affected area and catchment as a whole, in accordance with the following guidelines:

- *Guidelines for controlled activities on waterfront land (NRA, 2018)*
- *Why do fish need to cross the road? Fish passage requirements for waterway crossings (Fairfull & Witheridge, 2003)*
- *Policy and guidelines for fish habitat conservation and management (DPI, 2013).*

Although no direct impacts to the surrounding aquatic environments (i.e. instream works, works within riparian area) are expected, there is still a risk that indirect impacts from construction of the project may impact local watercourses. To ensure that the surrounding aquatic habitats remain intact and healthy during the project works the following recommendations should be implemented:

- ongoing visual assessments at watercourse crossings to ensure no adverse impacts are observed during construction
- implementation of the Network Operator’s construction contractor’s Environmental Management Strategy (EMS), or the Network Operator’s operational environmental management framework (or similar system).

Overall, with the implementation of the proposed mitigation measures, the project is not expected to result in adverse impacts on aquatic environments, ecological communities and species.

If any instream works are to be performed, appropriate approvals and permits are to be obtained under the FM Act and the WM Act.

7 Conclusion

7.1 Summary of results

The desktop assessment determined that the HTP will cross 20 named watercourses as well as many unnamed lower order watercourses (90% being Strahler Order <2). Of these, 16 named watercourses and 48 unnamed watercourses were mapped to contain KFH. Of these, 4 were determined to contain mapped habitat for Southern purple spotted gudgeon. Of these identified watercourses, 7 were selected for field survey as they were determined to contain mapped aquatic habitat for Southern purple spotted gudgeon or determined to be potentially impacted as a result of construction activities (i.e. tree pruning, removal of vegetation from top of bank result in sedimentation, step banks etc.). All watercourses within the HTP must be protected as there is potential for aquatic organisms to utilise all watercourses within the project impact area.

All 7 survey locations are mapped as KFH, which was confirmed during the survey. Six of the 7 survey areas were deemed to be a type 1 watercourse and 4 of the 7 were deemed to be a class 1 watercourse. One watercourse, Loder Creek, was deemed to be a type 2 watercourse as it lacked type 1 habitat features. Three of the 7 watercourses (Loder Creek, Monkey Place Creek and Watagan Creek) were deemed to be class 2, as they lack a permanency flow (Table 7.1). Watercourse type and class ratings are used to assess the impacts of certain activities on fish habitats in and to identify management recommendations to minimise impacts on different fish habitats such as watercourse crossing types. The class 1 watercourses require a bridge, arch structure or tunnel whereas class 2 requires a bridge, arch structure, culvert or ford. If crossings are required at any of the surveyed locations, bridge crossings will be the preferred crossing structure.

Table 7.1 Assessment summary

Watercourse	Watercourse type	Watercourse class	Final determination
Hunter River (SW01)	1	1	Highly sensitive and major key fish habitat
Hunter River (SW02)	1	1	Highly sensitive and major key fish habitat
Wollombi Brook	1	1	Highly sensitive and major key fish habitat
Loder Creek	2	2	Moderate sensitive and moderate key fish habitat
Monkey Place Creek	1	2	Highly sensitive and moderate key fish habitat
Congewai Creek	1	1	Highly sensitive and major key fish habitat
Watagan Creek	1	2	Highly sensitive and moderate key fish habitat

With the recommended mitigation and management measures, it is not expected that any fish habitat in the assessed watercourse will be impacted during construction or operation of the HTP. The riparian area and watercourse features would remain intact and would not be directly impacted. There are potential indirect impacts that could adversely impact aquatic environments (see section 5.1). The proposed mitigation and avoidance measures would reduce the overall risk of impact.

Although no direct impacts to the surrounding aquatic environments (i.e. instream works, works within riparian area) are expected, there is still a risk that indirect impacts from construction of the project may impact local watercourses. To ensure that the surrounding aquatic habitats remain intact and healthy during the project works the following recommendations should be implemented:

- visual assessments at watercourse crossings to ensure no adverse impacts are observed
- implementation of a project Environmental Management Strategy.

If any instream works are to be performed, appropriate approvals and permits are to be obtained under the FM Act and the WM Act. The project has been determined as being unlikely to result a significant impact on listed aquatic threatened species, populations or ecological communities listed under the FM Act.

8 Limitations

This report is provided by WSP Australia Pty Limited (*WSP*) for EnergyCo (*Client*) in response to specific instructions from the Client and in accordance with WSP's proposal dated 31 January 2024 and agreement with the Client 6 May 2024 (*Agreement*).

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Appendix A

Test of significance

Test of significance for southern spotted purple gudgeon & Darling River hardyhead (as per Part 7. Division 1, Section 7.3 of the *Biodiversity Act 2016*)

The following is to be considered for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

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 only likely impact to occur in an area of key fish habitat (KFH) will be the removal or trimming of tree canopy on the creek banks to facilitate the construction and operation of the powerlines spanning each riparian area. All trunk bases and understorey will be retained in-situ adjoining the creek banks. All potential indirect impacts associated with erosion and sedimentation impacts will be managed so they do not impact the riparian areas.

At most, any impact to water quality will be temporary and negligible. Each riparian area will continue to function as it currently performs. It is considered unlikely that temporary impacts would result in any long-term degradation of mapped KFH areas.

Southern purple spotted gudgeon

The project is not likely to have an adverse effect on the life cycle of the Southern purple spotted gudgeon such that a viable local population of the species is likely to be placed at risk of extinction.

Southern purple spotted gudgeon is threatened by:

- predation and competition with introduced fish such as eastern gambusia (*Gambusia holbrooki*) and redfin perch (*Perca fluviatilis*)
- habitat disturbance by common carp (*Cyprinus carpio*)
- fluctuations in water levels and flow due to river regulation
- increased turbidity and damage of stream banks by livestock access
- decreased water quality due to agricultural runoff and siltation
- extreme weather events, such as drought and bushfires
- local extinctions may not be naturally recolonised because of the species' inability to disperse the long distances required.

The project will have a limited impact on these factors that threaten Southern purple spotted gudgeon.

Importantly, watercourse crossings will be designed in accordance with *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Watercourse Crossings* (Fairfull and Witheridge, 2003) and *Policy & Guidelines for Fish Habitat Conservation & Management (2013 update)* (DPI, 2013). The extent of impact to waterbodies, water quality and hydrological processes is expected to be minor throughout the project, subsequently reducing the risk of impacts on threatened species within the subject land. Breeding and other lifecycle activities are expected to continue.

Darling River hardyhead

The Darling River hardyhead is threatened due to:

- the habitat of the Darling River hardyhead has been degraded through soil erosion, land clearing and livestock damage to riverbanks
- thermal pollution (changes in water temperature)
- the presence of competing species, including alien goldfish (*Carassius auratus*), eastern gambusia (*Gambusa holbrooki*) and common carp (*Cyprinus carpio*) may be causing significant declines of the Darling River hardyhead in the Hunter River catchment. It is also likely that gambusia feed on the eggs and larvae of the Darling River hardyhead
- water extraction from smaller tributary streams during droughts may put additional pressure on remnant populations.

The current known distribution of Darling River hardyhead is located outside of the HTP area, however, historically this species was located within the project impact area with the most recent record being in 1976. Due to the lack of presence of this species and limited instream impacts of the project, it is unlikely the project will have on Darling River hardyhead.

Additionally, the project footprint does not cross any mapped Darling River hardyhead habitat, however, there is a low likelihood this species may be present.

b) 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*
- **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.

c) In relation to the habitat of a threatened species 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*
- **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*
- **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.*

Degradation of riparian zones can impact both aquatic and terrestrial biodiversity that are affiliated with the habitat. Consequently, in the event of any disturbance to riparian areas, only the vegetation of the tree-stratum will be cleared (with tree trunks to be retained) in order to protect the understory in such areas. Any riparian areas subject to disturbance would be stabilised and rehabilitated, using endemic vegetation, to restore the area to pre-existing conditions as far as reasonably practicable. As the project is unlikely to impact core riparian zones, no direct impacts are expected to occur to these aquatic values of reliant threatened aquatic species.

Habitat connectivity will be maintained through avoiding the construction of additional watercourse barriers within watercourses. The project`s preference will be to utilise existing watercourse crossings (i.e., bridges, culverts) for construction and operation, to avoid the need to construct additional watercourse barriers. In the event new crossings are required, they will be designed in accordance with the *'Why Do Fish Need to Cross the Road?'* (Fairfull and Witheridge, 2003), and the *Policy & Guidelines for Fish Habitat Conservation & Management* (DPI, 2013), to ensure impacts on fish passage and habitat connectivity are minimised.

d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The project will not impact on any declared area of outstanding biodiversity value.

e) Whether the proposed development or activity is consistent with a Priorities Action Statement

The NSW DPI Priorities Action Statements outline recovery actions for these species. The actions include:

- advice to consent and determining authorities
- collate and review existing information
- community and stakeholder liaison, awareness and education
- compliance/enforcement
- enhance, modify or implement NRM planning processes to minimize adverse impacts on threatened species
- habitat rehabilitation
- pest eradication and control

- research/monitoring
- stocking/translocation
- survey/mapping.

The project does not interfere with any of the recovery actions for these species.

f) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A Key Threatening Process (KTP) is a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, population, or ecological community. Key threatening processes are listed under the BC Act and at the present there are currently 39 listed KTP's. Of the 38 listed KTP's under the BC Act, 2 are applicable to the threatened fish species subject to this assessment (Table A.1). However, minimisation of impacts to 'core' riparian areas, and preference for utilisation of existing watercourse crossings will reduce or avoid the impact of both KTP's.

Table A.1 Key threatening processes relevant to the project (BC Act)

Key threatening process	Relevance to the project
Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands	Yes. The project will prioritise utilisation of existing watercourse crossings for construction and operation, and in the event additional watercourse crossings are required by the project, they will be designed in accordance with the *'Why Do Fish Need to Cross the Road?'* booklet (Fairfull and Witheridge, 2003), and the *Policy & Guidelines for Fish Habitat Conservation & Management (2013 update)* (DPI, 2013).
Clearing of native vegetation	Yes. The Project will require clearing of native vegetation. However, impacts to riparian vegetation will be avoided or minimised where possible.

There are also KTP's specific to native fish and marine vegetation listed under the FM Act. Of the 8 listed KTP's under the FM Act, 5 are applicable to the threatened fish species subject to this assessment (Table A.2). However, minimisation of impacts to 'core' riparian areas, preference for utilisation of existing watercourse crossings, and the Project's support of renewable energy zones in the Hunter region, will reduce or avoid the impact of all KTP's.

Table A.2 Key threatening processes relevant to the project (FM Act)

Key threatening process	Relevance to the project
Degradation of native riparian vegetation along New South Wales water courses	Yes. The project may require temporary degradation of native riparian vegetation; however, this is limited to the trimming of tree canopy's to facilitate the construction and operation of the transmission line spanning each riparian area. It is expected that trunk bases and understorey will be retained in-situ, however, this is yet to be confirmed. Additionally, any riparian areas subject to disturbance will be stabilised and rehabilitated, using endemic vegetation, to restore the area to pre-existing conditions as far as reasonably practicable.
Human-caused climate change	Yes. The project is likely to generate temporary emissions during construction. However, the purpose of the project is to facilitate development of renewable energy zones in the Hunter region, Central-West Orana and New England, which will strive to reduce climate change impacts associated with energy production.
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	Yes. The project will prioritise utilisation of existing watercourse crossings for construction and operation, and in the event additional watercourse crossings are required by the project, they will be designed in accordance with the *'Why Do Fish Need to Cross the Road?'* booklet (Fairfull and Witheridge, 2003), and the *Policy & Guidelines for Fish Habitat Conservation & Management (2013 update)* (DPI, 2013).

Key threatening process	Relevance to the project
Removal of large woody debris from New South Wales rivers and streams	Yes. The project may require the removal of large woody debris to facilitate construction of watercourse crossings, if required. Preference will be to utilise existing watercourse crossings.

Conclusion

While there are several KTP's applicable to the threatened species subject to this assessment, and all of which are relevant to the project, management and mitigation measures are sufficient to reduce or avoid impacts from the KTP's. Anticipated impacts (direct or indirect) from the project to the habitat of both the southern spotted purple gudgeon and Darling River hardyhead are likely to only be temporary in nature and will be minimised through design and landscaping initiatives where possible. Consequently, the project is unlikely to have a significant impact on the applicable threatened species or their habitat.

Appendix B

Likelihood of occurrence

Table B.1 Likelihood of occurrence

Scientific name	Common name	BC Act[1]	FM Act[3]	EPBC Act[2]	Habitat	Likelihood of occurrence
Craterocephalus amniculus	Darling River hardyhead (Hunter River catchment population)	–	EP	–	The Darling River hardyhead is found in the upper tributaries of the Darling River near the Queensland and New South Wales border. The Hunter River population is the only known occurrence of the species in an eastward flowing river. They are usually found in slow flowing, clear, shallow waters or in aquatic vegetation at the edge of such waters. The species has also been recorded from the edge of fast flowing habitats such as the runs at the head of pools.	Moderate
Mogurnda adspersa	Southern purple spotted gudgeon	–	E	–	The Southern purple spotted gudgeon occurs in the Murray-Darling basin as well as parts of coastal northern NSW and Queensland. The species can be found in a variety of habitats such as rivers, creeks, watercourse and billabongs with slow-flowing or still waters. Cover in the form of aquatic vegetation, overhanging vegetation from riverbanks, leaf litter, rocks or snags are important for the species.	High

(1) V = Vulnerable, E = Endangered, CE = Critically Endangered, EX = Presumed Extinct under the BC Act

(2) V = Vulnerable, E = Endangered, M = Migratory under the Commonwealth EPBC Act.

(3) V = Vulnerable, E = Endangered, EP = Endangered Population, CE = Critically Endangered, EX = Presumed Extinct under the Fisheries Management Act 1994

Appendix M

Evidence to support and to justify the quantum of partial loss applied to disturbance area B and HZ

Our ref: PS201156-NCL-ECO-LTR-001 RevAFINAL

By email
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10 April 2025

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Dear Steven

HTP Partial Impacts evidence base

1. Introduction to project

This letter has been prepared by WSP Australia Pty Ltd on behalf of Energy Corporation of NSW (Energy Co) for the proposed Hunter Transmission project (HTP) (the project).

WSP Australia Pty Ltd has prepared a Biodiversity Development Assessment Report (BDAR) for the HTP in accordance with NSW Biodiversity Assessment Method 2020 (BAM).

A key component of the project assessment was consideration of partial impacts on native vegetation within the electrical transmission line (ETL) during construction and ongoing operational maintenance and how these partial impacts are assessed under the BAM.

Following ongoing consultation with the NSW Conservation Programs, Heritage and Regulation (CPHR) (formerly Biodiversity Conservation & Science (CPHR)) a range of assessment approaches to partial impacts and key considerations were identified, with a particular focus on providing a project specific and evidence-based approach.

This memo presents the finding of the evidence-based approach to partial impacts developed for the project. It also builds on the information previously presented in consultative workshop with CPHR on the 9th May 2023 and submitted as part of the approved Central-West Orana Renewable Energy Zone (CWO REZ) transmission infrastructure project.

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WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

WSP Australia Pty Limited ABN 80 078 004 798

1.1 Project description

The project is critical State significant infrastructure (CSSI). It must be built by the end of 2029 to protect energy security in NSW as the remaining coal-fired power stations close.

The project includes:

- a new overhead 500 kilovolt (kV) double circuit transmission line of around 100 kilometres (the HTP corridor)
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments to existing transmission lines
- ancillary works including road upgrades, access tracks, and temporary construction facilities such as laydown areas, stringing sites, and construction support sites (some with temporary workers accommodation).

The new transmission line would transport electricity generated in the Central-West Orana and New England Renewable Energy Zones (REZs). It would connect the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring. This would strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

The project disturbance area is identified based on realistic project component locations and areas however it is indicative at this stage. The area would be confirmed during finalisation of design and construction methodology and would be developed as part of the consideration of avoidance and impact minimisation. Disturbance area has the same meaning as 'Development site' as defined in the BAM.

The disturbance area would have varying degrees of physical disturbance along the transmission line alignment to reflect construction and operational requirements, and these have been applied to the biodiversity assessment. For the purpose of this BDAR, disturbance area has been divided into the following areas consisting of:

- **Disturbance area A** – assumed for complete removal of vegetation.
- **Disturbance area B** – assumed to have no ground disturbance except in circumstances associated with the operational requirements for vegetation maintenance to meet the vegetation clearance heights. The assumed partial vegetation clearing is restricted to clearance of vegetation with growth height potential of 2 metres or above.
- **Disturbance area HZ** – a hazard tree zone where there would be impacts to selected trees that are within the risk category height range 20–30 m and have poor structural stability posing a risk of falling.

The width of the disturbance areas A, B and HZ areas for transmission line components vary based on their vegetation clearing requirements and construction methodologies. Figure 1.1 provides an indicative overview of these disturbance types.

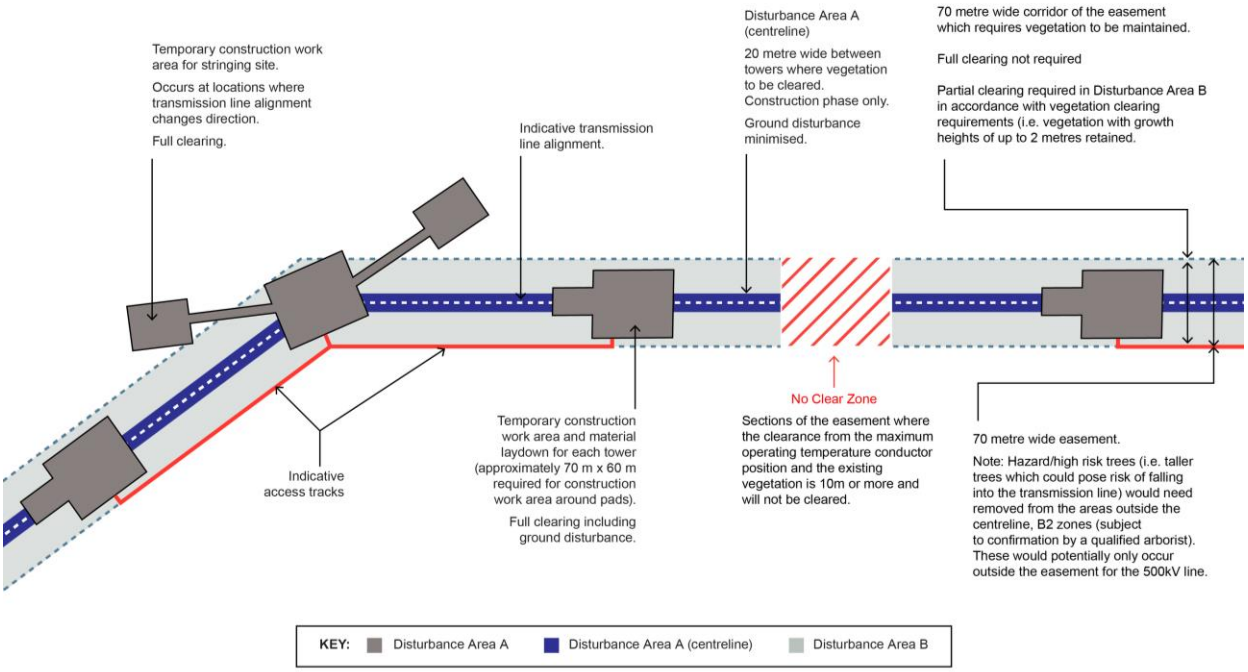


Figure 1-1 Indicative disturbance area definition for a typical 500 kV transmission line

2. Background to partial impacts in ETLs

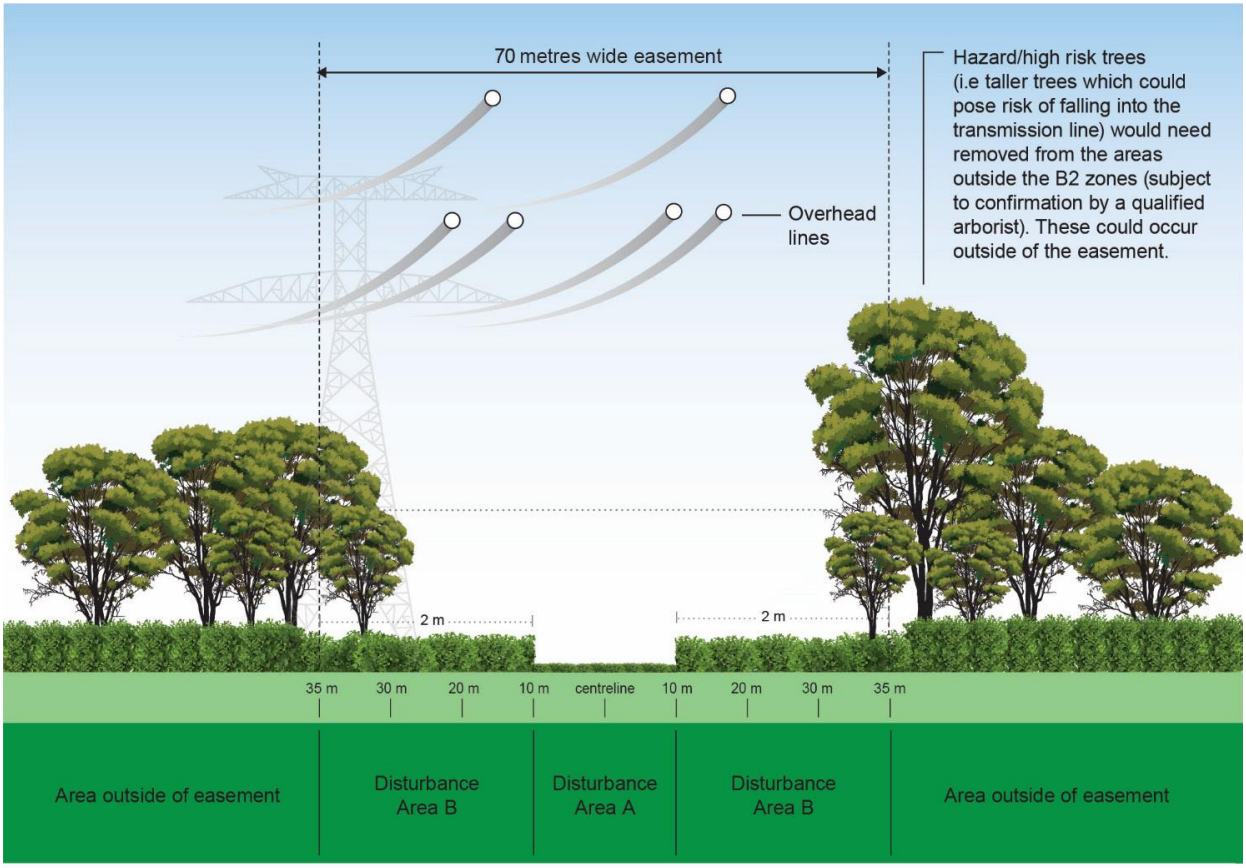
The project has identified partial impacts are applicable to two disturbance zones:

- **Disturbance area B** – assumed to have no ground disturbance except in circumstances associated with the operational requirements for vegetation maintenance to meet the vegetation clearance heights. The assumed partial vegetation clearing is restricted to clearance of vegetation with growth height potential of 2 metres or above.
- **Disturbance area HZ** – a hazard tree zone where there would be impacts to selected trees that are within the risk category height range 20–30 m and have poor structural stability posing a risk of falling.

These zones are associated with areas of the ETL corridor not subject to permanent construction footprints but rather areas of vegetation maintenance.

ETL corridor management traditionally focuses on the complete removal of vegetation using short rotation times with the aim to reduce the perceived fire hazard associated with transmission line corridor vegetation.

The project has taken a different approach where the maintenance zone underneath the transmission line will be managed through the removal of vegetation with specific growth height levels in accordance with vegetation clearing requirements (i.e. down to a growth height of 2 metres) leaving the midstory and ground layers intact (Figure 2.1).



Vegetation in the easement to be maintained to achieved minimum clearance requirements (based on growth heights). (Assessed as up to 2 metres growth heights).

Figure 2-1 Conceptual layout of transmission line project

This partial clearing of the ETL easement forms part of the measures taken to minimise impacts to biodiversity values. Maintaining a proportion of the understorey layer will help avoid total loss of species richness, encourage native species and limit colonisation opportunities of introduced species (see Clarke and White, 2008).

2.1.1 Key partial impacts to be considered

The maintenance of vegetation will still require the need to trim, spray or otherwise continually supress woody vegetation under powerlines. These impacts require quantification, with the key attributes assessed by the BAM as likely to be affected being:

- tree composition and structure
- shrub composition and structure
- litter cover function
- coarse woody debris function
- stem size class function
- regeneration function.

Following consultation with CPHR, the following impacts were specifically identified for potential removal and continual suppression of the tree and shrub growth forms also has the potential to expose all other growth forms to indirect impacts including, but not limited to:

- disturbance facilitating penetration of the vegetation assemblage by exotic weed species
- a localised reduction/loss of the stored aerial and soil seed bank through the removal and disturbance of topsoil and the loss of serotinous flora species

- a localised change in the microclimate of the vegetation assemblage and habitat i.e. changes in temperature, wind, light and humidity as a result of the loss of canopy cover in the assemblage
- a localised change in the hydrology of the vegetation assemblage and habitat i.e. changes in surface water flows as a result of the loss of structural features capturing surface water
- a localised change in the soil conditions of the vegetation assemblage and habitat i.e. increased sedimentation and nutrient availability as a result of direct impact to the soil profile and the removal of stabilising vegetation
- a localised change in species interactions such as pollination and seed dispersal.

2.2 Literature based theory on partial impacts for ETL

ETL partial clearing develops into novel habitats over time (see Eldridge, Eyitayo et al., 2017) and species and functional composition have been shown to be different between sites with control and thinned canopy treatments with proportionally more individuals of grasses and forbs in thinned plots (see Tsai et al., 2018). Where structural elements such as the canopy tree layer is removed from existing ETL easements across NSW, shrubby mid storey layer, or derived shrub land and grassland vegetation structure may develop.

Canopy opening disturbance has immediate and substantive effects on understory microclimate and therefore the establishment and growth of understory plants (Tsai et al., 2018). Where shrub and ground stratum cover increases it has been documented that composition or species richness may decrease through species being out competed by more dominant species. Studies show a general shift to early successional shade intolerant species and those species that reproduce through clonal growth (see Luken, et al., 1992; Eldridge, Eyitayo et al. 2017; Walker & Koen, 1995).

Specifically, for the project, most Dry Sclerophyll Forest PCTs have existing woody shrub layers will likely see changes in the future shrub and ground layers cover scores, while for those PCTs with greater grassy understorey components (e.g. Grassy Woodlands) similar future increase in vegetation cover for grass and grass like, forb, fern and other species cover attributes is likely (Nobel, 1997; Both et al. 1996).

2.3 Approach to partial impacts within BAM-C

To facilitate these partial impact scenarios the BAM allows for circumstances where partial clearing of vegetation is proposed and remaining vegetation will be maintained (i.e. not degraded further over time). The consideration of these partial impacts within the BAM-C is applied through the adjustment of future value of the relevant vegetation integrity (VI) attributes. In assessing direct impacts on native vegetation, future VI scores were calculated in the BAM-C for each disturbance area subset and associated vegetation zone as follows:

- For disturbance area A, the future VI score was calculated as zero (assuming total loss of native vegetation).
- For disturbance area B (partial clearing of the transmission line easement) future VI scores have been calculated through changes to mean average scores in attributes associated with composition condition, structure condition, and function condition.
- For disturbance area HZ (Hazard High Risk Trees) future VI scores have been calculated through changes to tree species composition and structure

2.3.1 BAM-C limitations in ability to measure partial impacts.

The BAM-C has a number of limitations when assessing partial impact, particularly the inflexibility in the input functions to calculate future VI scores and specifically in that attributes can only be decreased from the recorded mean average.

This limitation means the composition, structure and function attributes cannot adjusted to reflect increases in attributes observed or considered likely from existing powerline easements (e.g. increased shrub cover due to tree removal).

These deficiencies in the BAM-C generates overlapping conservatism in the final measurement of change predicted for the partial impact of the project on VI.

A summary of the key limitations of BAM-C is provided below:

- Only measures reductions in attributes values do not gain (e.g increased shrub or grass cover or diversity are not measured)
- VI changes are limited by benchmark data and seasonal influences (changes that are still above benchmark values indicate no change in VI). For example an observed decrease in forb diversity in a high condition PCT with substantially higher diversity than benchmark values will only generate a change in the VI scores if it fall below the upper benchmark value.

2.3.2 Previously approved approach to partial impacts

Previously approved ETL infrastructure projects assessment of partial impact in accordance with BAM have adopted conservative, literature-based changes in VI scores. Specifically, for project Energy Connect West and East a negotiated partial assessment that adopted the following reductions in VI values:

- all canopy attributes to zero
- 30% reduction in composition of understory shrub, grass & grass like, forb, fern and other species
- 30% reduction in of understory structure
- 25% reduction in leaf litter and fallen timber.

These approved changes in BAM-C VI partial impact for Grassy Woodlands formations for PEC East resulted in VI reductions ranging for individual PCTs from -43.1 to -58 VI scores.

The Central-West Orana Renewable Energy Zone (CWO REZ) transmission infrastructure project adopted an evidence base approach supported by field survey of existing easements to builds on and refines the previous literature-based assumptions in assessing partial impact. A total of 22 BAM plots across 11 separate sites and 10 PCTs (6 Grassy Woodland, 4 Dry Sclerophyll Shrubby) were used to derive the following manual adjustment to VI values within the BAM-C (refer to Table 2.2).

Table 2-2 Proposed adjustment to BAMC VI scores for partial impacts within the ETL by formation.

Attribute	Vegetation layer	Previously approved	Proposed GW	Proposed DSF
Composition	Canopy	Complete removal	Complete removal	Complete removal
	Shrub	30%	10% reduction	10% reduction
	Understory	30%	10% reduction	10% reduction
Structure	Canopy	Complete removal	Complete removal	Complete removal
	Shrub	30%	0%	20% reduction
	Understory	30%	0%	0%
Function	Canopy	Complete removal		
	Understory	30% Reduction in LL and Fallen Timber		

3. Methodology for HTP evidence-based approach

3.1 Overview

EnergyCo have built on the previous approach of these approved methods to develop a project specific and field-based evidence approach to partial impacts. The following sections outline the methodology, results and proposed outcomes supporting the partial impact approach adopted within the BDAR.

To increase our current understanding of the partial impacts within maintenance areas of ETLs, a range of field validated data across accessible ETLs within the project or same PCTs/ IBRA Subregions were collected.

For HTP a total of 36 BAM plots across 19 separate sites and 7 PCTs were sampled (4 Wet Sclerophyll Shrubby, 5 We Sclerophyll Grassy, 1 Grassy Woodland, 6 Dry Sclerophyll (Shrub/Grass) and 3 Dry Sclerophyll (Shrubby)PCTs) (refer to Tabel 3.1 and Figure 3.1). This assessment builds on the previously sampled 10 PCTs for the CWO REZ project (6 Grassy Woodland, 4 Dry Sclerophyll) (refer to Table 3.1)

Table 3.1 PCTs subject to field survey.

PCT Number	PCT	IBRA Subregion
Grassy Woodlands		
76	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Inland Slopes
80	Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion	Lower Slopes
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Inland Slopes
281	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Kerrabee
461	Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion	Inland Slopes
618	White Box x Grey Box - red gum - Rough-barked Apple grassy woodland on rich soils on hills in the upper Hunter Valley	Kerrabee
3315	Central Hunter Ironbark-Spotted Gum Forest	Hunter
Wet Sclerophyll Forests (Grassy sub-formation)		
3230	Central Coast Escarpment Moist Forest (Mod-good condition)	Wyong
3263	Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)	Wyong
Wet Sclerophyll Forests (Shrubby sub-formation)		
3150	Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)	Wyong
Dry Sclerophyll Forests (Shrub/grass sub-formation)		
3444	Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)	Hunter
3431	Central Hunter Ironbark Grassy Woodland	Hunter

PCT Number	PCT	IBRA Subregion
Dry Sclerophyll Forests (Shrubby sub-formation)		
3636	Warkworth Sands Woodland	Hunter
477	Inland Scribbly Gum - Red Stringybark - Black Cypress Pine - Red Ironbark open forest on sandstone hills in the southern Brigalow Belt South Bioregion and northern NSW South Western Slopes Bioregion	Inland Slopes
479	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Inland Slopes
1606	White Box - Narrow-leaved Ironbark - Blakely's Red Gum shrubby open forest of the central and upper Hunter	Kerrabee
1674	Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	Inland Slopes

TC22 (PCT 3431)

TC23 (PCT 3431)

MUSWELLBROOK LGA
SINGLETON LGA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub/grass sub-formation)

Legend

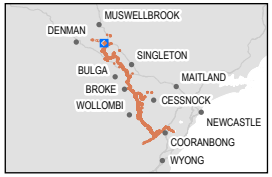
- Biodiversity study area

Existing environment

- 500 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3314 - Central Hunter Slopes Grey Box Forest (Thinned condition)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Poor condition)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)
- PCT0 - Not classified
- Excluded land



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Scale ratio correct when printed at A4

GDA 2020

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TC21 (PCT 3431)

TC20 (PCT 3431)

MUSWELLBROOK LGA
SINGLETON LGA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub/grass sub-formation)

Legend

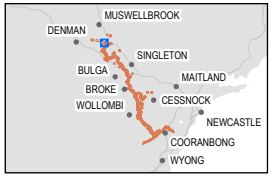
- Biodiversity study area

Existing environment

- 500 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3314 - Central Hunter Slopes Grey Box Forest (Poor condition)
- PCT3314 - Central Hunter Slopes Grey Box Forest (Thinned condition)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Poor condition)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)
- PCT0 - Not classified
- Excluded land



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TC32 (PCT 3431)

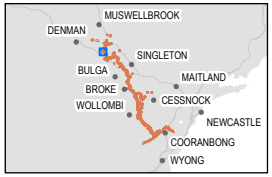
TC33 (PCT 3431)

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub/grass sub-formation)

Legend

- Local government area
- BAM quadrat



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HTP-TB-01 (PCT 3636)

HTP-MS-86 (PCT 3636)

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub)

Legend

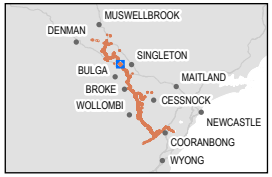
- Biodiversity study area

Existing environment

- 330 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3636 - Warkworth Sands Woodland (Disturbed Grassland)
- PCT3636 - Warkworth Sands Woodland (Thinned condition)
- Excluded land
- Category 1 land



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HTP-TB-02 (PCT 3636)

HTP-MS-87 (PCT 3636)

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub)

Legend

- Biodiversity study area

Existing environment

- 330 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3636 - Warkworth Sands Woodland (Thinned condition)
- Excluded land
- Category 1 land

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Metres

Coordinate system: GDA2020 MGA Zone 56

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HTP-MS-84 (PCT 3636)

HTP-MS-85 (PCT 3636)

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub)

Legend

- Biodiversity study area
- Road
- Local government area
- BAM quadrat

Plant Community Types

- PCT3636 - Warkworth Sands Woodland (Disturbed Grassland)
- PCT3636 - Warkworth Sands Woodland (Thinned condition)
- Excluded land
- Category 1 land

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Metres

Coordinate system: GDA2020 MGA Zone 56

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TC28 (PCT 3444)

TC29 (PCT 3444)

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub/grass sub-formation)

Legend

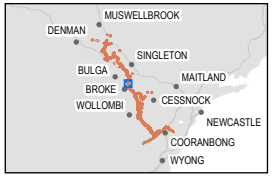
- Biodiversity study area

Existing environment

- 330 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)
- Excluded land



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TC30 (PCT 3444)

TC31 (PCT 3444)

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Dry Sclerophyll Forests (Shrub/grass sub-formation)

Legend

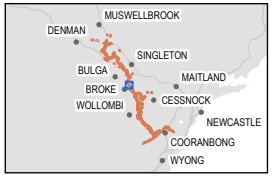
- Biodiversity study area

Existing environment

- 330 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)
- Excluded land



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TC26 (PCT 3444)

TC27 (PCT 3444)

Legend

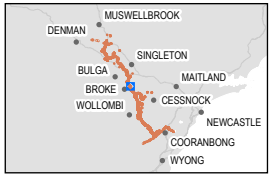
- Biodiversity study area

Existing environment

- 330 kV transmission line
- Local government area
- BAM quadrat

Plant Community Types

- PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)
- PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)
- Excluded land



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TC24 (PCT 3315)

TC25 (PCT 3315)

CESSNOCK ROAD

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Grassy woodlands

Legend

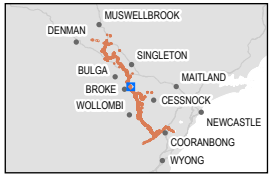
- Biodiversity study area

Existing environment

- 330 kV transmission line
- Road
- Local government area
- BAM quadrat

Plant Community Types

- PCT3314 - Central Hunter Slopes Grey Box Forest (Thinned condition)
- PCT3315 - Central Hunter Ironbark-Spotted Gum Forest (Thinned condition)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)
- PCT0 - Not classified
- Excluded land



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OLNEY STATE FOREST

LCEB_HTP6 (PCT 3230)

LCEB_HTP5 (PCT 3230)

JILLIBY STATE CONSERVATION AREA

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT0 - Not classified
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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HTP-MS-62 (PCT 3230)

HTP-MS-61 (PCT 3230)

OLNEY STATE FOREST

JILLIBY STATE CONSERVATION AREA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT0 - Not classified
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

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LCEB_HTP1 (PCT 3230)

LCEB_HTP2 (PCT 3230)

OLNEY STATE FOREST

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT0 - Not classified
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 15/07/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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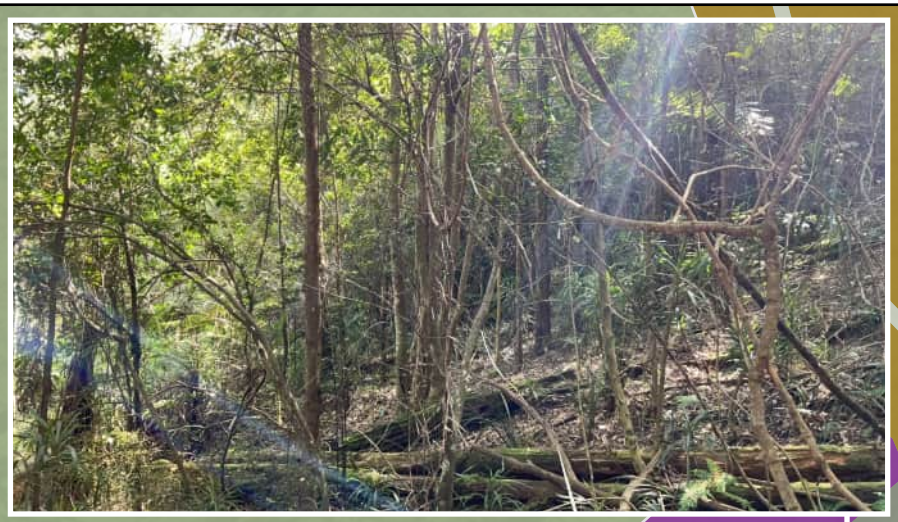

LCEB_HTP4 (PCT 3150)

LCEB_HTP3 (PCT 3150)

OLNEY STATE FOREST

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Shrubby sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)
- PCT0 - Not classified
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 15/07/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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OLNEY STATE FOREST

LCEB_HTP8 (PCT 3263)

LCEB_HTP7 (PCT 3263)

JILLIBY STATE CONSERVATION AREA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 15/07/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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OLNEY STATE FOREST

LCEB_HTP10 (PCT 3263)

LCEB_HTP9 (PCT 3263)

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Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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LCEB_HTP12 (PCT 3263)

LCEB_HTP11 (PCT 3263)

OLNEY STATE FOREST

JILLIBY STATE CONSERVATION AREA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- Road
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)
- PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)
- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 15/07/2025

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LCEB_HTP14 (PCT 3150)

LCEB_HTP13 (PCT 3150)

WATAGAN FOREST ROAD

JILLIBY STATE CONSERVATION AREA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- Road
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 15/07/2025

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WATAGAN FOREST ROAD

LCEB_HTP16 (PCT 3150)

LCEB_HTP15 (PCT 3150)

JILLIBY STATE CONSERVATION AREA

Hunter Transmission Project
Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- Road
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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LCEB_HTP18 (PCT 3150)

LCEB_HTP17 (PCT 3150)

JILLIBY STATE CONSERVATION AREA

Hunter Transmission Project Biodiversity Development Assessment Report

Appendix M
Partial Impact Survey Locations
Wet Sclerophyll Forests (Grassy sub-formation)

Legend

- Biodiversity study area

Existing environment

- 500 kV transmission line
- State conservation area
- State forest
- Local government area
- BAM quadrat

Plant Community Types

- Excluded land

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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3.2 Survey methodology

3.2.1 Survey location

To ensure the analysis and assessment of partial impacts are suitably conservative, with limited variability, the following rule set was developed for all sample locations;

- only sampled ETLs with a minimum of 40 m wide management easement (typically of 330 kV or greater kV)
- remnant reference sites are PCTs in moderate-good condition (VI >50).
- all paired sample sites were in the same PCT
- all paired sample sites were generally located <100m apart to avoid microclimate variability.
- all paired sample sites were subject to same existing management regimes and disturbances (land use).

3.2.2 VI plot – method

VI plots were completed in accordance with section 4.3.3 of the BAM. A schematic diagram illustrating the layout of each VI plot is provided in Figure 3-2.

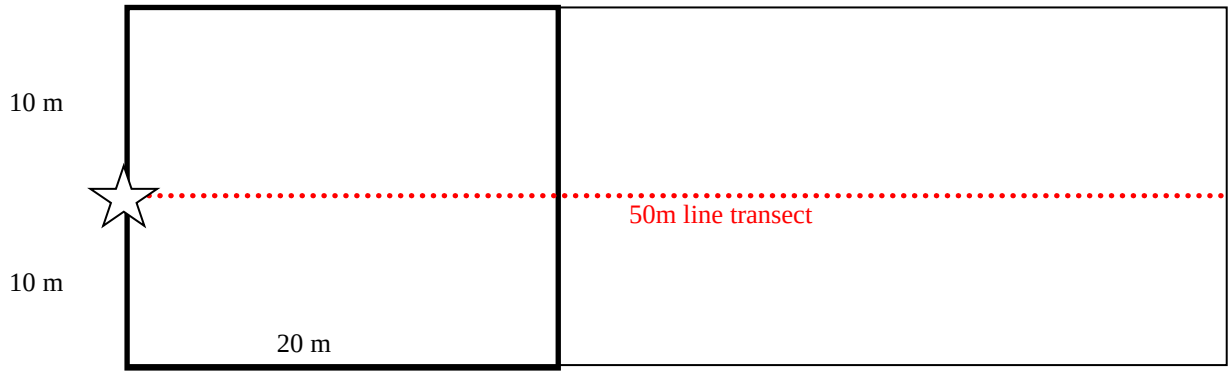

Figure 3-2 VI plot layout

The following site attributes were recorded at each VI plot location:

- **Location:** (easting – northing grid type MGA 94, Zone 54 & 55).
- **Vegetation structure and dominant species and vegetation condition:** Vegetation structure was recorded through estimates of percentage foliage cover, average height and height range for each vegetation layer.
- **Native and exotic species richness** (within a 400-metre squared quadrat): This consisted of recording all species by systematically walking through each 20 metre x 20 metre plot. The cover and abundance (percentage of area of quadrat covered) of each species was estimated. The growth form, stratum/layer and whether each species was native/exotic/high threat weed was also recorded.
- **Number of trees with hollows** (1,000 metre squared quadrat): This was the frequency of hollows within living and dead trees within each 50 metre x 20 metre plot. A hollow was only recorded if (a) the entrance could be seen: (b) the estimated entrance width was at least five centimetres across: (c) the hollow appeared to have depth: (d) the hollow was at least one metre above the ground and the centre of the tree was located within the sampled quadrat.

- **Number of large trees and stem size diversity** (1,000 metre squared quadrat): tree stem size diversity was calculated by measuring the diameter at breast height (DBH) (i.e. 1.3 metre from the ground) of all living trees (greater than five centimetre DBH) within each 50 metre x 20 metre plot. For multi-stemmed living trees, only the largest stem was included in the count. Number of large trees was determined by comparing living tree stem DBH against the PCTs benchmarks.
- **Total length of fallen logs** (1,000 metre squared quadrat): This was the cumulative total of logs within each 50 metre x 20 metre plot with a diameter of at least 10 centimetres and a length of at least 0.5 metre.
- **Litter cover:** This comprised estimating the average percentage groundcover of litter (i.e. leaves, seeds, twigs, branchlets and branches with a diameter less than 10 centimetre which is detached from a living plant) from within five 1 metre x 1 metre sub-plots spaced evenly either side of the 50-metre central transect.
- **Evaluation of regeneration:** This was estimated as the presence/absence of overstorey species present at the site that was regenerating (i.e. saplings with a diameter at breast height less than or equal to five centimetres).

Prior to establishing plot survey locations, vegetation stratification was undertaken to provide a representative vegetation zone for sampling. Stratification involved marking waypoints and bearings randomly to provide a representative assessment of the VI of the vegetation zone in the subject land and establishing the required number of plots at some of these waypoints.

Where a regularly sized 50 x 20 m plot could not be fit into vegetation due to size constraints (e.g. narrow roadside strip of vegetation, or narrow riparian zone) the plot size and shape was modified in shape keeping the required area of the quadrats (1,000 metre squared quadrat and nested 400-metre squared quadrat) intact. This was only done where the shape of the vegetation would not allow the use of a 50 x 20 m plot.

3.2.3 VI score calculations

As outlined in BAM Section 4.3.3, VI (VI) is a metric-based assessment used to measure the condition of native vegetation against a benchmark, based on survey data collected by the assessor. Within each vegetation zone in the subject land, a quantitative measure of the composition, structure and function attributes is obtained from the survey. The composition, structure and relevant function attributes for each vegetation zone are then assessed against the benchmark data for the relevant PCT. The default benchmarks for PCTs held within the BAM-C were not modified.

The plot survey data was used to determine the VI scores for a vegetation zone. Equations 16–24 from Appendix H of the BAM (housed within the BAM-C) were used to determine the current VI score for each vegetation zone within the partial impact and adjoining remnant control.

To further account for the influences of external variables on VI, the assessment compared VI scores within the ETLs with adjoining control sites (paired plots).

The VI loss was calculated as the difference between the VI of the two paired condition states.

3.2.4 Survey and data limitations

Survey of existing ETLs face a number of challenges, principally associated with access restrictions. Existing ETL easements are under management and access agreements between Transgrid and the landowner and not EnergyCo. Therefore the partial impact surveys were restricted to ETLs associated with the current project and where available relevant ETLs for previous EnergyCo/Transgrid projects (CWO).

The condition of ETLs significantly influences the measurable change to PCT condition. Where existing disturbances are high, interpreting changes in attribute data is limited (pasture improvement, substantial grazing with high weed cover low native diversity).

Therefore to provide a conservative assessment of the partial impacts, all sample sites were identified in moderate to good condition with VI scores of >50.

Where existing management regimes (grazing) were observed and could not be avoided, sample sites were located in areas under the same level of management to ensure any observed VI changes were representative of The ETL easement management.

4. Field results

4.1 Grassy Woodlands

The summary data of the eight paired BAM plots for each of the PCTs within the Grassy Woodlands formation is provided below in Table 4.1. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.1 and 4.2. A summary of the quantum of the actual change in average VI values is provided in Figure 4.3.

Table 4-1 Summary average composition and structure data of sampled PCTs within the Grassy Woodlands formation within the ETL and adjoining remnant areas.

Grassy Woodlands	Composition data - Species Richness									Structure data - Percentage Cover								
	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed
PCT 3315																		
Average Remnant	38	7	14	10	5	1	1	4	3	133	19.8	18.9	91.8	1.4	1	0.1	0.4	2.3
Average Partial Impact	22	3	4	11	3	1	0	2	2	69.6	5.4	42.3	9.7	2.2	10	0	0.3	0.7
PCT 80																		
Average Remnant	21	2	2	10	7	0	0	11	2	60.3	8	6	31.8	14.5	0	0	10.9	2
Average Partial Impact	17	1	0	8	7	0	1	15	3	38.3	2	0	27.1	9.1	0	0.1	22.6	15.1
PCT 76																		
Average Remnant	19	1	2	9	6	1	0	10	1	85.5	15	5.8	57.6	7	0.1	0	2.2	0.3
Average Partial Impact	16	0	2	11	3	0	0	11	1	75.5	0	11	60.1	4.4	0	0	5.7	3
PCT 461																		
Average Remnant	38	5	9	9	13	1	1	3	0	68	18	15.9	15.6	17.8	0.5	0.2	0.3	0

Grassy Woodlands	Composition data - Species Richness									Structure data - Percentage Cover								
	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed
Average Partial Impact	41	4	11	12	11	1	2	5	0	66.3	2.6	27.4	24	11.8	0.1	0.4	1.2	0
PCT 618																		
Average Remnant	21	1	2	9	8	0	1	8	1	70.1	10	1.1	55.2	3.7	0	0.1	1.4	0.4
Average Partial Impact	19	1	0	9	9	0	0	6	1	43.8	0.1	0	38.3	5.4	0	0	3.8	5
PCT 281																		
Average Remnant	34	3	3.5	17.5	8	1	1	4.5	1	87.9	13.7	9.9	62.1	1.6	0.55	0.2	1.8	0.1
Average Partial Impact	23.0	1.0	2.5	15.0	3.5	1.0	0.0	7.0	2.0	57.1	0.6	3.1	52.7	0.4	0.4	0.0	17.5	0.3
ALL PCT Remnant	**28.5**	**3.1**	**4.5**	**11.4**	**7.9**	**0.8**	**0.9**	**6.9**	**1.3**	**86.2**	**19.1**	**8.5**	**50.6**	**7.5**	**0.5**	**0.1**	**4.4**	**2.5**
ALL PCT Partial	**23.1**	**1.8**	**3.0**	**11.1**	**6.3**	**0.6**	**0.4**	**7.6**	**1.5**	**62.9**	**2.0**	**11.2**	**38.9**	**9.1**	**1.6**	**0.1**	**10.6**	**4.9**

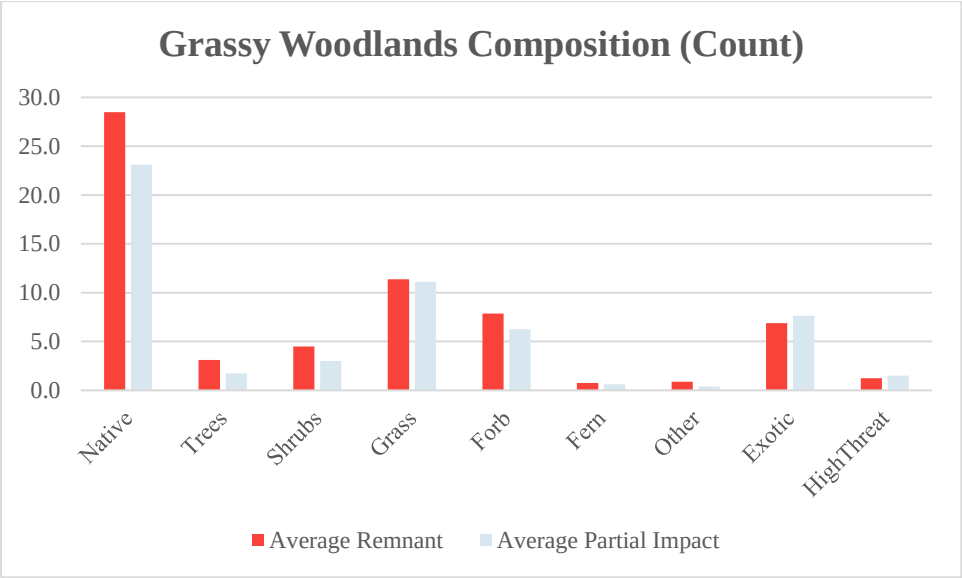

Figure 4-1 Grassy woodlands average composition data within the ETL, adjoining remnant vegetation

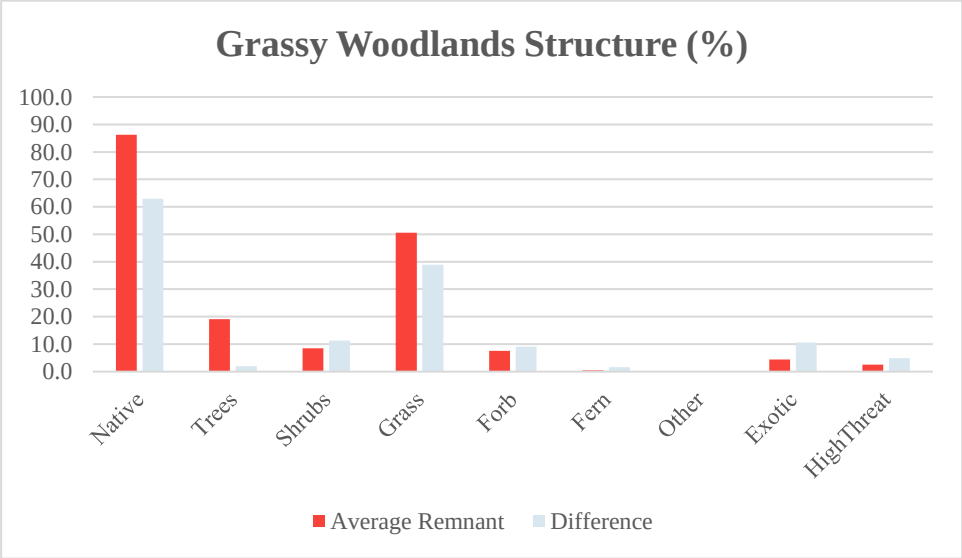

Figure 4-2 Grassy woodlands average structure data within the ETL, adjoining remnant vegetation

4.2 Key trends and findings for Grassy woodlands attribute scores

Following analysis of the data the following general trends were observed for the Grassy Woodland Formation sample sites between the management of ETL and adjoining remnant vegetation areas:

- greatest change was associated with loss in canopy cover/composition (~20%)
- ETL resulted in some increased weed cover and composition.
- the understory values for shrubs, grass, and other showed no or limited change in values
- very minor decreased in forb composition was observed combined with an increased in cover.

4.3 Changes in VI for Grassy Woodland

The summary VI data of each of the PCTs within the Grassy Woodlands formation following BAM-C calculation is provided below in Table 4.2. A comparative analysis of observed differences in VI between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.3.

Table 4-2 Summary VI data of the sampled PCTs within the Grassy Woodlands formation within the ETL, adjoining remnant vegetation.

Keith Vegetation Formation	Condition	Composition Condition Score	Structure Condition Score	Function Condition Score	VI Score	Change in VI %
Grassy Woodlands	Average Remnant	75.3	71.4	74.5	73.0	
	Average Partial impact	62.8	37.0	22.9	36.2	
VI Loss					36.8	50.41

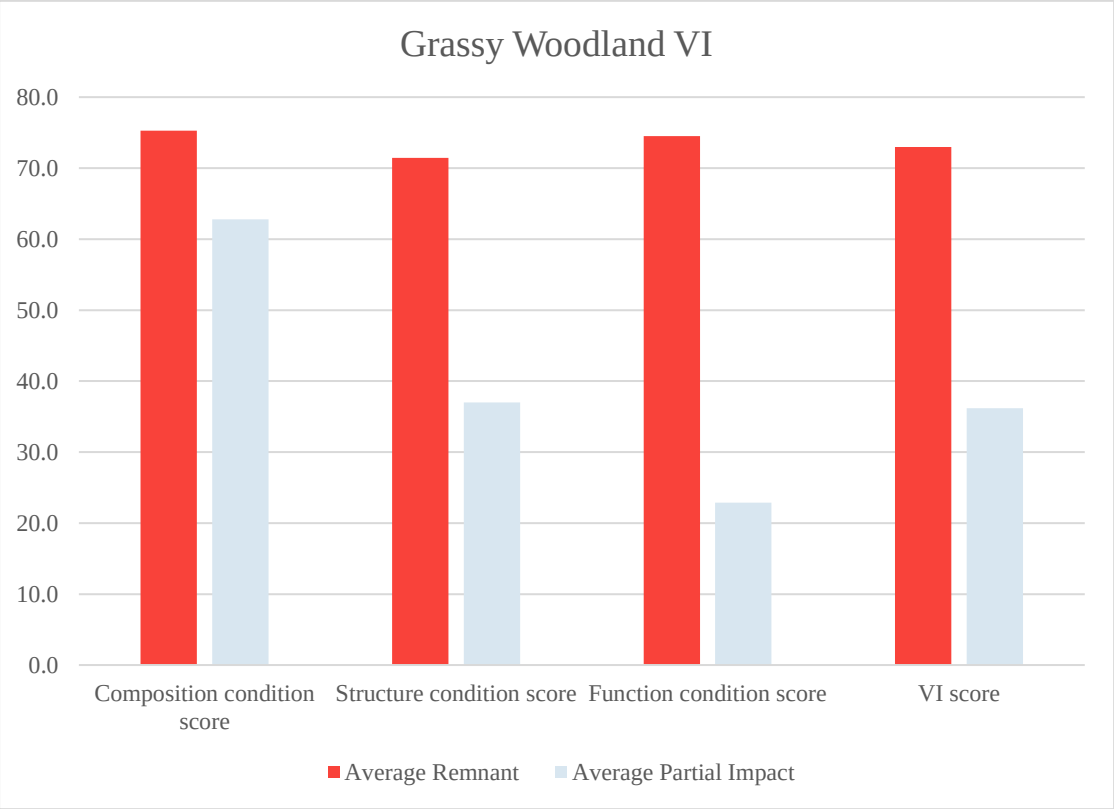

Figure 4-3 Grassy woodlands average change in VI values within the ETL (partial), adjoining (remnant) vegetation.

4.4 Key trends and findings for Grassy woodlands VI (VI)

Following analysis of the data the following general trends were observed for the Grassy Woodland Formation sample sites between the management of ETL and adjoining remnant vegetation areas;

- the average changes composition component to VI is minimal <10% decrease with some PCTs actually increasing in native diversity
- greatest change to VI is attributed to the decreases in structure (50%) and function (70%) scores
- VI changes vary for PCTs based on benchmarks with range of decreases from -4.5 to -41 (Average of -36 GW)
- the total average VI loss for Grassy Woodland 36.8 or 50% decrease in VI score

4.5 Dry Sclerophyll Forest (Shrub/Grass)

The summary data of the paired BAM plots for each of the PCTs within the Dry Sclerophyll Forest formation is provided below in Table 4.3. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.4. A summary of the quantum of the actual change in average VI values is provided in Figure 4.5.

Table 4-3 Summary data of the sampled PCTs within the Dry Sclerophyll Forest formation within the ETL, adjoining remnant vegetation.

Dry Sclerophyll Forest formation	Composition data - Species Richness									Structure data - Percentage Cover								
	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed
PCT 477																		
Average Remnant	34	3	10	15	4	1	1	1	0	66.1	14	27.8	23	1.1	0.1	0.1	0.1	0
Average Partial Impact	28	2	11	9	3	1	2	0	0	53.1	2.5	42.3	5.9	2.1	0.1	0.2	0	0
PCT 479																		
Average Remnant	47	5	14	16	9	1	2	1	0	132.3	80	23.4	26.5	2	0.1	0.3	0.1	0
Average Partial Impact	43	2	11	19	9	1	1	6	0	137	2	9.5	98.3	22.1	5	0.1	5.5	0
PCT 1606																		
Average Remnant	24	3	9	6	5	1	0	1	0	65.1	15.1	46.3	2.6	1	0.1	0	0.1	0
Average Partial Impact	23	0	5	13	4	1	0	4	1	69.1	0	13	55.5	0.4	0.2	0	6.6	2
PCT 1674																		
Average Remnant	19	1	6	9	2	0	1	2	0	57.4	25	21	8.1	0.3	0	3	0.2	0

Dry Sclerophyll Forest formation	Composition data - Species Richness									Structure data - Percentage Cover								
	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed
Average Partial Impact	20	1	9	6	2	1	1	0	0	45.1	2	30.2	12.3	0.4	0.1	0.1	0	0
PCT - 3636																		
Average Remnant	23.7	4.0	4.3	11.7	10.7	1.7	1.7	7.7		75.3	28.4	2.5	41.1	1.9	1.0	0.3	2.1	2.8
Average Partial Impact	19.0	1.7	0.7	10.0	4.7	1.3	0.7	10.3		73.6	2.1	1.8	65.9	1.5	2.2	0.1	12.8	7.2
ALL PCT Remnant	**27.3**	**3.5**	**7.0**	**11.6**	**7.8**	**1.2**	**1.3**	**4.5**	**0.0**	**77.7**	**31.0**	**16.1**	**28.1**	**1.5**	**0.6**	**0.6**	**1.1**	**1.4**
ALL PCT Partial	**23.8**	**1.5**	**4.8**	**10.9**	**4.6**	**1.2**	**0.8**	**6.4**	**0.3**	**74.8**	**1.8**	**12.8**	**54.4**	**3.9**	**1.8**	**0.1**	**7.9**	**3.8**

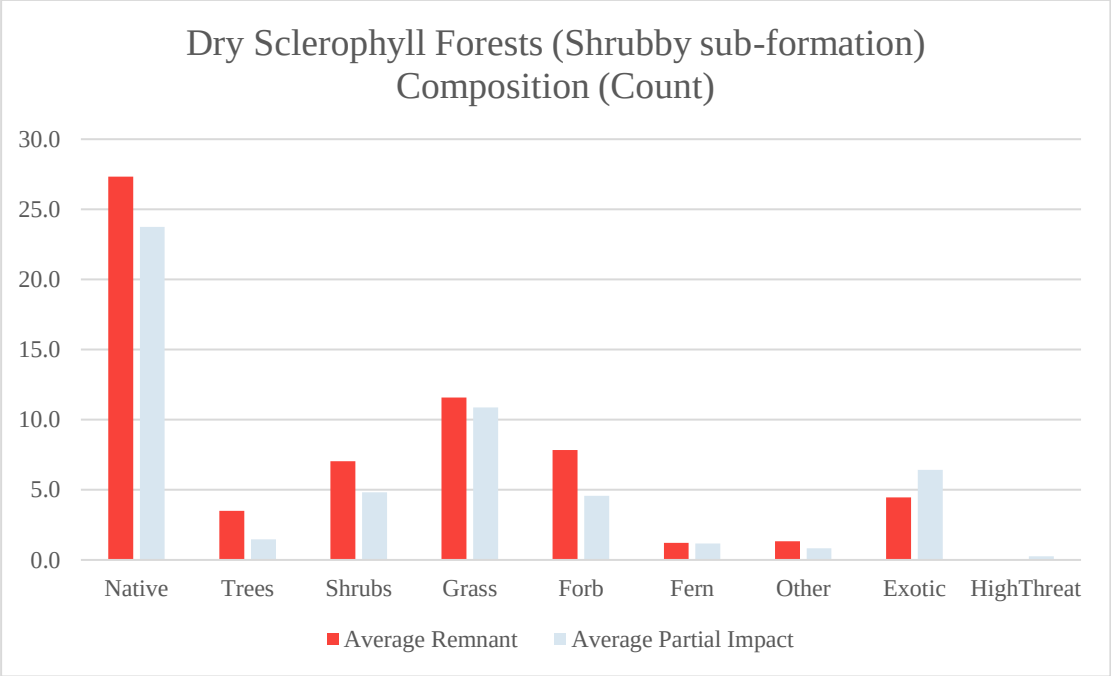

Figure 4-4 Dry Sclerophyll Forest average composition data within the ETL, adjoining remnant vegetation

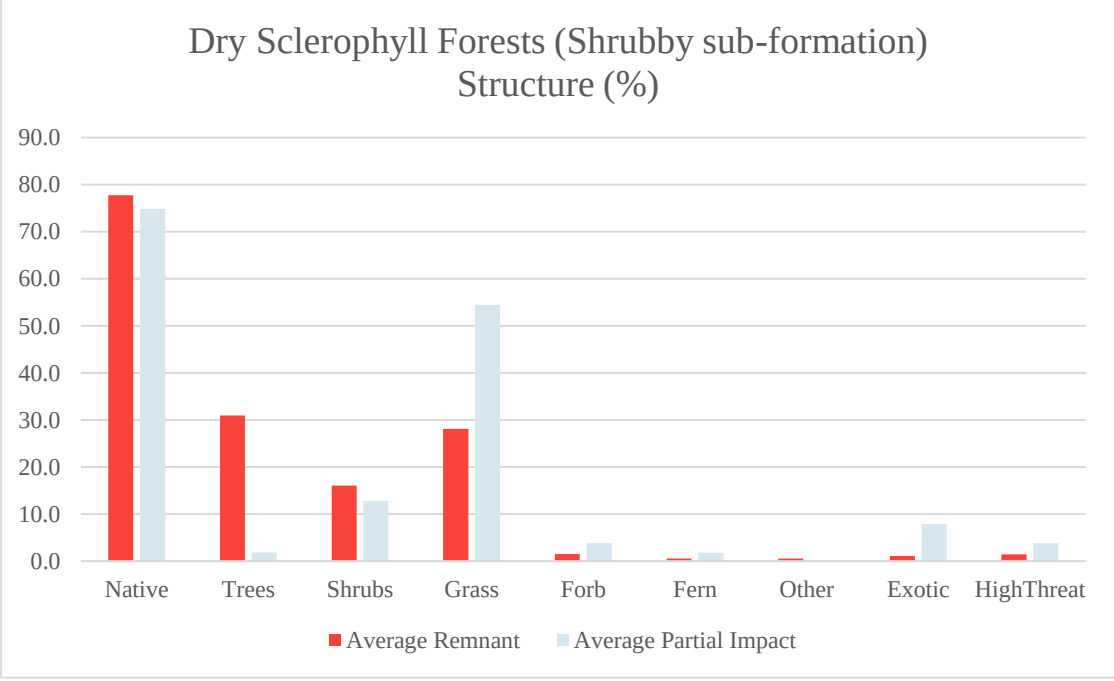

Figure 4-5 Dry Sclerophyll Forest average structure data within the ETL, adjoining remnant vegetation

4.6 Key trends and findings for Dry Sclerophyll Forest attribute scores

Following analysis of the data the following general trends were observed for the Dry Sclerophyll Forest formation between the management of ETL and adjoining remnant vegetation areas:

- the greatest change was associated with loss in canopy cover/composition

- there was an inverse relationship within the ETL for increased grass/forb and to a lesser extent decrease shrub cover for some PCTs - however not consistent
- only a marginal increase in weed cover and composition (<5%)
- no significant change in composition or total native cover.

4.7 Changes in VI for Dry Sclerophyll Forest

The summary VI data of each of the PCTs within the Dry Sclerophyll Forest formation following BAM-C calculation is provided below in Table 4.4. A comparative analysis of observed differences in VI values within the ETL (Field), adjoining remnant vegetation and corresponding literature based 30% reduction is provided in Figure 4.6.

Table 4-4 Summary VI data of the sampled PCTs within the Dry Sclerophyll Forest formation within the ETL, adjoining remnant vegetation.

Keith Vegetation Formation	Condition	Composition Condition Score	Structure Condition Score	Function Condition Score	VI Score	Change in VI %
Dry Sclerophyll Forest	Average Remnant	72.8	50.3	83.1	65.8	
	Average Partial impact	55.9	31.2	17.3	30.6	
BAMC VI Loss					35.2	53.4

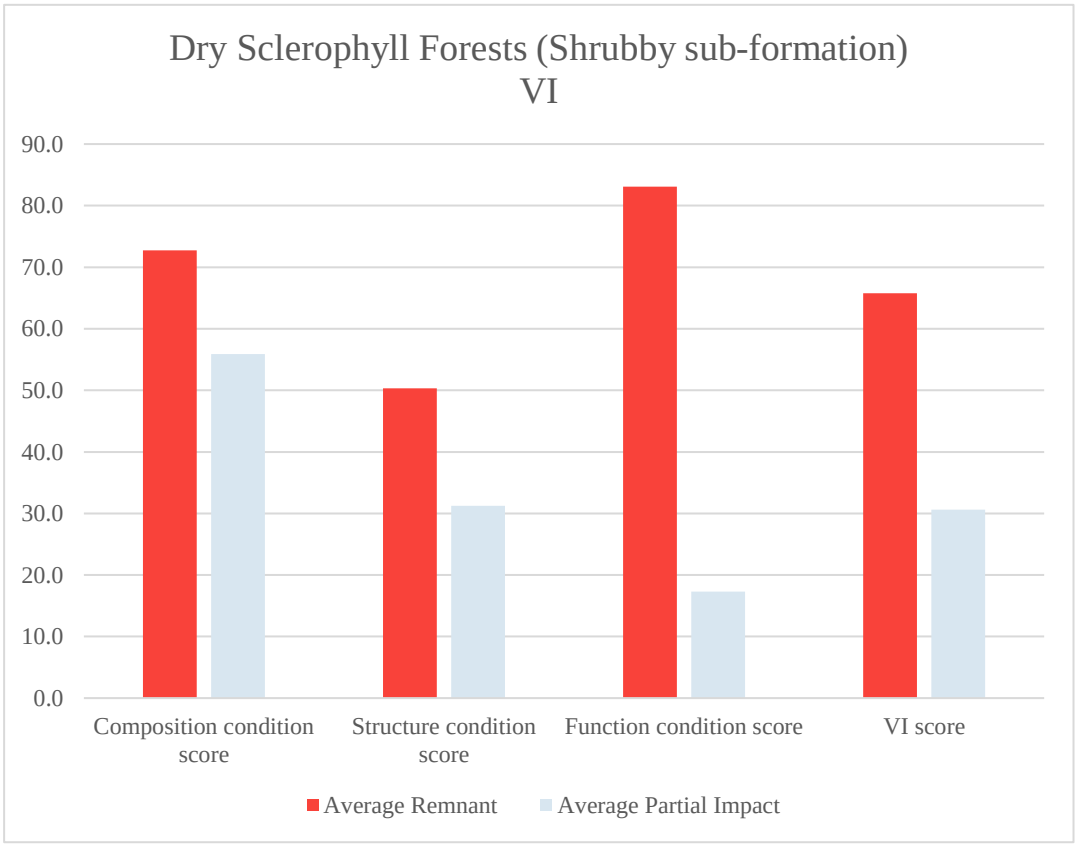

Figure 4-6 Dry Sclerophyll Forest average change in VI values within the ETL (Field), adjoining remnant vegetation.

4.8 Key trends and findings for Dry Sclerophyll Forest VI

Following analysis of the data the following general trends were observed for the Dry Sclerophyll Forest Formation sample sites between the management of ETL and adjoining remnant vegetation areas:

- the average changes composition component to VI is minimal <10% decrease with some PCTs actually increasing in native diversity
- the greatest change to VI is attributed to the decreases in structure (20%) and function (50%) scores
- VI changes vary for PCTs based on benchmarks with range of decreases from -23.7 to -61 (Average of -35.2)
- the total average VI change was 53 % decrease

4.9 Dry Sclerophyll Forest (Shrub/Grassy)

The summary data of the paired BAM plots for each of the PCTs within the Dry Sclerophyll Forest (Shrub Grassy) formation is provided below in Table 4.5. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.7 and Figure 4.8. A summary of the quantum of the actual change in average VI values is provided in Figure 4.9.

Table 4-5 Summary data of the sampled PCTs within the Dry Sclerophyll Forest formation within the ETL, adjoining remnant vegetation.

Dry Sclerophyll Forest formation	Composition data - Species Richness									Structure data - Percentage Cover								
	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed	Native	Trees	Shrubs	Grass	Forbs	Fern	Other	Exotic	High threat weed
PCT 3444 Lower Hunter Spotted Gum Ironbark Forest (Mod-good condition)																		
Average Remnant	32.0	3.3	5.3	8.3	12.7	1.0	1.3	4.0	2.0	79.8	42.1	2.6	9.6	25.0	0.2	0.3	1.7	1.5
Average Partial Impact	27.7	2.3	3.0	7.7	12.0	1.0	1.7	6.3	2.3	41.7	6.5	1.4	27.9	5.5	0.2	0.2	4.2	22.0
PCT 3431																		
Average Remnant	35.7	7.0	13.0	5.7	5.7	1.0	3.3	0.3	1.0	93.0	40.5	27.4	16.1	8.3	0.2	0.5	0.0	0.1
Average Partial Impact	32.0	3.3	8.0	11.0	7.0	1.0	1.7	3.7	2.3	78.5	1.8	28.7	28.7	18.2	0.9	0.2	1.1	0.6
ALL PCT Remnant	**33.8**	**5.2**	**9.2**	**7.0**	**9.2**	**1.0**	**2.3**	**2.2**	**1.5**	**86.4**	**41.3**	**15.0**	**12.9**	**16.6**	**0.2**	**0.4**	**0.9**	**0.8**
ALL PCT Partial	**29.8**	**2.8**	**5.5**	**9.3**	**9.5**	**1.0**	**1.7**	**5.0**	**2.3**	**60.1**	**4.1**	**15.0**	**28.3**	**11.9**	**0.6**	**0.2**	**2.6**	**11.3**

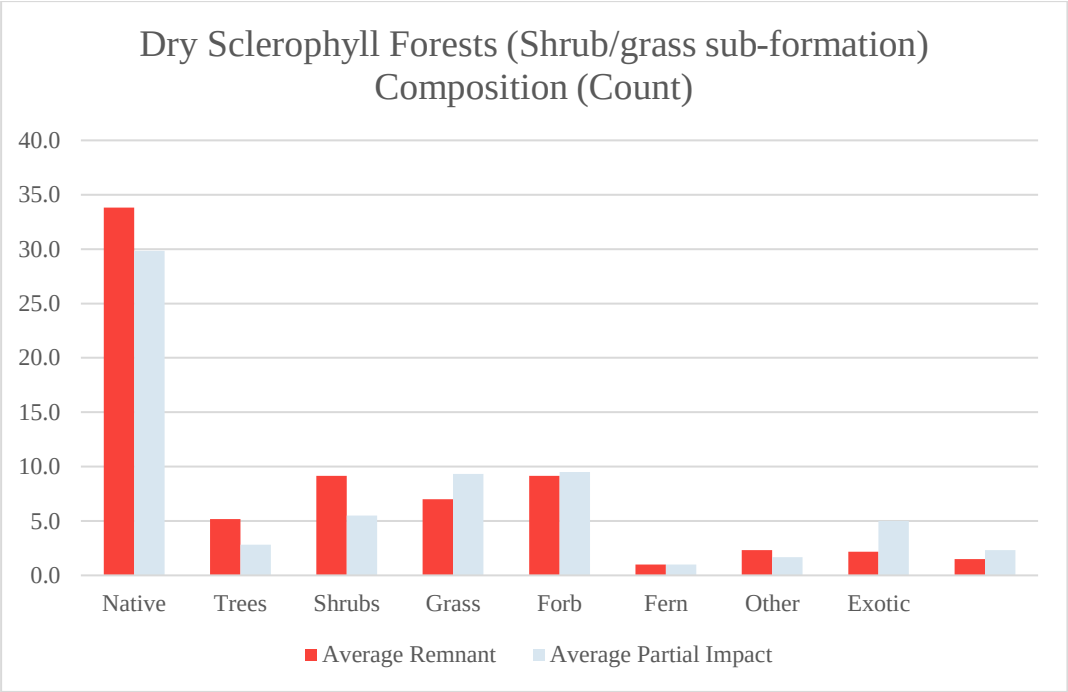

Figure 4-7 Dry Sclerophyll Forest average composition data within the ETL, adjoining remnant vegetation

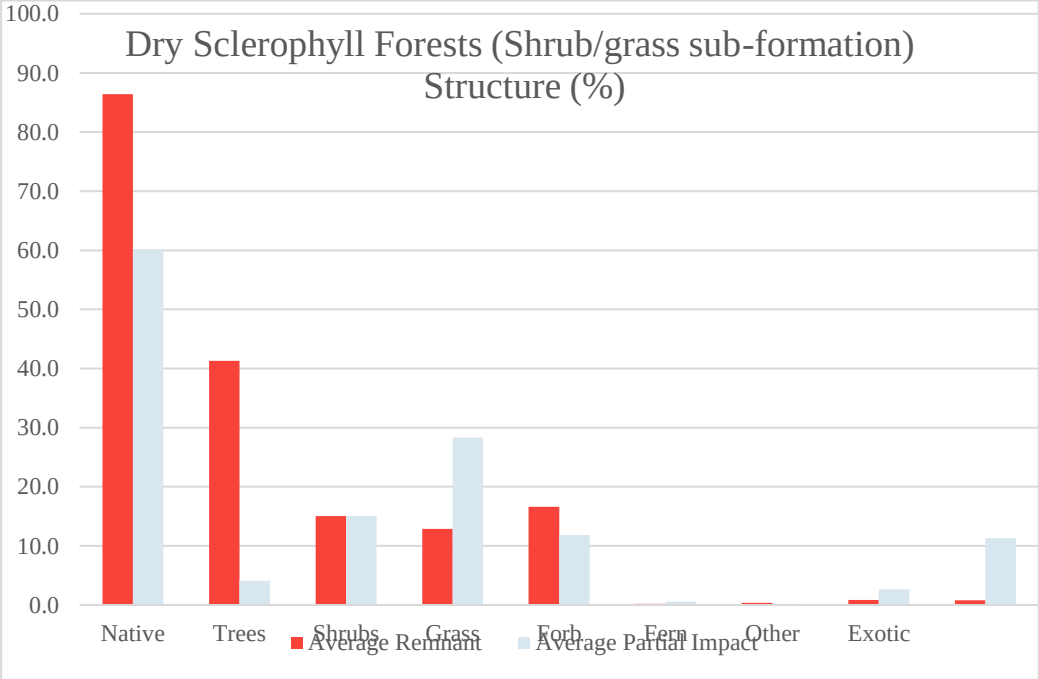

Figure 4-8 Dry Sclerophyll Forest average structure data within the ETL, adjoining remnant vegetation

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We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

4.10 Key trends and findings for Dry Sclerophyll Forest attribute scores

Following analysis of the data the following general trends were observed for the Dry Sclerophyll Forest Formation sample sites between the management of ETL and adjoining remnant vegetation areas:

- the greatest change was associated with loss in canopy cover/composition
- there was an inverse relationship within the ETL for decrease in canopy and an increased grass/forb and to a lesser extent decrease shrub cover for some PCTs
- An increase in exotic and high threat weeds composition and native cover.

4.11 Changes in VI for Dry Sclerophyll Forest

The summary VI data of each of the PCTs within the Dry Sclerophyll Forest formation following BAM-C calculation is provided below in Table 4.6. A comparative analysis of observed differences in VI values within the ETL (Field), adjoining remnant vegetation and corresponding literature based 30% reduction is provided in Figure 4.9.

Table 4-6 Summary VI data of the sampled PCTs within the Dry Sclerophyll Forest formation within the ETL, adjoining remnant vegetation.

Keith Vegetation Formation	Condition	Composition Condition Score	Structure Condition Score	Function Condition Score	VI Score	Change in %
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Average Remnant	75.3	48.2	68.2	62.5	
	Field sampled TL	70.8	32.85	19.55	35.15	
VI Loss					27.3	43.7

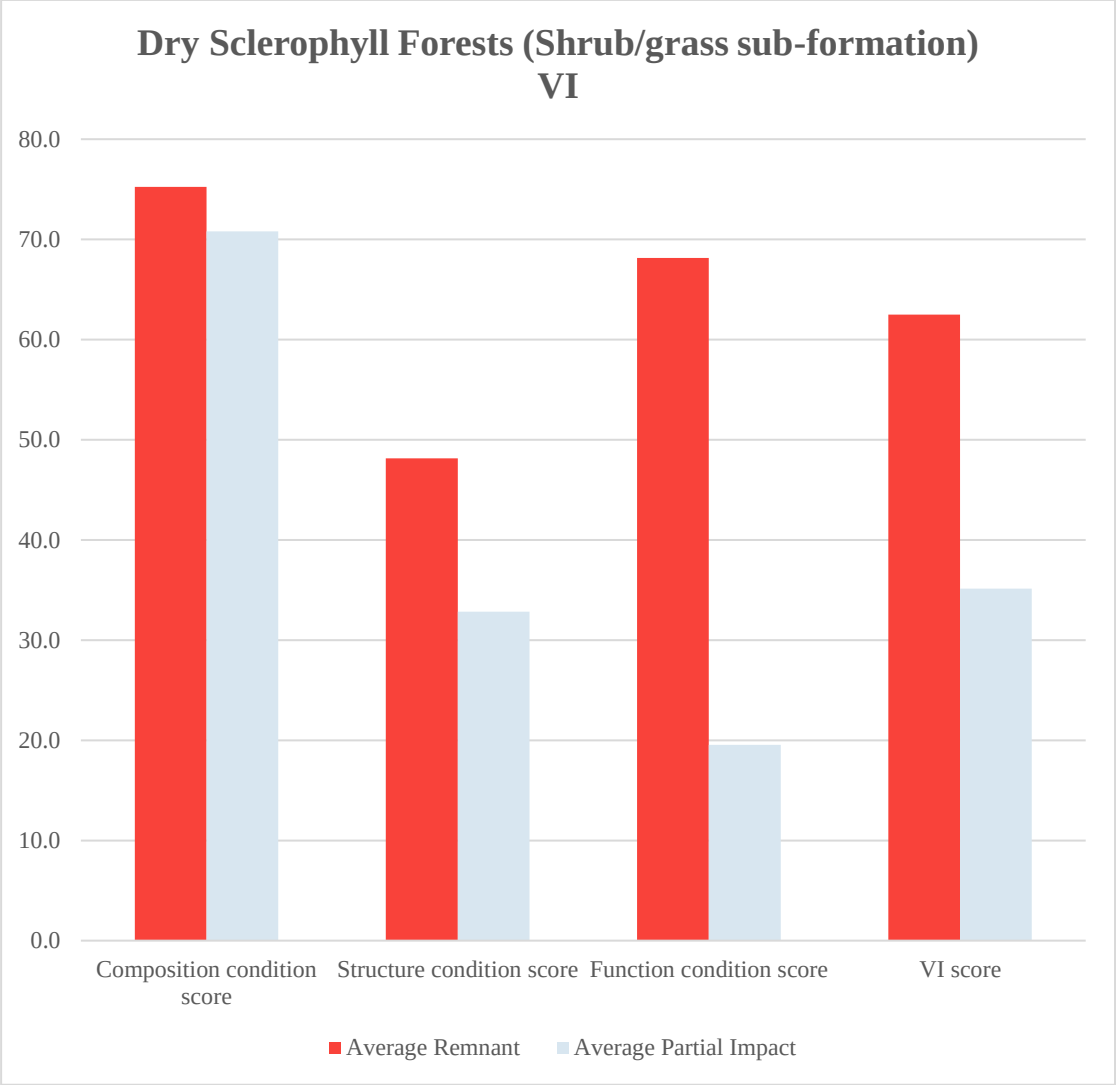

Figure 4-9 Dry Sclerophyll Forest average change in VI values within the ETL (Field), adjoining remnant vegetation.

4.12 Key trends and findings for Dry Sclerophyll Forest VI

Following analysis of the data the following general trends were observed for the Dry Sclerophyll Forest Formation sample sites between the management of ETL and adjoining remnant vegetation areas:

- the average changes composition component to VI is minimal <10% decrease
- the greatest change to VI is attributed to the decreases in function (~70%) scores
- VI changes vary for PCTs based on benchmarks with Average of -25
- the total average VI change was 43 % decrease

4.13 Wet Sclerophyll Forests (Grassy sub-formation)

The summary data of the seven paired BAM plots for each of the PCTs within the Wet Sclerophyll Forests (Grassy sub-formation) is provided below in Table 4.7. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.10 and Figure 4.11.

Table 4-7 Summary data of the sampled PCTs within the Wet Sclerophyll Forests (Grassy sub-formation) within the ETL, adjoining remnant vegetation.

Keith Formation Class/Plant Community Type	Benchmark / condition	Composition data – Species Richness									Structure data – Percentage Cover								
		Native	Trees	Shrub	Grass	Forb	Fern	Other	Exotic	High Threat	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	High Threat
Wet Sclerophyll Forests (Grassy sub-formation)																			
PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)																			
Average Remnant		45	6	15	6	4	1	13	0	0	59.3	47.6	4	3.6	0.5	0.1	3.5	0	0
Average Partial Impact		52	7	16	11	9	1	8	1	2	106.4	4.2	5	93.6	1.6	1	1	0.1	0.3
PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)																			
Average Remnant		34	5	10	5	1	2	11	0	39	63.1	47	6.4	8.2	0.1	0.3	1.1	0	0
Average Partial Impact		50	3	18	6	3	5	15	0	1	113.2	35.1	54.1	13	2.3	1.8	6.9	0	0.5
Formation Average Remnant		**36.2**	**6.8**	**9.8**	**5.2**	**2.6**	**1.8**	**10**	**0**	**22.4**	**72.16**	**48.86**	**8.08**	**8.98**	**0.36**	**0.98**	**4.9**	**0**	**0**
Formation Average Partial Impact		**39.2**	**4**	**13**	**7**	**5.2**	**2.2**	**7.8**	**0.4**	**15**	**91.5**	**8.3**	**19.48**	**51.72**	**1.44**	**6.6**	**3.96**	**4.02**	**4.18**

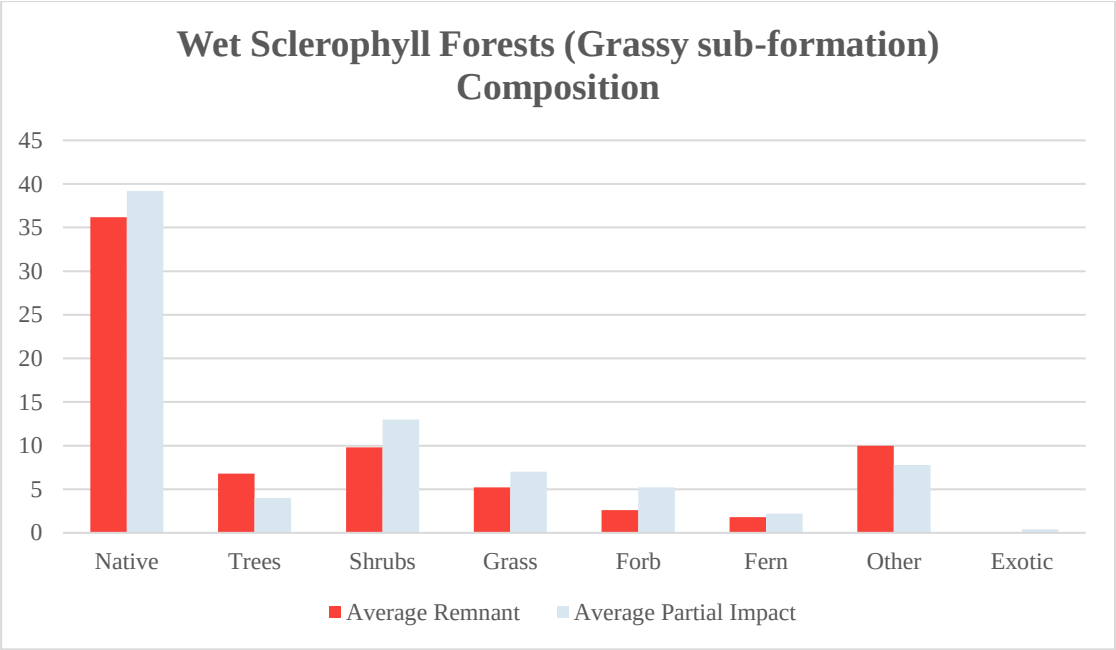

Figure 4-10 Wet Sclerophyll Forest average composition data within the ETL, adjoining remnant vegetation

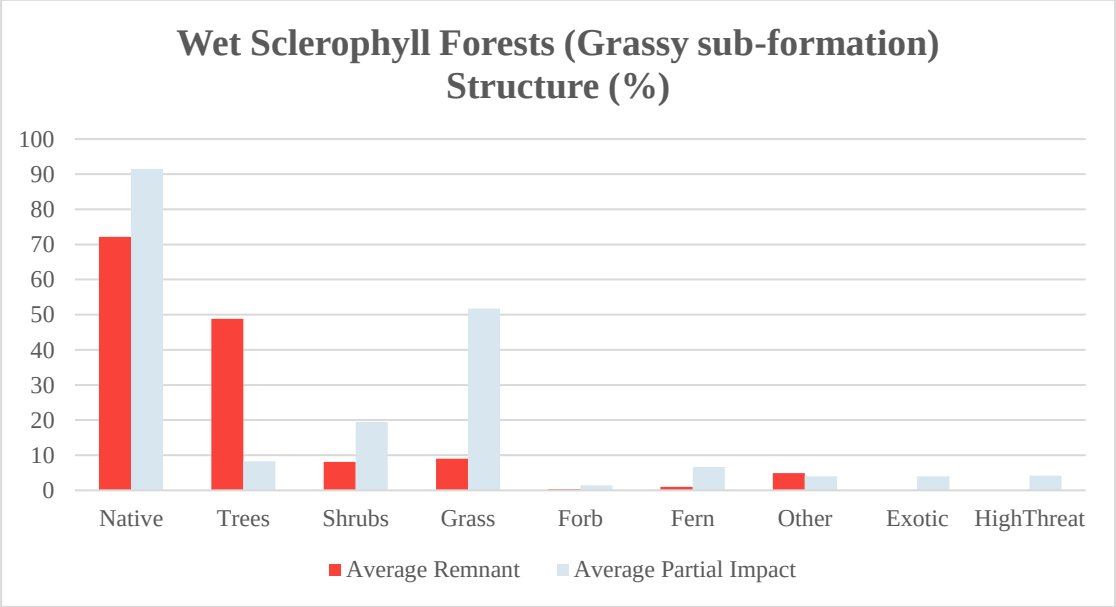

Figure 4-11 Wet Sclerophyll Forests (Grassy sub-formation) Structure data within the ETL, adjoining remnant vegetation

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4.14 Key trends and findings for Wet Sclerophyll Forests (Grassy sub-formation) attribute scores

The following general trends were observed for the Wet Sclerophyll Forests (Grassy sub-formation) sample sites with a partial impact resulting from management of ETL and adjoining remnant vegetation areas:

- greatest change was associated with loss in canopy cover/composition (~20%)
- partial impacts areas resulted in some increased weed cover and composition.
- the understory values for shrubs, grass, and other showed increase in composition values
- significant increases in grass and shrub cover at the expense of canopy cover

4.15 Changes in VI for Wet Sclerophyll Forests (Grassy sub-formation)

The summary VI data of each of the PCTs within the Wet Sclerophyll Forests (Grassy sub-formation) formation following BAM-C calculation is provided below in Table 4.8. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.12.

Table 4-8 Summary VI data of the sampled PCTs within the Wet Sclerophyll Forests (Grassy sub-formation) formation within the ETL.

Formation	Condition	Composition condition score	Structure condition score	Function condition score	VI score	Change (%)
Wet Sclerophyll Forests (Grassy sub-formation)	**Average Remnant**	69.6	53.95	64.9	62.25	
	Average Partial Impact	78.85	45.75	38.95	51.3	
VI Loss					10.95	17.59

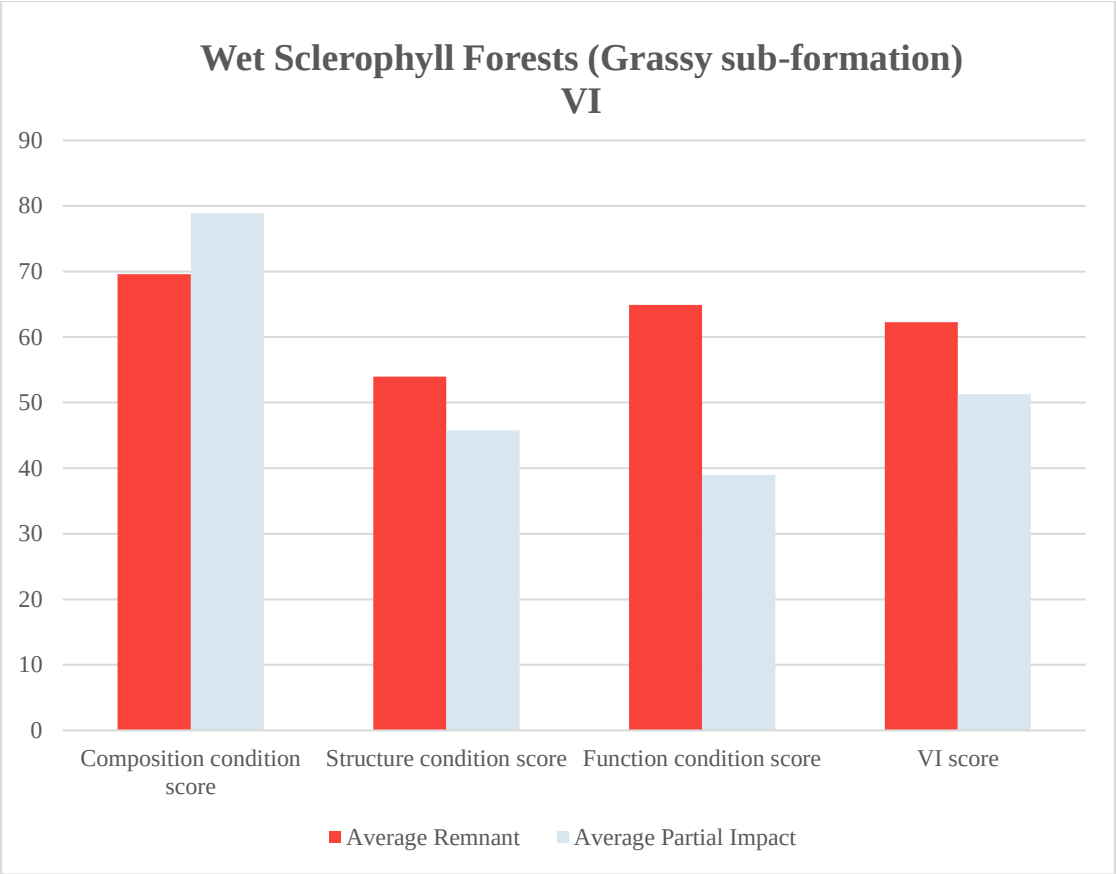

Figure 4-12 Wet Sclerophyll Forests (Grassy sub-formation) average change in VI values within the ETL (DNG), adjoining (Remnant) vegetation.

4.16 Key trends and findings for Wet Sclerophyll Forests (Grassy sub-formation) VI

Following analysis of the data the following general trends were observed for the Grassy Woodland Formation sample sites between the management of ETL and adjoining remnant vegetation areas;

- the average changes composition component to VI is minimal ~10% decrease with some PCTs actually increasing in native diversity
- greatest change to VI is attributed to the decreases in function (25%) scores
- VI changes vary for PCTs based on benchmarks with range of decreases from +1.3 to -23
- VI Composition attributes increase in diversity with canopy removal

4.17 Wet Sclerophyll Forests (Shrubby sub-formation)

The summary data of the seven paired BAM plots for each of the PCTs within the Wet Sclerophyll Forests (Shrubby sub-formation) is provided below in Table 4.9. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.13 and Figure 4.14.

Table 4-9 Summary data of the sampled PCTs within the Wet Sclerophyll Forests (Shrubby sub-formation) within the ETL, adjoining remnant vegetation.

Wet Sclerophyll Forests (Shrubby sub-formation)	Benchmark / condition	Composition									Structure								
		Native	Trees	Shrub	Grass	Forb	Fern	Other	Exotic	High Threat	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	High Threat
PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)																			
Average Remnant		43.75	8.75	12.25	4.25	4.75	1.5	12.25	0	7	119.325	73.15	13.875	6.55	1.925	0.425	23.4	0	0
Average Partial Impact		35.5	4	12.5	2.75	4	2.75	9.5	0.75	7.25	97.225	11.425	24.05	36.1	0.975	5.5	19.175	20.15	0.125

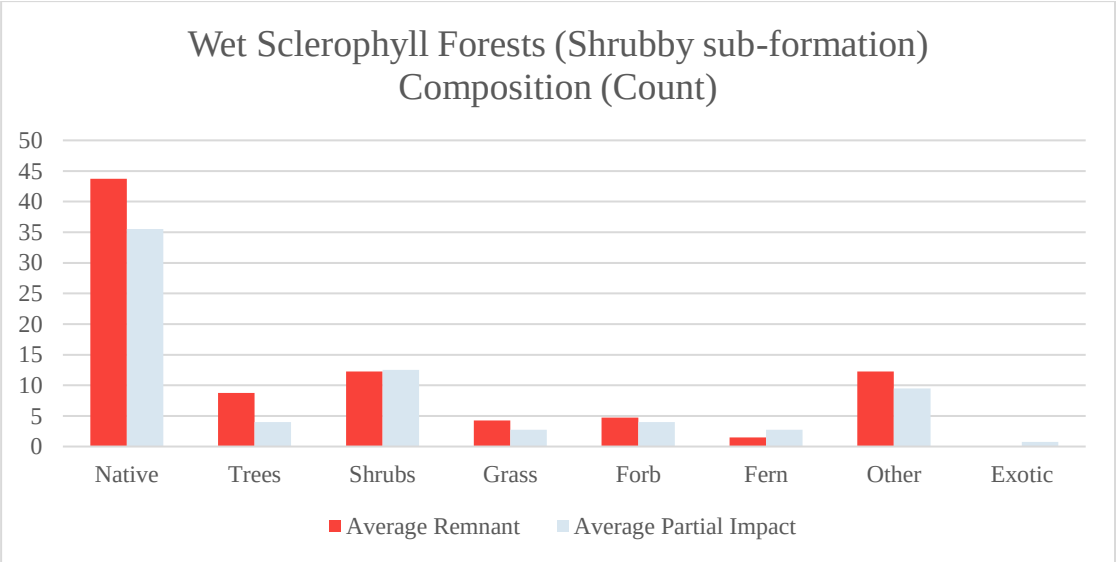

Figure 4-13 Wet Sclerophyll Forest average composition data within the ETL, adjoining remnant vegetation

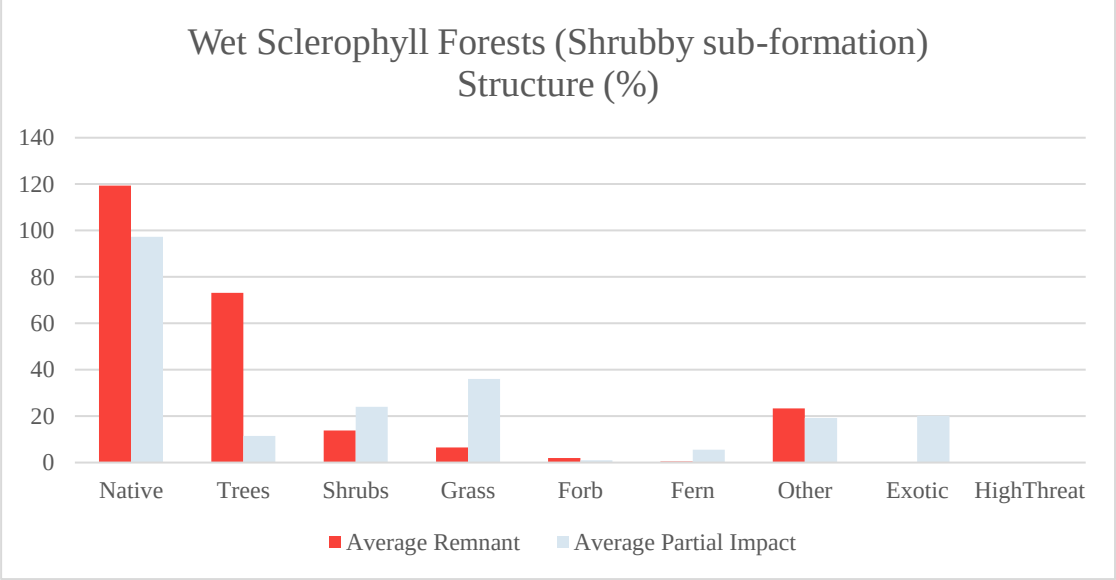

Figure 4-13 Wet Sclerophyll Forests (Shrubby sub-formation) structure data within the ETL, adjoining remnant vegetation

4.18 Key trends and findings for Wet Sclerophyll Forests (Shrubby sub-formation) attribute scores

Following analysis of the data the following general trends were observed for the Wet Sclerophyll Forests (Shrubby sub-formation) sample sites between the management of ETL and adjoining remnant vegetation areas:

- greatest change was associated with loss in canopy cover/composition (~20)
- ETL resulted in some increased weed cover and composition.
- the understory composition values for shrubs, grass, ferns and other showed no or limited change in values
- the understory structure values for shrubs, grass, ferns increased following canopy removal

4.19 Changes in VI for Wet Sclerophyll Forests (Shrubby sub-formation)

The summary VI data of each of the PCTs within the Wet Sclerophyll Forests (Shrubby sub-formation) following BAM-C calculation is provided below in Table 4.10. A comparative analysis of observed differences in sampled cover and composition attributes between the sampled remnant and adjoining ETL managed for a partial impact is provided in Figure 4.15.

Table 4-10 Summary VI data of the sampled PCTs within the Wet Sclerophyll Forests (Shrubby sub-formation) within the ETL, adjoining remnant vegetation.

Formation	Condition	Composition condition score	Structure condition score	Function condition score	VI score	Change (%)
Wet Sclerophyll Forests (Shrubby sub-formation)	**Average Remnant**	86.8	65.3	66.9	72.4	
	Average Partial Impact	75.2	39.1	52.2	53.5	
VI Loss					18.9	26.1

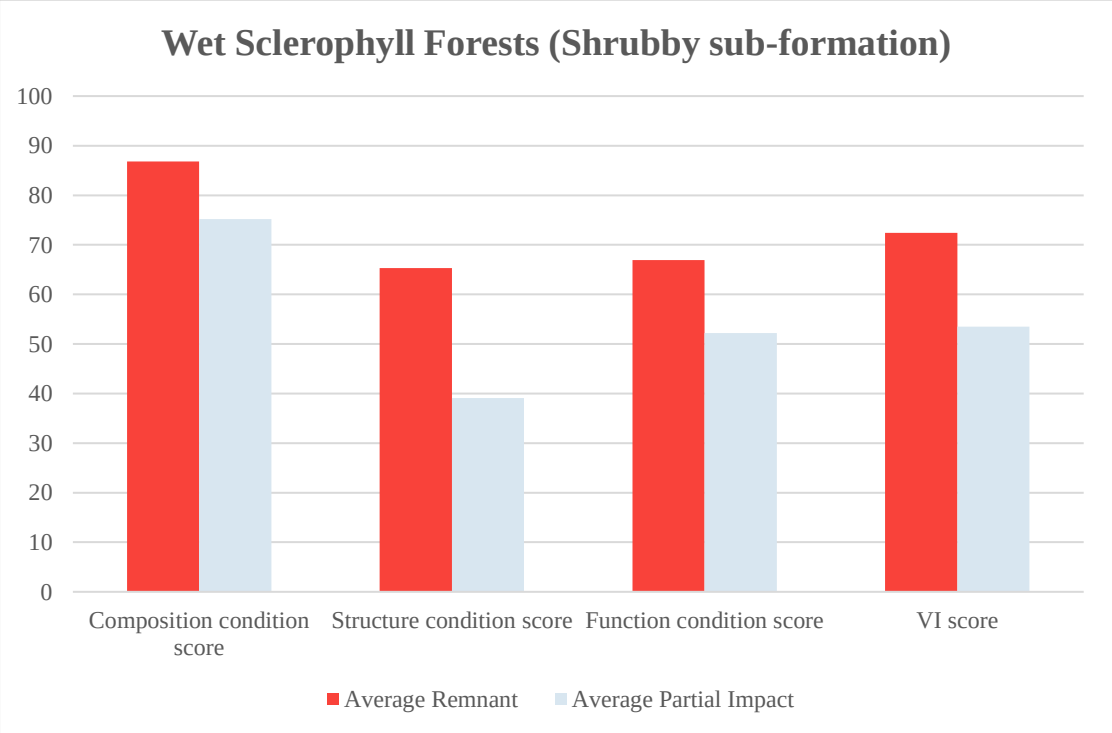

Figure 4-15 Wet Sclerophyll Forests (Shrubby sub-formation) average change in VI values within the ETL (DNG), adjoining (remnant) vegetation.

4.20 Key trends and findings for Wet Sclerophyll Forests (Shrubby sub-formation) VI

Following analysis of the data the following general trends were observed for the Wet Sclerophyll Forests (Shrubby sub-formation) sample sites between the management of ETL and adjoining remnant vegetation areas;

- the average changes composition component to VI is minimal <20% decrease
- greatest change to VI is attributed to the decreases in structure (40%) and function (20%) scores
- VI changes decreases (Average of -18.9)

5. Conclusion

EnergyCo have undertaken an evidence-based approach to informing the potential partial impacts associated with ongoing maintenance of ETLs.

This approach provides the results of field-based sampling of ETL partial impacts specific for the project.

A summary of the VI values determined from the field survey and assessed within the BAM-C for five formations Grassy Woodlands, Dry Sclerophyll (Shrub/Grassy), Dry Sclerophyll (Grassy), Wet Sclerophyll Forest (Grassy) and Wet Sclerophyll Forest (Shrub/Grassy) vegetation formations is provided in Table 5.1.

Table 5-1 Summary VI scores and loss from sampled formations within existing ETLs relevant to the project.

Keith Vegetation Formation	VI Score	VI Loss	VI Change %
Grassy woodlands	36.2	36.8	36.8
Dry Sclerophyll Forests (Shrubby sub-formation)	35.2	27.4	44.8
Dry Sclerophyll Forests (Shrub/grass sub-formation)	38.2	50.7	25.0
Wet Sclerophyll Forest (Grass Sub-formation)	51.3	11	17.6
Wet Sclerophyll Forest (Shrubby Sub-formation)	53.5	18.9	26.1

The assessment of the field results has confirmed:

- ETLs maintain biodiversity values within easements subject to partial loss with VI scores of between 35 and 53 across the five formations sampled.
- The impacts of ETL partial impacts reduce VI scores by between 17.6 and 44.8%.
- The field based evidence form ETLs confirm the retention of biodiversity values, significantly more than the potential full loss scenario.

5.1 Review of observed reduction in attribute values

To translate the observed changes from partial impact within the ETL to the projects assessment within the BAMC in accordance with BAM, it is necessary to determine the percentage change between the field sampled existing easements and adjoining remnant vegetation. A summary of the observed % reduction is provided below in Table 5.1 and Figures 5.1 and 5.2

The key findings identified include:

- The forb, grass and exotic attributes composition and structure generally increased for all PCTs and formations by >10%.
- Decreases in shrub composition were observed within the Grassy Woodland and Dry sclerophyll forest formation by ~30% however within Wet Sclerophyll Forest formations these shrub values increased.

- Wet Sclerophyll Forest (Shrubby formations in creased in composition for all understorey values and total native composition
- For the majority of understorey attributes across all formations the cover and structure scores increase following removal of canopy within the ETLs.
- A tree component is retained in both structure and composition scores of ETLs.
- Exotic composition and structures scores increase following ETL management.
- Given the extremely low benchmark values and scores for the Fern, Other and Hight threat Exotic attributes, an assessment % change is generally uninformative.

Table 5.1 Observed average percentage adjustment to BAMC attribute scores for partial impacts within the ETL by formation

Formation	Composition (% reduction)									Structure (% reduction)								
	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	High Threat	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	High Threat
Grassy woodlands	18.9	44.0	33.3	2.2	20.6	16.7	57.1	-10.9	-20.0	27.0	89.8	-33.0	23.0	-21.5	-245.9	44.4	-143.3	-94.6
Dry Sclerophyll Forests (Shrubby sub-formation)	13.1	58.3	31.4	6.1	41.5	3.4	37.5	-43.9	NI	3.7	94.0	20.5	-93.9	-156.6	-223.3	82.1	-609.7	-173.8
Dry Sclerophyll Forests (Shrub/grass sub-formation)	11.8	45.2	40.0	-33.3	-3.6	0.0	28.6	-130.8	-55.6	30.4	90.0	-0.1	-120.1	28.7	-183.3	43.5	-209.8	-1281.6
Wet Sclerophyll Forest (Grass Sub-formation)	**18.9**	**54.3**	**-2.0**	**35.3**	**15.8**	**-83.3**	**22.4**	NI	**-3.6**	**18.5**	**84.4**	**-73.3**	**-451.1**	**49.4**	**-1194.1**	**18.1**	NI	NI
Wet Sclerophyll Forest (Shrubby Sub-formation)	-8.3	41.2	-32.7	-34.6	-100.0	-22.2	22.0	NI	33.0	NI	83.0	-141.1	-475.9	-300.0	-573.5	19.2	NI	NI

Notes NA= Not appliable, NI = change in attribute data is insufficient and Not Informative

Based on the above key findings, the projects partial impact within ETL management zone (Disturbance Area B) adopted the following manual adjustment to VI values within the BAM-C (refer to Table 5.2).

Table 5-2 Proposed adjustment to BAMC VI scores for partial impacts within the ETL by formation.

BAM-C attribute	Vegetation layer	Vegetation formation						
		DSF (shrub/grass)	DSF (shrubby)	Forested wetlands	Grassy woodland	Rainforests	WSF (grassy)	WSF (shrubby)
Composition	Tree	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal
	Shrub	10% reduction	10% reduction	No reduction	10% reduction	No reduction	No reduction	No reduction
	Grass/grasslike	No reduction	10% reduction	No reduction	10% reduction	30% reduction	No reduction	30% reduction
	Forb/fern/other	20% reduction	No reduction	20% reduction	No reduction	20% reduction	20% reduction	20% reduction
Structure	Tree	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal
	Shrub	30% reduction	20% reduction	No reduction	No reduction	30% reduction	No reduction	30% reduction
	Grass/grasslike	30% reduction	No reduction	No reduction	No reduction	30% reduction	No reduction	30% reduction
	Forb/fern/other	30% reduction	No reduction	20% reduction	20% reduction	30% reduction	20% reduction	30% reduction
Function	Tree	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal	Complete removal
	Understory	30% reduction in leaf litter and fallen timber						

We would appreciate the opportunity to meet and discuss this application and potential timing for any determination.

Yours sincerely

Alex Cockerill
National Executive - Ecology

List of attachments

Attachment A Data sheets for Partial Impact

Attachment A
Data sheets for Partial Impact

A.1.1.1.1 HTP-MS-61 – Easement

Date	26/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56	Easting	357088
Plot Name	HTP-MS-61		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6335709
PCT	3230 - easement		36	35	6	12	6	4	1	6	0	1		Orientation	231
Paired With	HTP-MS-62		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
Species	Cover	Abundance	100	99.9	0.8	20.7	63	0.4	5	10	0	0.1		BAM Attributes 20x50m plot	
Acacia maidenii	0.1	2	TG		0.1									Stem classes	
Acacia ulicifolia	0.6	2	SG			0.6								80+	0
Acrotriche divaricata	5	50	SG			5								50-79	0
Allocasuarina torulosa	0.1	1	TG		0.1									30-49	0
Astrotricha latifolia	0.4	5	SG			0.4								20-29	no
Billardiera scandens	0.1	3	OG							0.1				10-19	no
Breynia oblongifolia	1	30	SG			1								5-9	no
Calochlaena dubia	0.4	10	OG							0.4				<5	yes
Centella asiatica	0.1	10	FG					0.1						Hollows	0
Daviesia ulicifolia	0.1	1	SG			0.1								Length logs (m)	0
Denhamia silvestris	0.1	5	SG			0.1									
Drosera spp.	0.1	5	FG					0.1						BAM Attributes 1x1 plot (%)	12
Elaeocarpus reticulatus	0.6	5	SG			0.6								Litter (%)	15
Entolasia stricta	1	40	GG				1								5
Eucalyptus pilularis	0.1	4	TG		0.1										5
Gahnia sieberiana	2	20	GG				2								25
Glochidion ferdinandi	0.2	5	TG		0.2										10
Gonocarpus teucrioides	0.1	5	FG					0.1							
Hibbertia dentata	8	100	OG							8					
Hibbertia scandens	0.4	5	OG							0.4					
Imperata cylindrica	55	500	GG				55								
Lantana camara	0.1	1	HT									0.1			
Lepidosperma laterale	1	30	GG				1								
Lomandra longifolia	1	15	GG				1								
Oxalis spp.	0.1	1	FG					0.1							
Persoonia linearis	2	15	SG			2									
Phyllanthus hirtellus	0.1	5	SG			0.1									
Platysace lanceolata	0.4	10	SG			0.4									
Polyscias sambucifolia	0.4	3	SG			0.4									
Pomaderris ferruginea	10	60	SG			10									
Pteridium esculentum	5	100	EG						5						
Schizomeria ovata	0.1	3	TG		0.1										
Schoenus melanostachys	3	20	GG				3								
Smilax australis	1	20	OG							1					
Smilax glyciphylla	0.1	1	OG							0.1					
Trochocarpa laurina	0.2	1	TG		0.2										

A.1.1.1.2 HTP-MS-62 – Mod-good

Date	26/06/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-MS-62		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3230-mod-good		50	50	9	10	10	4	4	13	0	0	
Paired With	HTP-MS-61		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	108.2	108.2	50.3	7	31.7	0.8	3.9	14.5	0	0	
Acacia maidenii	0.1	1	TG		0.1								
Acrotriche divaricata	5	40	SG			5							
Adiantum aethiopicum	0.4	20	EG						0.4				
Allocasuarina torulosa	8	20	TG		8								
Alphitonia excelsa	0.1	1	TG		0.1								
Amyema miquelii	0.1	1	OG							0.1			
Angophora floribunda	1	1	TG		1								
Archontophoenix cunninghamiana	0.1	5	OG							0.1			
Billardiera scandens	0.2	10	OG							0.2			
Breynia oblongifolia	0.1	2	SG			0.1							
Calanthe triplicata	0.1	1	FG					0.1					
Calochlaena dubia	5	50	OG							5			
Cissus hypoglauca	1	1	OG							1			
Cordyline stricta	1	30	OG							1			
Dianella caerulea	0.4	10	FG					0.4					
Doodia australis	0.4	10	EG						0.4				
Elaeocarpus reticulatus	0.1	1	SG			0.1							
Entolasia marginata	1	20	GG				1						
Entolasia stricta	5	80	GG				5						
Eucalyptus pilularis	24	8	TG		24								
Gahnia sieberiana	20	80	GG				20						
Glochidion ferdinandi	1	2	TG		1								
Guioa semiglauca	0.1	1	TG		0.1								
Hibbertia dentata	5	100	OG							5			
Hibbertia scandens	0.4	5	OG							0.4			
Imperata cylindrica	2	50	GG				2						
Lasiopetalum ferrugineum var. cordatum	0.4	5	SG			0.4							
Lepidosperma laterale	0.4	10	GG				0.4						
Leucopogon lanceolatus	0.1	3	SG			0.1							
Lindsaea microphylla	0.1	5	EG						0.1				
Lomandra confertifolia	0.4	5	GG				0.4						
Lomandra longifolia	2	30	GG				2						
Microlaena stipoides var. stipoides	0.1	5	GG				0.1						
Opercularia varia	0.1	5	FG					0.1					
Oplismenus imbecillis	0.6	20	GG				0.6						
Pandorea pandorana subsp. pandorana	0.4	5	OG							0.4			
Parsonsia straminea	0.1	3	OG							0.1			
Persoonia linearis	0.2	1	SG			0.2							
Polyscias sambucifolia	0.4	3	SG			0.4							
Pseuderanthemum variabile	0.2	30	FG					0.2					
Psychotria loniceroides	0.1	1	SG			0.1							
Pteridium esculentum	3	50	EG						3				
Rubus moluccanus var. trilobus	0.2	5	SG			0.2							
Rubus nebulosus	0.1	1	OG							0.1			
Schoenus melanostachys	0.2	3	GG				0.2						
Smilax australis	1	20	OG							1			
Smilax glyciphylla	0.1	3	OG							0.1			
Syncarpia glomulifera subsp. glomulifera	15	20	TG		15								
Synoum glandulosum subsp. glandulosum	0.4	5	SG			0.4							
Trochocarpa laurina	1	3	TG		1								

Easting	347055
Northing	6335771
Orientation	8
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	7
30-49	10
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	36
BAM Attributes 1x1 plot (%)	69
Litter (%)	75
	85
	65
	75
	45

A.1.1.1.3 LCED_HTP1 – Easement

Date	9/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP1		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3230 - easement		55	52	7	16	11	9	1	8	1	2
Paired With	LCEB_HTP2		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	106.8	106.4	4.2	5	93.6	1.6	1	1	0.1	0.3
Eucalyptus pilularis	3	25	TG		3							
Angophora floribunda	0.1	1	TG		0.1							
Syncarpia glomulifera	0.5	1	TG		0.5							
Glochidion ferdinandi	0.2	1	TG		0.2							
Acrotriche divaricata	2	20	SG			2						
Leucopogon juniperinus	0.1	1	SG			0.1						
Acacia maidenii	0.1	1	TG		0.1							
Ozothamnus diosmifolius	0.2	2	SG			0.2						
Allocasuarina torulosa	0.1	2	TG		0.1							
Daviesia ulicifolia	0.3	5	SG			0.3						
Astrotricha latifolia	0.1	1	SG			0.1						
Trochocarpa laurina	0.2	2	TG		0.2							
Breynia oblongifolia	0.1	1	SG			0.1						
Platysace lanceolata	1	20	SG			1						
Persoonia linearis	0.1	1	SG			0.1						
Comesperma ericinum	0.1	1	SG			0.1						
Leucopogon lanceolatus	0.1	1	SG			0.1						
Pomaderris ferruginea	0.1	1	SG			0.1						
Elaeocarpus reticulatus	0.4	4	SG			0.4						
Polyscias sambucifolia	0.1	1	SG			0.1						
Acacia elongata	0.1	1	SG			0.1						
Denhamia silvestris	0.1	1	SG			0.1						
Lantana camara	0.1	1	HT									0.1
Callicoma serratifolia	0.1	1	SG			0.1						
Billardiera scandens	0.2	20	OG							0.2		
Hibbertia dentata	0.2	1	OG							0.2		
Hibbertia scandens	0.1	1	OG							0.1		
Lobelia purpurascens	0.2	20	FG					0.2				
Imperata cylindrica	80	5000	GG				80					
Pomax umbellata	0.2	50	FG					0.2				
Cymbopogon refractus	1	100	GG				1					
Lomandra longifolia	0.2	10	GG				0.2					
Entolasia stricta	1	100	GG				1					
Kennedia rubicunda	0.1	5	OG							0.1		
Grona varians	0.1	10	OG							0.1		
Pteridium esculentum	1	10	EG						1			
Gahnia clarkei	0.5	2	GG				0.5					
Glycine clandestina	0.1	10	OG							0.1		
Oxalis perennans	0.1	10	FG					0.1				
Lomandra filiformis subsp. filiformis	0.1	5	GG				0.1					
Aristida vagans	0.1	10	GG				0.1					
Lepidosperma laterale	10	100	GG				10					
Digitaria spp.	0.1	10	GG				0.1					
Viola hederacea	0.5	100	FG					0.5				
Gonocarpus tetragynus	0.2	25	FG					0.2				
Eragrostis spp.	0.1	10	GG				0.1					
Themeda triandra	0.5	20	GG				0.5					
Andropogon virginicus	0.2	20	HT									0.2
Goodenia heterophylla subsp. heterophylla	0.1	1	FG					0.1				
Cassytha glabella	0.1	1	OG							0.1		
Conyza bonariensis	0.1	2	EX								0.1	
Pandorea pandorana	0.1	1	OG							0.1		
Solenogyne bellioides	0.1	1	FG					0.1				
Pseuderanthemum variabile	0.1	3	FG					0.1				
Dianella caerulea	0.1	1	FG					0.1				

Easting	346485
Northing	6335149
Orientation	313
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	7
BAM Attributes 1x1 plot (%)	66

A.1.1.1.4 LCED_HTP2 – Mod-good

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP2		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3230		45	45	6	15	6	4	1	13	0	0
Paired With	LCEB_HTP1		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	59.3	59.3	47.6	4	3.6	0.5	0.1	3.5	0	0
Eucalyptus pilularis	30	25	TG		30							
Angophora floribunda	2	2	TG		2							
Syncarpia glomulifera	10	20	TG		10							
Allocasuarina torulosa	5	11	TG		5							
Leucopogon juniperinus	0.3	2	SG			0.3						
Psychotria loniceroides	0.1	1	SG			0.1						
Synoum glandulosum subsp. glandulosum	1	5	SG			1						
Elaeocarpus reticulatus	0.1	1	SG			0.1						
Cordyline stricta	1	10	OG							1		
Breynia oblongifolia	0.5	10	SG			0.5						
Persoonia linearis	0.5	5	SG			0.5						
Trochocarpa laurina	0.5	2	TG		0.5							
Acrotriche divaricata	0.1	1	SG			0.1						
Leucopogon lanceolatus	0.5	5	SG			0.5						
Acacia elongata	0.1	1	SG			0.1						
Guioa semiglauca	0.1	1	TG		0.1							
Myrsine variabilis	0.3	1	SG			0.3						
Denhamia cunninghamii	0.1	1	SG			0.1						
Pomaderris ferruginea	0.1	1	SG			0.1						
Daviesia ulicifolia	0.1	1	SG			0.1						
Polyscias sambucifolia	0.1	1	SG			0.1						
Grona varians	0.1	20	OG							0.1		
Dianella caerulea	0.2	10	FG					0.2				
Geitonoplesium cymosum	0.2	10	OG							0.2		
Hibbertia dentata	0.1	1	OG							0.1		
Lomandra longifolia	0.5	10	GG				0.5					
Entolasia stricta	0.5	25	GG				0.5					
Glycine clandestina	0.1	10	OG							0.1		
Pandorea pandorana	0.1		OG							0.1		
Smilax australis	0.1	1	OG							0.1		
Calochlaena dubia	0.1	1	OG							0.1		
Pseuderanthemum variabile	0.1	5	FG					0.1				
Dioscorea transversa	0.5	10	OG							0.5		
Parsonsia straminea	0.5	5	OG							0.5		
Glycine tabacina	0.1	1	OG							0.1		
Cymbopogon refractus	0.5	10	GG				0.5					
Passiflora herbertiana	0.1	1	OG							0.1		
Lobelia purpurascens	0.1	5	FG					0.1				
Imperata cylindrica	1	100	GG				1					
Cheilanthes sieberi	0.1	10	EG						0.1			
Cassytha glabella	0.5	2	OG							0.5		
Oplismenus imbecillis	0.1	5	GG				0.1					
Rubus parvifolius	0.1	1	SG			0.1						
Gahnia clarkei	1	1	GG				1					
Dichondra repens	0.1	1	FG					0.1				

Easting	346499
Northing	6335127
Orientation	#N/A
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	6
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	111
BAM Attributes 1x1 plot (%)	92

A.1.1.1.5 LCED_HTP3 – Mod-good

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP3		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3150		43	43	9	8	3	8	3	12	0	0
Paired With	LCEB_HTP4		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	101.8	101.8	72.4	6.3	2.5	2.1	1.2	17.3	0	0
Eucalyptus pilularis	30	6	TG		30							
Syncarpia glomulifera	10	5	TG		10							
Allocasuarina torulosa	5	5	TG		5							
Angophora floribunda	1	2	TG		1							
Synoum glandulosum subsp. glandulosum	5	15	SG			5						
Archontophoenix cunninghamiana	1	15	OG							1		
Cryptocarya glaucescens	20	25	TG		20							
Trochocarpa laurina	1	10	TG		1							
Cordyline stricta	2	25	OG							2		
Cyathea australis	0.5	1	OG							0.5		
Breynia oblongifolia	0.1	1	SG			0.1						
Rhodamnia rubescens	0.3	2	SG			0.3						
Acacia elongata	0.1	1	SG			0.1						
Commersonia fraseri	0.1	1	SG			0.1						
Psychotria loniceroides	0.1	5	SG			0.1						
Elaeocarpus reticulatus	0.5	1	SG			0.5						
Guioa semiglauca	5	2	TG		5							
Schizomeria ovata	0.3	1	TG		0.3							
Diploglottis australis	0.1	1	TG		0.1							
Dioscorea transversa	1	100	OG							1		
Calochlaena dubia	10	500	OG							10		
Pseuderanthemum variabile	1	1000	FG					1				
Geitonoplesium cymosum	0.1	10	OG							0.1		
Doodia Aspera	1	1000	EG						1			
Alpinia caerulea	0.5	2	FG					0.5				
Gahnia clarkei	2	20	GG				2					
Hibbertia dentata	0.5	20	OG							0.5		
Hibbertia scandens	0.5	20	OG							0.5		
Smilax australis	0.1	1	OG							0.1		
Oxalis perennans	0.1	10	FG					0.1				
Pandorea pandorana	0.1	1	OG							0.1		
Schelhammera undulata	0.1	10	FG					0.1				
Oplismenus imbecillis	0.1	10	GG				0.1					
Viola silicestris	0.1	5	FG					0.1				
Rubus moluccanus	0.1	1	SG			0.1						
Parsonsia straminea	0.5	1	OG							0.5		
Cissus hypoglauca	1	1	OG							1		
Lobelia purpurascens	0.1	10	FG					0.1				
Acianthus fornicatus	0.1	1	FG					0.1				
Dianella caerulea	0.1	5	FG					0.1				
Lomandra longifolia	0.4	4	GG				0.4					
Adiantum formosum	0.1	5	EG						0.1			
Blechnum cartilagineum	0.1	2	EG						0.1			

Easting	346438
Northing	6335076
Orientation	119
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	2
50-79	5
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	215
BAM Attributes 1x1 plot (%)	90

A.1.1.1.6 LCED_HTP4 – Easement

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP4		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3150 - easement		43	42	7	10	3	5	3	14	0	1
Paired With	LCEB_HTP3		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	94.4	94.1	37.3	16.5	2.6	2.1	0.5	35.1	0	0.3
Archontophoenix cunninghamiana	2	5	OG							2		
Acacia implexa	2	10	SG			2						
Ficus coronata	2	1	SG			2						
Synoum glandulosum subsp. glandulosum	10	50	SG			10						
Cryptocarya microneura	25	50	TG		25							
Cyathea australis	5	20	OG							5		
Cordyline stricta	10	50	OG							10		
Sloanea australis	1	10	TG		1							
Cryptocarya glaucescens	10	20	TG		10							
Trochocarpa laurina	0.1	1	TG		0.1							
Lantana camara	0.3	1	HT									0.3
Schizomeria ovata	0.3	1	TG		0.3							
Breynia oblongifolia	0.1	1	SG			0.1						
Pittosporum multiflorum	1	20	SG			1						
Acmena smithii	0.5	1	TG		0.5							
Wilkiea huegeliana	0.3	1	SG			0.3						
Psychotria loniceroides	0.1	1	SG			0.1						
Elaeocarpus reticulatus	0.4	1	SG			0.4						
Syncarpia glomulifera	0.4	1	TG		0.4							
Tasmannia insipida	0.1	1	SG			0.1						
Calochlaena dubia	1	50	OG							1		
Dioscorea transversa	0.5	50	OG							0.5		
Pteridium esculentum	0.1	1	EG						0.1			
Viola silicestris	0.1	20	FG					0.1				
Oplismenus imbecillis	0.1	20	GG				0.1					
Grona varians	0.1	10	OG							0.1		
Cyathochaeta diandra	0.5	5	GG				0.5					
Hibbertia dentata	1	100	OG							1		
Cissus hypoglauca	10	50	OG							10		
Schelhammera undulata	1	1000	FG					1				
Pseuderanthemum variabile	0.5	100	FG					0.5				
Smilax australis	5	50	OG							5		
Hydrocotyle sibthorpioides	0.1	10	FG					0.1				
Gahnia clarkei	2	20	GG				2					
Adiantum aethiopicum	0.1	10	EG						0.1			
Rubus rosifolius	0.5	10	SG			0.5						
Alpinia caerulea	0.4	2	FG					0.4				
Doodia Aspera	0.3	30	EG						0.3			
Gynochthodes jasminoides	0.1	1	OG							0.1		
Cayratia clematidea	0.1	1	OG							0.1		
Hibbertia scandens	0.1	1	OG							0.1		
Geitonoplesium cymosum	0.1	1	OG							0.1		
Tetrastigma nitens	0.1	1	OG							0.1		

Easting	346410
Northing	6335099
Orientation	310
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	317
BAM Attributes 1x1 plot (%)	90

A.1.1.1.7 LCED_HTP5 – Easement

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP5		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3230 - easement		33	32	3	9	8	6	2	4	0	1
Paired With	LCEB_HTP6		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	110	80	1.6	32.1	42.7	1	1.1	1.5	0	30
Allocasuarina torulosa	1	5	TG		1							
Daviesia ulicifolia	15	25	SG			15						
Leptospermum polygalifolium	15	60	SG			15						
Acacia ulicifolia	1	10	SG			1						
Ozothamnus diosmifolius	0.1	1	SG			0.1						
Platysace lanceolata	0.1	1	SG			0.1						
Acrotriche divaricata	0.5	10	SG			0.5						
Persoonia linearis	0.1	1	SG			0.1						
Breynia oblongifolia	0.1	1	SG			0.1						
Trochocarpa laurina	0.5	2	TG		0.5							
Cordyline stricta	0.3	3	OG							0.3		
Elaeocarpus reticulatus	0.2	1	SG			0.2						
Eucalyptus pilularis	0.1	1	TG		0.1							
Andropogon virginicus	30	1000	HT									30
Pteridium esculentum	1	50	EG						1			
Lomandra longifolia	5	50	GG				5					
Lepidosperma laterale	1	10	GG				1					
Hibbertia dentata	1	100	OG							1		
Pomax umbellata	0.5	50	FG					0.5				
Pterostylis spp.	0.1	10	FG					0.1				
Hypericum gramineum	0.1	20	FG					0.1				
Cheilanthes sieberi	0.1	20	EG						0.1			
Solenogyne bellioides	0.1	10	FG					0.1				
Oxalis perennans	0.1	1	FG					0.1				
Gahnia clarkei	1	10	GG				1					
Hibbertia scandens	0.1	1	OG							0.1		
Calochlaena dubia	0.1	1	OG							0.1		
Imperata cylindrica	25	2000	GG				25					
Schoenus melanostachys	0.5	1	GG				0.5					
Gonocarpus tetragynus	0.1	10	FG					0.1				
Panicum simile	0.1	1	GG				0.1					
Echinopogon caespitosus	0.1	10	GG				0.1					
Entolasia stricta	10	1000	GG				10					

Easting	347230
Northing	6335844
Orientation	214
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	0

A.1.1.1.8 LCED_HTP6 – Mod-good

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP6		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3230		34	34	3	12	3	5	2	9	0	0
Paired With	LCEB_HTP5		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	90.1	90.1	20.3	13	40.3	0.5	5.1	10.9	0	0
Eucalyptus pilularis	15	15	TG		15							
Allocasuarina torulosa	5	11	TG		5							
Persoonia linearis	2	20	SG			2						
Podolobium ilicifolium	5	50	SG			5						
Acrotriche divaricata	1	10	SG			1						
Rubus moluccanus	0.1	1	SG			0.1						
Schizomeria ovata	0.3	1	TG		0.3							
Pomaderris ferruginea	0.2	1	SG			0.2						
Acacia ulicifolia	1	10	SG			1						
Platysace lanceolata	1	50	SG			1						
Ozothamnus diosmifolius	0.1	1	SG			0.1						
Acacia floribunda	0.2	1	SG			0.2						
Polyscias sambucifolia	0.2	5	SG			0.2						
Elaeocarpus reticulatus	2	5	SG			2						
Leucopogon lanceolatus	0.2	1	SG			0.2						
Cordyline stricta	0.2	2	OG							0.2		
Pteridium esculentum	5	50	EG						5			
Imperata cylindrica	25	2000	GG				25					
Hibbertia dentata	5	1000	OG							5		
Lindsaea linearis	0.1	10	EG						0.1			
Lomandra longifolia	0.3	5	GG				0.3					
Glycine clandestina	0.1	10	OG							0.1		
Grona varians	0.1	5	OG							0.1		
Parsonsia straminea	0.1	1	OG							0.1		
Kennedia rubicunda	0.2	10	OG							0.2		
Billardiera scandens	0.1	5	OG							0.1		
Patersonia spp.	0.1	5	FG					0.1				
Oxalis perennans	0.1	10	FG					0.1				
Calochlaena dubia	5	500	OG							5		
Entolasia stricta	15	1000	GG				15					
Dianella caerulea	0.1	5	FG					0.1				
Viola betonicifolia	0.1	1	FG					0.1				
Pseuderanthemum variabile	0.1	2	FG					0.1				
Hibbertia scandens	0.1	5	OG							0.1		

Easting	347225
Northing	6335901
Orientation	329
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	174
BAM Attributes 1x1 plot (%)	85

A.1.1.2.1 LCED_HTP7 – Easement

Date	11/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP7		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263 - easement		51	50	3	18	6	3	5	15	0	1
Paired With	LCEB_HTP8		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	113.7	113.2	35.1	54.1	13	2.3	1.8	6.9	0	0.5
Syncarpia glomulifera	30	25	TG		30							
Eucalyptus pilularis	5	2	TG		5							
Acacia schinoides	10	10	SG			10						
Commersonia fraseri	40	100	SG			40						
Astrotricha latifolia	1	10	SG			1						
Lantana camara	0.5	10	HT									0.5
Leucopogon juniperinus	0.1	5	SG			0.1						
Allocasuarina torulosa	0.1	1	TG		0.1							
Rhodamnia rubescens	0.2	1	SG			0.2						
Cordyline stricta	0.5	5	OG							0.5		
Psychotria loniceroides	0.1	1	SG			0.1						
Breynia oblongifolia	0.2	1	SG			0.2						
Persoonia linearis	0.5	2	SG			0.5						
Ozothamnus diosmifolius	0.1	1	SG			0.1						
Pomaderris ligustrina	1	10	SG			1						
Zieria pilosa	0.1	1	SG			0.1						
Denhamia silvestris	0.1	1	SG			0.1						
Archontophoenix cunninghamiana	0.1	1	OG							0.1		
Synoum glandulosum subsp. glandulosum	0.1	1	SG			0.1						
Olearia nernstii	0.1	1	SG			0.1						
Daviesia ulicifolia	0.1	1	SG			0.1						
Howittia trilocularis	0.2	1	SG			0.2						
Platycerium bifurcatum	0.1	1	EG						0.1			
Oplismenus imbecillis	5	3000	GG				5					
Adiantum aethiopicum	0.1	10	EG						0.1			
Entolasia stricta	5	500	GG				5					
Hibbertia dentata	2	200	OG							2		
Calochlaena dubia	1	100	OG							1		
Geitonoplesium cymosum	0.1	10	OG							0.1		
Lobelia purpurascens	2	2000	FG					2				
Gahnia clarkei	1	10	GG				1					
Stephania japonica	0.1	1	OG							0.1		
Pteridium esculentum	0.5	50	EG						0.5			
Doodia Aspera	1	100	EG						1			
Hibbertia scandens	0.1	1	OG							0.1		
Cissus antarctica	1	20	OG							1		
Pseuderanthemum variabile	0.2	20	FG					0.2				
Cassytha glabella	1	100	OG							1		
Lomandra longifolia	0.5	5	GG				0.5					
Sarcopetalum harveyanum	0.5	10	OG							0.5		
Imperata cylindrica	1	100	GG				1					
Grona varians	0.1	1	OG							0.1		
Oxalis perennans	0.1	10	FG					0.1				
Lepidosperma laterale	0.5	5	GG				0.5					
Cheilanthes sieberi	0.1	10	EG						0.1			
Goodenia ovata	0.1	1	SG			0.1						
Rubus moluccanus	0.1	1	SG			0.1						
Kennedia rubicunda	0.1	1	OG							0.1		
Eustrephus latifolius	0.1	1	OG							0.1		
Smilax australis	0.1	1	OG							0.1		
Tetrastigma nitens	0.1	1	OG							0.1		

Easting	345951
Northing	6334749
Orientation	104
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	144
BAM Attributes 1x1 plot (%)	87

A.1.1.2.2 LCED_HTP8 – Mod-good

Date	11/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP8		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263		34	34	5	10	5	1	2	11	0	0
Paired With	LCEB_HTP7		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	63.1	63.1	47	6.4	8.2	0.1	0.3	1.1	0	0
Syncarpia glomulifera	30	100	TG		30							
Allocasuarina torulosa	1	10	TG		1							
Eucalyptus pilularis	10	10	TG		10							
Eucalyptus deanei	1	1	TG		1							
Persoonia linearis	0.2	1	SG			0.2						
Pultenaea spinosa	2	15	SG			2						
Astrotricha latifolia	0.3	2	SG			0.3						
Pomaderris ligustrina	1	5	SG			1						
Acacia prominens	5	3	TG		5							
Acacia floribunda	0.1	1	SG			0.1						
Acacia schinoides	2	10	SG			2						
Psychotria loniceroides	0.1	1	SG			0.1						
Breynia oblongifolia	0.1	1	SG			0.1						
Myrsine variabilis	0.1	1	SG			0.1						
Elaeocarpus reticulatus	0.5	1	SG			0.5						
Lomandra longifolia	1	10	GG				1					
Gahnia clarkei	2	20	GG				2					
Entolasia stricta	5	1000	GG				5					
Calochlaena dubia	0.1	1	OG							0.1		
Smilax australis	0.1	1	OG							0.1		
Dianella caerulea	0.1	10	FG					0.1				
Gynochthodes jasminoides	0.1	1	OG							0.1		
Pandorea pandorana	0.1	1	OG							0.1		
Parsonsia straminea	0.1	1	OG							0.1		
Geitonoplesium cymosum	0.1	1	OG							0.1		
Pteridium esculentum	0.2	5	EG						0.2			
Oplismenus imbecillis	0.1	10	GG				0.1					
Hibbertia dentata	0.1	2	OG							0.1		
Lepidosperma laterale	0.1	2	GG				0.1					
Eustrephus latifolius	0.1	1	OG							0.1		
Lindsaea linearis	0.1	1	EG						0.1			
Cissus antarctica	0.1	10	OG							0.1		
Archontophoenix cunninghamiana	0.1	1	OG							0.1		
Clematis glycinoides	0.1	1	OG							0.1		

Easting	345935
Northing	6334766
Orientation	236
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	173
BAM Attributes 1x1 plot (%)	97

A.1.1.2.3 LCED_HTP9 – Easement

Date	11/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP9		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263 - easement		33	32	2	10	7	7	2	4	0	1
Paired With	LCEB_HTP10		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	108.4	88.4	1.1	7.2	73	1.6	5.1	0.4	0	20
Seringia arborescens	5	50	SG			5						
Commersonia fraseri	0.1	1	SG			0.1						
Astrotricha latifolia	0.5	5	SG			0.5						
Leucopogon juniperinus	1	20	SG			1						
Pomaderris intermedia	0.1	1	SG			0.1						
Daviesia ulicifolia	0.1	1	SG			0.1						
Pomaderris eriocephala	0.1	1	SG			0.1						
Pultenaea spinosa	0.1	1	SG			0.1						
Allocasuarina torulosa	0.1	1	TG		0.1							
Eucalyptus punctata	1	10	TG		1							
Persoonia linearis	0.1	1	SG			0.1						
Pomax umbellata	1	1000	FG					1				
Imperata cylindrica	10	1000	GG				10					
Andropogon virginicus	20	2000	HT									20
Lepidosperma laterale	5	50	GG				5					
Cymbopogon refractus	30	2000	GG				30					
Pteridium esculentum	5	200	EG						5			
Lomandra longifolia	5	500	GG				5					
Cheilanthes sieberi	0.1	15	EG						0.1			
Hibbertia dentata	0.1	10	OG							0.1		
Calochilus robertsonii	0.1	1	FG					0.1				
Dianella revoluta	0.1	10	FG					0.1				
Aristida vagans	2	1000	GG				2					
Cissus antarctica	0.1	1	OG							0.1		
Geitonoplesium cymosum	0.1	1	OG							0.1		
Lobelia purpurascens	0.1	20	FG					0.1				
Billardiera scandens	0.1	1	OG							0.1		
Gonocarpus tetragynus	0.1	20	FG					0.1				
Gahnia clarkei	1	10	GG				1					
Pterostylis spp.	0.1	5	FG					0.1				
Digitaria spp.	20	2000	GG				20					
Oxalis perennans	0.1	5	FG					0.1				
Pimelea latifolia subsp. elliptifoli	0.1	1	SG			0.1						

Easting	345870
Northing	6334662
Orientation	205
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	53
BAM Attributes 1x1 plot (%)	75

A.1.1.2.4 LCED_HTP10 – Mod-good

Date	11/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP10		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263		21	21	5	4	4	2	1	5	0	0
Paired With	LCEB_HTP9		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	54.7	54.7	50.1	2.1	1.3	0.2	0.5	0.5	0	0
Eucalyptus pilularis	10	3	TG		10							
Syncarpia glomulifera	20	15	TG		20							
Eucalyptus acmenoides	10	10	TG		10							
Allocasuarina torulosa	10	25	TG		10							
Persoonia linearis	1	10	SG			1						
Glochidion ferdinandi	0.1	1	TG		0.1							
Daviesia ulicifolia	0.5	5	SG			0.5						
Acacia schinoides	0.5	5	SG			0.5						
Denhamia silvestris	0.1	2	SG			0.1						
Parsonsia straminea	0.1	1	OG							0.1		
Pteridium esculentum	0.5	50	EG						0.5			
Pandorea pandorana	0.1	1	OG							0.1		
Hibbertia scandens	0.1	5	OG							0.1		
Pseuderanthemum variabile	0.1	10	FG					0.1				
Entolasia stricta	1	100	GG				1					
Dianella caerulea	0.1	1	FG					0.1				
Lomandra longifolia	0.1	1	GG				0.1					
Lepidosperma laterale	0.1	1	GG				0.1					
Imperata cylindrica	0.1	10	GG				0.1					
Smilax australis	0.1	1	OG							0.1		
Tylophora spp.	0.1	1	OG							0.1		

Easting	345827
Northing	6334672
Orientation	230
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	5
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	140
BAM Attributes 1x1 plot (%)	98

A.1.1.2.5 LCED_HTP11 – Easement

Date	11/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP11		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263 - easement		28	27	2	9	5	3	2	6	1	0
Paired With	LCEB_HTP12		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	69.6	49.6	0.3	10.4	16	1.3	20.1	1.5	20	0
Astrotricha latifolia	5	25	SG			5						
Daviesia ulicifolia	2	20	SG			2						
Leucopogon juniperinus	2	25	SG			2						
Acacia floribunda	0.5	3	SG			0.5						
Allocasuarina torulosa	0.2	1	TG		0.2							
Persoonia linearis	0.2	1	SG			0.2						
Leucopogon lanceolatus	0.1	1	SG			0.1						
Acacia schinoides	0.1	1	SG			0.1						
Elaeocarpus reticulatus	0.3	3	SG			0.3						
Acrotriche divaricata	0.2	2	SG			0.2						
Eucalyptus pilularis	0.1	1	TG		0.1							
Pteridium esculentum	20	200	EG						20			
Setaria parviflora	20	200	EX								20	
Hibbertia dentata	1	100	OG							1		
Lepidosperma laterale	2	200	GG				2					
Lobelia purpurascens	1	100	FG					1				
Entolasia stricta	2	200	GG				2					
Gonocarpus tetragynus	0.2	50	FG					0.2				
Smilax australis	0.1	1	OG							0.1		
Aristida vagans	1	100	GG				1					
Hibbertia scandens	0.1	1	OG							0.1		
Pomax umbellata	0.1	10	FG					0.1				
Lomandra longifolia	1	100	GG				1					
Billardiera scandens	0.1	1	OG							0.1		
Digitaria spp.	10	1000	GG				10					
Glycine clandestina	0.1	2	OG							0.1		
Lindsaea linearis	0.1	1	EG						0.1			
Kennedia rubicunda	0.1	1	OG							0.1		

Easting	345510
Northing	6334336
Orientation	42
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	53
BAM Attributes 1x1 plot (%)	75

A.1.1.2.6 LCED_HTP12 – Mod-good

Date	11/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP12		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263		31	31	9	10	1	2	1	8	0	0
Paired With	LCEB_HTP11		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	75.5	75.5	49.3	20.9	0.1	0.2	0.1	4.9	0	0
Eucalyptus pilularis	40	20	TG		40							
Allocasuarina torulosa	2	10	TG		2							
Syncarpia glomulifera	5	5	TG		5							
Acacia schinoides	10	100	SG			10						
Persoonia linearis	2	10	SG			2						
Pomaderris intermedia	0.1	1	SG			0.1						
Synoum glandulosum subsp. glandulosum	1	10	SG			1						
Psychotria loniceroides	2	50	SG			2						
Astrotricha latifolia	5	20	SG			5						
Cryptocarya glaucescens	1	2	TG		1							
Schizomeria ovata	0.1	1	TG		0.1							
Cordyline stricta	1	10	OG							1		
Trochocarpa laurina	0.5	1	TG		0.5							
Clerodendrum tomentosum	0.1	1	TG		0.1							
Acacia floribunda	0.1	1	SG			0.1						
Leucopogon lanceolatus	0.1	1	SG			0.1						
Guioa semiglauca	0.5	5	TG		0.5							
Callicoma serratifolia	0.5	1	SG			0.5						
Cryptocarya microneura	0.1	1	TG		0.1							
Rhodomyrtus psidioides	0.1	1	SG			0.1						
Blechnum cartilagineum	0.1	1	EG						0.1			
Calochlaena dubia	2	20	OG							2		
Hibbertia dentata	1	50	OG							1		
Smilax australis	0.1	1	OG							0.1		
Dianella caerulea	0.1	1	FG					0.1				
Smilax australis	0.5	10	OG							0.5		
Lomandra longifolia	0.1	1	GG				0.1					
Pseuderanthemum variabile	0.1	10	FG					0.1				
Hibbertia scandens	0.1	1	OG							0.1		
Archontophoenix cunninghamiana	0.1	1	OG							0.1		
Parsonsia straminea	0.1	1	OG							0.1		

Easting	345476
Northing	6334401
Orientation	232
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	13
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	83
BAM Attributes 1x1 plot (%)	94

A.1.1.2.7 LCED_HTP13 – Easement

Date	12/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP13		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263 - easement		35	33	4	14	2	2	2	9	1	1
Paired With	LCEB_HTP14		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	115.1	114.4	1.8	15.2	80.5	0.2	5.1	11.6	0.5	0.2
Astrotricha latifolia	10	40	SG			10						
Syncarpia glomulifera	0.5	1	TG		0.5							
Allocasuarina torulosa	1	3	TG		1							
Seringia arborescens	0.4	1	SG			0.4						
Ozothamnus diosmifolius	0.5	5	SG			0.5						
Cordyline stricta	0.2	2	OG							0.2		
Persoonia linearis	1	5	SG			1						
Acacia irrorata	2	3	SG			2						
Acacia implexa	0.1	1	SG			0.1						
Myrsine variabilis	0.1	1	SG			0.1						
Breynia oblongifolia	0.3	2	SG			0.3						
Rhodamnia rubescens	0.2	2	SG			0.2						
Commersonia fraseri	0.1	1	SG			0.1						
Lantana camara	0.2	1	HT									0.2
Melicope micrococca	0.2	2	SG			0.2						
Glochidion ferdinandi	0.2	1	TG		0.2							
Eucalyptus pilularis	0.1	1	TG		0.1							
Leucopogon juniperinus	0.1	1	SG			0.1						
Denhamia silvestris	0.1	1	SG			0.1						
Imperata cylindrica	80	5000	GG				80					
Lepidosperma laterale	0.5	5	GG				0.5					
Stephania japonica	0.2	5	OG							0.2		
Hibbertia dentata	10	2000	OG							10		
Calochlaena dubia	0.2	2	OG							0.2		
Pteridium esculentum	5	50	EG						5			
Smilax australis	0.2	2	OG							0.2		
Coronidium elatum	0.1	2	SG			0.1						
Hibbertia scandens	0.5	1	OG							0.5		
Geitonoplesium cymosum	0.1	1	OG							0.1		
Sarcopetalum harveyanum	0.1	1	OG							0.1		
Clematis glycinoides	0.1	1	OG							0.1		
Oxalis perennans	0.1	10	FG					0.1				
Pseuderanthemum variabile	0.1	1	FG					0.1				
Cheilanthes sieberi	0.1	10	EG						0.1			
Setaria parviflora	0.5	3	EX								0.5	

Easting	345302
Northing	6334183
Orientation	112
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	22
BAM Attributes 1x1 plot (%)	90

A.1.1.2.8 LCED_HTP14 – Mod-good

Date	12/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP14		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3263		45	45	9	12	5	5	1	13	0	0
Paired With	LCEB_HTP13		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	93.9	93.9	53.5	18.3	2.6	2.3	0.2	17	0	0
Eucalyptus deanei	15	4	TG		15							
Eucalyptus pilularis	20	10	TG		20							
Eucalyptus acmenoides	10	6	TG		10							
Allocasuarina torulosa	5	10	TG		5							
Eucalyptus paniculata	1	2	TG		1							
Syncarpia glomulifera	1	1	TG		1							
Astrotricha latifolia	5	20	SG			5						
Persoonia linearis	1	5	SG			1						
Breynia oblongifolia	1	10	SG			1						
Cordyline stricta	2	20	OG							2		
Claoxylon australe	0.4	1	SG			0.4						
Seringia arborescens	10	15	SG			10						
Clerodendrum tomentosum	0.4	1	TG		0.4							
Leucopogon juniperinus	0.1	1	SG			0.1						
Synoum glandulosum subsp. glandulosum	0.1	1	SG			0.1						
Cryptocarya glaucescens	1	2	TG		1							
Psychotria loniceroides	0.1	1	SG			0.1						
Acacia schinoides	0.3	1	SG			0.3						
Solanum stelligerum	0.1	2	SG			0.1						
Acacia floribunda	0.1	1	SG			0.1						
Melicope micrococca	0.1	1	SG			0.1						
Cryptocarya microneura	0.1	1	TG		0.1							
Lomandra longifolia	0.2	2	GG				0.2					
Gahnia clarkei	2	20	GG				2					
Gymnostachys anceps	1	10	FG					1				
Stephania japonica	2	20	OG							2		
Cissus hypoglauca	10	100	OG							10		
Cissus antarctica	1	10	OG							1		
Dioscorea transversa	1	100	OG							1		
Geitonoplesium cymosum	0.1	10	OG							0.1		
Alpinia caerulea	1	10	FG					1				
Clematis glycinoides	0.1	1	OG							0.1		
Pseuderanthemum variabile	0.1	10	FG					0.1				
Smilax australis	0.2	3	OG							0.2		
Parsonsia straminea	0.1	1	OG							0.1		
Doodia Aspera	0.2	25	EG						0.2			
Hibbertia dentata	0.2	20	OG							0.2		
Oplismenus imbecillis	0.2	20	GG				0.2					
Hydrocotyle sibthorpioides	0.1	1	FG					0.1				
Marsdenia rostrata	0.1	1	OG							0.1		
Sarcopetalum harveyanum	0.1	1	OG							0.1		
Lepidosperma laterale	0.1	1	GG				0.1					
Dianella caerulea	0.1	1	FG					0.1				
Entolasia stricta	0.1	10	GG				0.1					
Gynochthodes jasminoides	0.1	1	OG							0.1		

Easting	345248
Northing	6334225
Orientation	324
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	244
BAM Attributes 1x1 plot (%)	82

A.1.1.2.9 LCED_HTP15 – Easement

Date	12/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP15		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	- easement		37	37	3	15	5	3	3	8	0	0
Paired With	LCEB_HTP16		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	163.2	163.2	5.5	60.2	61.1	0.6	11.2	24.6	0	0
Acacia schinoides	10	20	SG			10						
Syncarpia glomulifera	5	5	TG		5							
Astrotricha latifolia	20	50	SG			20						
Seringia arborescens	10	20	SG			10						
Melicope micrococca	2	20	SG			2						
Ozothamnus diosmifolius	0.2	1	SG			0.2						
Elaeocarpus reticulatus	10	50	SG			10						
Breynia oblongifolia	5	50	SG			5						
Rubus rosifolius	0.5	5	SG			0.5						
Trochocarpa laurina	0.3	2	TG		0.3							
Cordyline stricta	1	10	OG							1		
Rhodamnia rubescens	0.2	1	SG			0.2						
Asterolasia correifolia	0.2	2	SG			0.2						
Rubus moluccanus	1	50	SG			1						
Persoonia linearis	0.2	1	SG			0.2						
Stenocarpus salignus	0.5	1	SG			0.5						
Schizomeria ovata	0.2	1	TG		0.2							
Polyscias sambucifolia	0.1	1	SG			0.1						
Acacia irrorata	0.3	1	SG			0.3						
Lomandra longifolia	0.3	5	GG				0.3					
Entolasia stricta	20	2000	GG				20					
Lepidosperma laterale	0.3	3	GG				0.3					
Hydrocotyle sibthorpioides	0.2	20	FG					0.2				
Hibbertia dentata	20	1000	OG							20		
Calochlaena dubia	2	25	OG							2		
Cheilanthes sieberi	0.2	50	EG						0.2			
Pteridium esculentum	10	100	EG						10			
Stephania japonica	0.2	5	OG							0.2		
Hibbertia scandens	0.2	2	OG							0.2		
Blechnum cartilagineum	1	20	EG						1			
Smilax australis	1	20	OG							1		
Gahnia clarkei	0.5	5	GG				0.5					
Gynochthodes jasminoides	0.1	1	OG							0.1		
Dioscorea transversa	0.1	5	OG							0.1		
Lepidosperma spp.	40	500	GG				40					
Gonocarpus tetragynus	0.2	20	FG					0.2				
Lobelia purpurascens	0.2	20	FG					0.2				

Easting	344867
Northing	6334064
Orientation	168
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	67
BAM Attributes 1x1 plot (%)	62

A.1.1.2.10 LCED_HTP16 – Mod-good

Date	12/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP16		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT			47	47	10	14	6	3	2	12	0	0
Paired With	LCEB_HTP15		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	120.1	120.1	98.6	8	6	2.1	0.3	5.1	0	0
Syncarpia glomulifera	20	20	TG		20							
Eucalyptus acmenoides	25	15	TG		25							
Allocasuarina torulosa	2	2	TG		2							
Cymbidium suave	0.1	5	OG							0.1		
Elaeocarpus reticulatus	2	10	SG			2						
Acmena smithii	10	20	TG		10							
Cryptocarya glaucescens	15	100	TG		15							
Cryptocarya microneura	10	20	TG		10							
Psychotria loniceroides	0.5	10	SG			0.5						
Cordyline stricta	1	10	OG							1		
Clerodendrum tomentosum	0.5	1	TG		0.5							
Synoum glandulosum subsp. glandulosum	2	20	SG			2						
Acacia irrorata	2	5	SG			2						
Wilkiea huegeliana	0.1	1	SG			0.1						
Trochocarpa laurina	1	10	TG		1							
Astrotricha latifolia	0.5	5	SG			0.5						
Schizomeria ovata	15	50	TG		15							
Livistona australis	0.2	1	OG							0.2		
Melicope micrococca	0.1	1	SG			0.1						
Persoonia linearis	0.1	1	SG			0.1						
Syzygium spp.	0.2	1	SG			0.2						
Rhodamnia rubescens	0.1	1	SG			0.1						
Myrsine variabilis	0.1	1	SG			0.1						
Asterolasia correifolia	0.1	1	SG			0.1						
Neolitsea dealbata	0.1	1	TG		0.1							
Archontophoenix cunninghamiana	0.1	1	OG							0.1		
Pittosporum spinescens	0.1	1	SG			0.1						
Breynia oblongifolia	0.1	1	SG			0.1						
Lomandra longifolia	0.5	5	GG				0.5					
Smilax australis	1	100	OG							1		
Entolasia stricta	5	1000	GG				5					
Gynochthodes jasminoides	1	100	OG							1		
Pseuderanthemum variabile	1	1000	FG					1				
Marsdenia suaveolens	0.1	1	OG							0.1		
Dioscorea transversa	1	100	OG							1		
Pandorea pandorana	0.1	1	OG							0.1		
Parsonsia straminea	0.2	1	OG							0.2		
Doodia Aspera	0.2	10	EG						0.2			
Calochlaena dubia	0.2	5	OG							0.2		
Gahnia melanocarpa	0.1	1	GG				0.1					
Alpinia caerulea	1	20	FG					1				
Tetrastigma nitens	0.1	1	OG							0.1		
Gahnia clarkei	0.2	6	GG				0.2					
Oplismenus imbecillis	0.1	1	GG				0.1					
Lepidosperma laterale	0.1	1	GG				0.1					
Blechnum cartilagineum	0.1	3	EG						0.1			
Viola silicestris	0.1	5	FG					0.1				

Easting	344856
Northing	6334112
Orientation	351
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	5
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	525
BAM Attributes 1x1 plot (%)	89

A.1.1.2.11 LCED_HTP17 – Easement

Date	12/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP17		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	- easement		32	30	2	11	1	6	3	7	2	0
Paired With	LCEB_HTP18		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	97.3	17.2	1.1	4.3	0.2	1	5.2	5.4	80.1	0
Syncarpia glomulifera	0.1	1	TG		0.1							
Eucalyptus agglomerata	1	6	TG		1							
Astrotricha latifolia	2	20	SG			2						
Persoonia linearis	0.1	1	SG			0.1						
Cordyline stricta	4	40	OG							4		
Zieria pilosa	0.5	3	SG			0.5						
Leucopogon juniperinus	0.1	1	SG			0.1						
Breynia oblongifolia	1	10	SG			1						
Ozothamnus diosmifolius	0.1	1	SG			0.1						
Melicope micrococca	0.1	1	SG			0.1						
Pomaderris ligustrina	0.1	1	SG			0.1						
Seringia arborescens	0.1	1	SG			0.1						
Claoxylon australe	0.1	1	SG			0.1						
Rhodamnia rubescens	0.1	1	SG			0.1						
Setaria parviflora	80	2000	EX								80	
Pteridium esculentum	5	50	EG						5			
Smilax australis	0.5	20	OG							0.5		
Lomandra longifolia	0.2	3	GG				0.2					
Hibbertia dentata	0.5	50	OG							0.5		
Lobelia purpurascens	0.1	10	FG					0.1				
Clematis glycinoides	0.1	1	OG							0.1		
Senecio minimus	0.5	5	FG					0.5				
Cayratia clematidea	0.1	1	OG							0.1		
Sarcopetalum harveyanum	0.1	1	OG							0.1		
Lysimachia arvensis	0.1	1	EX								0.1	
Cheilanthes sieberi	0.1	10	EG						0.1			
Veronica plebeia	0.1	20	FG					0.1				
Doodia Aspera	0.1	5	EG						0.1			
Eustrephus latifolius	0.1	1	OG							0.1		
Viola silicestris	0.1	5	FG					0.1				
Oxalis perennans	0.1	1	FG					0.1				
Caladenia catenata	0.1	1	FG					0.1				

Easting	344355
Northing	6333937
Orientation	205
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	3
BAM Attributes 1x1 plot (%)	80

A.1.1.2.12 LCED_HTP18 – Mod-good

Date	12/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	LCEB_HTP18		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT			41	41	7	15	3	4	0	12	0	0
Paired With	LCEB_HTP17		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	161.6	161.6	68.1	22.9	15.1	1.3	0	54.2	0	0
Eucalyptus agglomerata	30	10	TG		30							
Eucalyptus deanei	10	3	TG		10							
Syncarpia glomulifera	5	5	TG		5							
Allocasuarina torulosa	3	3	TG		3							
Rhodamnia rubescens	0.5	5	SG			0.5						
Melicope micrococca	1	10	SG			1						
Breynia oblongifolia	2	25	SG			2						
Synoum glandulosum subsp. glandulosum	10	50	SG			10						
Astrotricha latifolia	1	10	SG			1						
Diospyros australis	5	20	SG			5						
Seringia arborescens	0.4	1	SG			0.4						
Cordyline stricta	5	50	OG							5		
Myrsine variabilis	0.1	1	SG			0.1						
Schizomeria ovata	0.1	1	TG		0.1							
Claoxylon australe	0.1	2	SG			0.1						
Pittosporum revolutum	2	10	SG			2						
Persoonia linearis	0.2	1	SG			0.2						
Cryptocarya glaucescens	10	20	TG		10							
Pomaderris ligustrina	0.3	1	SG			0.3						
Cryptocarya microneura	10	50	TG		10							
Leucopogon juniperinus	0.1	1	SG			0.1						
Parsonsia straminea	0.5	5	OG							0.5		
Hibbertia dentata	5	50	OG							5		
Gymnostachys anceps	1	10	FG					1				
Gahnia melanocarpa	5	50	GG				5					
Lepidosperma laterale	10	100	GG				10					
Clematis glycinoides	0.1	10	OG							0.1		
Dioscorea transversa	1	100	OG							1		
Calochlaena dubia	10	1000	OG							10		
Smilax australis	10	100	OG							10		
Rubus moluccanus	0.1	2	SG			0.1						
Rubus rosifolius	0.1	1	SG			0.1						
Cissus hypoglauca	20	200	OG							20		
Stephania japonica	0.2	2	OG							0.2		
Geitonoplesium cymosum	0.4	20	OG							0.4		
Gynochthodes jasminoides	1	50	OG							1		
Pseuderanthemum variabile	0.1	10	FG					0.1				
Tetrastigma nitens	1	10	OG							1		
Oplismenus imbecillis	0.1	10	GG				0.1					
Dianella caerulea	0.1	10	FG					0.1				
Lobelia purpurascens	0.1	10	FG					0.1				

Easting	344343
Northing	6333976
Orientation	291
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	6
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	180
BAM Attributes 1x1 plot (%)	82

A.1.1.3.1 HTP-MS-88 – Poor

Date	13/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-88		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3314 - poor		41	26	3	4	9	9	0	1	12	3
Paired With	HTP-MS-89		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	67.9	35.6	15.2	1.6	15.7	3	0	0.1	19.3	13
Eucalyptus moluccana	15	5	TG		15							
Sida rhombifolia	10	500	EX								10	
Senecio madagascariensis	5	100	HT									5
Heliotropium amplexicaule	5	100	HT									5
Galenia pubescens	3	40	HT									3
Bidens subalternans	2	50	EX								2	
Austrostipa verticillata	0.1	2	GG				0.1					
Aristida ramosa	10	100	GG				10					
Dichondra repens	1	50	FG					1				
Hybanthus vernonii	0.4	20	FG					0.4				
Calotis lappulacea	0.2	10	FG					0.2				
Eremophila debilis	0.4	10	SG			0.4						
Lomandra confertifolia	1	50	GG				1					
Microlaena stipoides var. stipoides	1	40	GG				1					
Anthosachne scabra	1	30	GG				1					
Bidens pilosa	2	100	EX								2	
Gomphocarpus fruticosus	0.4	10	EX								0.4	
Einadia nutans subsp. linifolia	0.1	5	FG					0.1				
Stackhousia viminea	0.1	5	FG					0.1				
Brunoniella australis	0.2	10	FG					0.2				
Glycine tabacina	0.1	5	OG							0.1		
Acacia salicina	0.1	1	TG		0.1							
Teucrium junceum	0.4	3	SG			0.4						
Cymbopogon refractus	0.4	5	GG				0.4					
Lomandra multiflora subsp. multiflora	0.1	1	GG				0.1					
Conyza bonariensis	1	20	EX								1	
Cynosurus echinatus	1	40	EX								1	
Sida corrugata	0.1	5	FG					0.1				
Enchylaena tomentosa	0.4	10	SG			0.4						
Myoporum montanum	0.4	2	SG			0.4						
Austrostipa scabra	2	50	GG				2					
Vittadinia cuneata	0.8	50	FG					0.8				
Opuntia stricta	0.8	5	EX								0.8	
Chrysocephalum semipapposum	0.1	5	FG					0.1				
Sisymbrium orientale	0.4	10	EX								0.4	
Verbena bonariensis	0.2	5	EX								0.2	
Notelaea microcarpa	0.1	1	TG		0.1							
Passiflora caerulea	0.1	1	EX								0.1	
Plantago lanceolata	1	50	EX								1	
Richardia humistrata	0.4	10	EX								0.4	
Juncus usitatus	0.1	1	GG				0.1					

Easting	306622
Northing	6413048
Orientation	265
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	4
BAM Attributes 1x1 plot (%)	47

A.1.1.3.2 HTP-MS-89 – Easement

Date	13/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-89		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3314 - easement		32	12	0	1	3	6	1	1	16	4
Paired With	HTP-MS-88		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	112.8	3.3	0	0.2	1.5	1.4	0.1	0.1	33.5	76
Hyparrhenia rufa subsp. altissima	65	1000	HT									65
Gomphocarpus fruticosus	5	100	EX								5	
Acacia saligna	5	20	EX								5	
Sida rhombifolia	10	200	EX								10	
Senecio madagascariensis	5	100	HT									5
Cirsium vulgare	0.8	50	EX								0.8	
Plantago lanceolata	5	100	EX								5	
Chloris gayana	5	50	HT									5
Oxalis corniculata	0.4	20	EX								0.4	
Conyza parva	1	50	EX								1	
Dichondra repens	0.8	20	FG					0.8				
Bidens pilosa	3	100	EX								3	
Linum marginale	0.1	5	FG					0.1				
Lomandra confertifolia	0.1	5	GG				0.1					
Brunoniella australis	0.1	10	FG					0.1				
Verbena officinalis	0.4	10	EX								0.4	
Phyllanthus virgatus	0.1	5	FG					0.1				
Cyclospermum leptophyllum	0.4	20	EX								0.4	
Conyza sumatrensis	0.8	20	EX								0.8	
Eremophila debilis	0.2	10	SG			0.2						
Cynosurus echinatus	0.4	10	EX								0.4	
Aristida ramosa	1	50	GG				1					
Glycine clandestina	0.1	5	OG							0.1		
Hybanthus vernonii	0.1	10	FG					0.1				
Galenia pubescens	1	10	HT									1
Centaurium tenuiflorum	0.4	20	EX								0.4	
Cheilanthes sieberi	0.1	5	EG						0.1			
Verbena bonariensis	0.4	5	EX								0.4	
Chrysocephalum semipapposum	0.2	20	FG					0.2				
Cymbopogon refractus	0.4	10	GG				0.4					
Opuntia stricta	0.1	1	EX								0.1	
Gamochaeta purpurea	0.4	20	EX								0.4	

Easting	306556
Northing	6412993
Orientation	310
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	7.4

A.1.1.4.1 TC24 – Easement

Date	26/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC24		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3315	Easement	26	22	3	4	11	3	1	0	2	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	70.6	69.6	5.4	42.3	9.7	2.2	10	0	0.3	0.7
Eucalyptus crebra	5	24	TG		5							
Grevillea montana	40	240	SG			40						
Callistemon linearis	0.2	1	SG			0.2						
Persoonia linearis	0.1	1	SG			0.1						
Acacia parvipinnula	2	11	SG			2						
Corymbia maculata	0.2	2	TG		0.2							
Allocasuarina torulosa	0.2	6	TG		0.2							
Cheilanthes sieberi	10	500	EG						10			
Cymbopogon refractus	0.5	10	GG				0.5					
Chrysocephalum apiculatum	2	50	FG					2				
Oxalis perennans	0.1	10	FG					0.1				
Eragrostis curvula	0.5	3	HT									0.5
Gahnia aspera	4	50	GG				4					
Cynodon dactylon	4	30	GG				4					
Panicum queenslandicum	0.2	20	GG				0.2					
Senecio madagascariensis	0.2	20	HT									0.2
Taraxacum officinale	0.2	40	EX								0.2	
Lomandra multiflora subsp. multiflora	0.2	5	GG				0.2					
Laxmannia compacta	0.1	5	FG					0.1				
Eragrostis brownii	0.1	6	GG				0.1					
Richardia humistrata	0.1	2	EX								0.1	
Microlaena stipoides	0.2	20	GG				0.2					
Aristida vagans	0.1	10	GG				0.1					
Eragrostis brownii	0.2	25	GG				0.2					
Digitaria spp.	0.1	15	GG				0.1					
Austrostipa scabra	0.1	20	GG				0.1					

Easting	327334
Northing	6377132
Orientation	125
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	12

A.1.1.4.2 TC25 – Mod-good

Date	26/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC25		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3315	Mod-good	45	38	7	14	10	5	1	1	4	3
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	135.7	133	19.8	18.9	91.8	1.4	1	0.1	0.4	2.3
Allocasuarina luehmannii	2	3	TG		2							
Eucalyptus crebra	6	4	TG		6							
Corymbia maculata	1	3	TG		1							
Eucalyptus moluccana	10	10	TG		10							
Callitris endlicheri	0.2	2	TG		0.2							
Allocasuarina torulosa	0.4	2	TG		0.4							
Dodonaea viscosa	4	60	SG			4						
Grevillea montana	6	30	SG			6						
Callistemon linearis	1	6	SG			1						
Olea europaea subsp. cuspidata	0.2	3	HT									0.2
Persoonia linearis	1	5	SG			1						
Correa reflexa	0.2	2	SG			0.2						
Exocarpos strictus	2	11	SG			2						
Acacia parvipinnula	3	10	SG			3						
Breynia oblongifolia	0.5	4	SG			0.5						
Solanum stelligerum	0.2	6	SG			0.2						
Solanum cinereum	0.1	2	SG			0.1						
Notelaea longifolia	0.2	1	TG		0.2							
Melaleuca nodosa	0.4	1	SG			0.4						
Denhamia silvestris	0.2	4	SG			0.2						
Euryomyrtus ramosissima	0.2	4	SG			0.2						
Gahnia aspera	70	200	GG				70					
Lobelia purpurascens	1	150	FG					1				
Juncus usitatus	1	15	GG				1					
Cymbopogon refractus	0.2	6	GG				0.2					
Eragrostis curvula	2	7	HT									2
Microlaena stipoides	10	200	GG				10					
Cheilanthes sieberi	1	50	EG						1			
Cynodon dactylon	10	40	GG				10					
Oxalis perennans	0.1	5	FG					0.1				
Taraxacum officinale	0.1	10	EX								0.1	
Eragrostis brownii	0.2	20	GG				0.2					
Hydrocotyle spp.	0.1	3	FG					0.1				
Opuntia stricta	0.1	1	EX								0.1	
Sigesbeckia spp.	0.1	1	FG					0.1				
Grona varians	0.1	1	OG							0.1		
Senecio madagascariensis	0.1	3	HT									0.1
Conyza spp.	0.1	6	EX								0.1	
Eremophila debilis	0.1	1	SG			0.1						
Dianella caerulea	0.1	2	FG					0.1				
Richardia humistrata	0.1	4	EX								0.1	
Lomandra multiflora subsp. multiflora	0.1	1	GG				0.1					
Entolasia stricta	0.1	1	GG				0.1					
Echinopogon ovatus	0.1	1	GG				0.1					
Chloris spp.	0.1	1	GG				0.1					

Easting	327313
Northing	6377109
Orientation	127
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	9
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	17
BAM Attributes 1x1 plot (%)	40

A.1.1.5.1 TC20 – Easement

Date	25/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC20		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3431	Easement	40	32	2	4	8	13	1	4	6	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	31.3	28.7	1.1	2.7	20.9	3.3	0.2	0.5	1	1.6
Brachychiton populneus subsp. populneus	0.1	1	TG		0.1							
Eucalyptus moluccana	1	13	TG		1							
Cheilanthes sieberi	0.2	15	EG						0.2			
Lomandra multiflora subsp. multiflora	10	50	GG				10					
Cassinia quinquefaria	2	27	SG			2						
Hyparrhenia hirta	1.5	25	HT									1.5
Bursaria spinosa	0.5	7	SG			0.5						
Cymbopogon refractus	1.5	30	GG				1.5					
Eremophila debilis	0.1	2	SG			0.1						
Verbena rigida var. rigida	0.5	17	EX								0.5	
Stackhousia viminea	0.1	10	FG					0.1				
Opuntia stricta	0.1	1	EX								0.1	
Hybanthus vernonii	0.1	2	FG					0.1				
Senecio madagascariensis	0.1	5	HT									0.1
Hardenbergia violacea	0.2	8	OG							0.2		
Enteropogon ramosus	0.1	3	GG				0.1					
Rhytidosporum spp.	0.1	3	SG			0.1						
Chrysocephalum apiculatum	0.3	120	FG					0.3				
Brunoniella australis	1	50	FG					1				
Sida corrugata	0.1	2	FG					0.1				
Wahlenbergia communis	0.1	6	FG					0.1				
Tricoryne elatior	0.1	1	FG					0.1				
Dichelachne crinita	1	20	GG				1					
Dichondra sp. Inglewood	0.1	10	FG					0.1				
Richardia humistrata	0.1	3	EX								0.1	
Oxalis perennans	0.1	1	FG					0.1				
Tylophora spp.	0.1	2	OG							0.1		
Convolvulus erubescens	0.1	1	OG							0.1		
Glycine clandestina	0.1	3	OG							0.1		
Fimbristylis dichotoma	0.1	5	GG				0.1					
Acacia saligna	0.1	1	EX								0.1	
Vernonia cinerea	0.1	3	FG					0.1				
Taraxacum officinale	0.1	1	EX								0.1	
Dianella revoluta	1	12	FG					1				
Sida rhombifolia	0.1	1	EX								0.1	
Lomandra filiformis	8	30	GG				8					
Cynodon dactylon	0.1	5	GG				0.1					
Euphorbia drummondii	0.1	8	FG					0.1				
Eragrostis brownii	0.1	4	GG				0.1					
Calotis lappulacea	0.1	10	FG					0.1				

Easting	305544
Northing	6413183
Orientation	228
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	9

A.1.1.5.2 TC21 – Thinned

Date	25/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC21		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3431	Thinned	43	36	2	7	8	16	1	2	4	3
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	137.5	131.5	55.5	3	5.3	67	0.1	0.6	3.7	2.3
Eucalyptus moluccana	55	23	TG		55							
Acacia saligna	1.5	6	EX								1.5	
Notelaea microcarpa var. microcarpa	0.5	4	TG		0.5							
Olearia elliptica	0.2	1	SG			0.2						
Solanum brownii	0.5	20	SG			0.5						
Teucrium junceum	0.2	1	SG			0.2						
Amyema spp.	0.5	4	OG							0.5		
Bursaria spinosa	0.2	10	SG			0.2						
Acacia falcata	1	5	SG			1						
Dichondra sp. Inglewood	50	1.5	FG					50				
Euphorbia drummondii	0.1	20	FG					0.1				
Sida corrugata	15	0.2	FG					15				
Senecio madagascariensis	0.2	15	HT									0.2
Wahlenbergia communis	0.1	5	FG					0.1				
Cymbopogon refractus	0.4	15	GG				0.4					
Opuntia stricta	2	45	EX								2	
Hyparrhenia hirta	2	25	HT									2
Verbena rigida var. rigida	0.1	10	EX								0.1	
Hybanthus vernonii	0.1	10	FG					0.1				
Stackhousia viminea	0.1	5	FG					0.1				
Oxytes brachypoda	0.5	33	FG					0.5				
Dichelachne crinita	1	12	GG				1					
Einadia nutans	0.1	3	FG					0.1				
Glycine clandestina	0.1	5	OG							0.1		
Glossocardia bidens	0.1	10	FG					0.1				
Conyza spp.	0.1	3	EX								0.1	
Aristida ramosa	0.2	10	GG				0.2					
Brunoniella australis	0.1	5	FG					0.1				
Dianella revoluta	0.1	1	FG					0.1				
Eremophila debilis	0.8	18	SG			0.8						
Solanum cinereum	0.1	1	SG			0.1						
Lomandra filiformis	3	35	GG				3					
Lomandra multiflora subsp. multiflora	0.3	10	GG				0.3					
Oxalis perennans	0.1	3	FG					0.1				
Panicum queenslandicum	0.1	4	GG				0.1					
Chrysocephalum apiculatum	0.2	25	FG					0.2				
Commelina cyanea	0.1	3	FG					0.1				
Austrostipa spp.	0.2	7	GG				0.2					
Arthropodium spp.	0.1	2	FG					0.1				
Rytidosperma erianthum	0.1	5	GG				0.1					
Cheilanthes sieberi	0.1	10	EG						0.1			
Galenia pubescens	0.1	3	HT									0.1
Vittadinia spp.	0.2	10	FG					0.2				

Easting	305549
Northing	6413220
Orientation	259
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	8
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	17
BAM Attributes 1x1 plot (%)	40

A.1.1.5.3 TC22 – Easement

Date	25/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC22		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3431	Easement	24	18	3	1	6	6	1	1	4	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	87.5	31.9	10	0.1	20.8	0.7	0.2	0.1	0.5	55.1
Allocasuarina luehmannii	2	7	TG		2							
Eucalyptus crebra	3	14	TG		3							
Eucalyptus moluccana	5	33	TG		5							
Acacia saligna	0.2	2	EX								0.2	
Hyparrhenia hirta	55	200	HT									55
Senecio madagascariensis	0.1	15	HT									0.1
Dichondra sp. Inglewood	0.1	10	FG					0.1				
Cheilanthes sieberi	0.2	20	EG						0.2			
Stackhousia viminea	0.1	2	FG					0.1				
Lomandra confertifolia	20	50	GG				20					
Brunoniella australis	0.1	3	FG					0.1				
Aristida ramosa	0.1	2	GG				0.1					
Wahlenbergia communis	0.1	3	FG					0.1				
Eragrostis brownii	0.2	12	GG				0.2					
Sida rhombifolia	0.1	6	EX								0.1	
Conyza spp.	0.1	1	EX								0.1	
Glycine tabacina	0.1	2	OG							0.1		
Richardia humistrata	0.1	3	EX								0.1	
Euphorbia drummondii	0.1	5	FG					0.1				
Panicum queenslandicum	0.3	20	GG				0.3					
Eremophila debilis	0.1	3	SG			0.1						
Cynodon dactylon	0.1	2	GG				0.1					
Lomandra multiflora subsp. multiflora	0.1	2	GG				0.1					
Dianella revoluta	0.2	5	FG					0.2				

Easting	305341
Northing	6413148
Orientation	81
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	5
BAM Attributes 1x1 plot (%)	8

A.1.1.5.4 TC23 – Thinned

Date	25/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC23		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3431	Thinned	32	26	5	1	10	8	1	1	5	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	48.7	48.1	29.4	0.1	17.1	1.1	0.3	0.1	0.5	0.1
Eucalyptus moluccana	10	20	TG		10							
Allocasuarina luehmannii	15	22	TG		15							
Eucalyptus blakelyi	2	3	TG		2							
Eucalyptus crebra	2	7	TG		2							
Casuarina glauca	0.4	5	TG		0.4							
Eragrostis brownii	0.2	20	GG				0.2					
Austrostipa scabra	0.5	10	GG				0.5					
Cheilanthes sieberi	0.3	30	EG						0.3			
Panicum queenslandicum	0.1	5	GG				0.1					
Cymbopogon refractus	0.5	15	GG				0.5					
Lomandra confertifolia	15	50	GG				15					
Cynodon dactylon	0.2	6	GG				0.2					
Stackhousia viminea	0.1	5	FG					0.1				
Dichondra sp. Inglewood	0.2	10	FG					0.2				
Glycine tabacina	0.1	3	OG							0.1		
Eremophila debilis	0.1	4	SG			0.1						
Sida rhombifolia	0.1	3	EX								0.1	
Sida corrugata	0.2	12	FG					0.2				
Verbena rigida var. rigida	0.1	2	EX								0.1	
Hybanthus vernonii	0.1	3	FG					0.1				
Brunoniella australis	0.2	8	FG					0.2				
Einadia nutans	0.1	2	FG					0.1				
Senecio madagascariensis	0.1	10	HT									0.1
Plantago lanceolata	0.1	1	EX								0.1	
Lomandra multiflora subsp. multiflora	0.2	3	GG				0.2					
Opuntia stricta	0.1	3	EX								0.1	
Dianella revoluta	0.1	2	FG					0.1				
Commelina cyanea	0.1	3	FG					0.1				
Bothriochloa biloba	0.1	2	GG				0.1					
Chloris truncata	0.2	6	GG				0.2					
Taraxacum officinale	0.1	2	EX								0.1	
Aristida ramosa	0.1	1	GG				0.1					

Easting	305358
Northing	6413117
Orientation	74
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	4
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	9
BAM Attributes 1x1 plot (%)	46

A.1.1.5.5 TC32 – Easement

Date	28/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC32		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3431	Easement	45	33	2	4	9	17	1	0	9	3
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	84.7	64.4	8.3	1.4	41.9	12.6	0.2	0	11	9.3
Allocasuarina luehmannii	8	35	TG		8							
Bursaria spinosa	0.2	2	SG			0.2						
Acacia amblygona	0.2	3	SG			0.2						
Acacia salicina	0.3	1	TG		0.3							
Gomphocarpus fruticosus	1	56	EX								1	
Pimelea linifolia	0.9	5	SG			0.9						
Scaevola ramosissima	6	43	FG					6				
Themeda triandra	26	73	GG				26					
Senecio madagascariensis	2	40	HT									2
Cymbopogon refractus	12	24	GG				12					
Hyparrhenia hirta	7	27	HT									7
Verbena rigida var. rigida	8	40	EX								8	
Cheilanthes sieberi	0.2	15	EG						0.2			
Hypericum gramineum	0.2	15	FG					0.2				
Dichondra sp. Inglewood	1	40	FG					1				
Conyza spp.	0.3	15	EX								0.3	
Plantago turrifera	0.2	15	FG					0.2				
Oxalis perennans	0.3	15	FG					0.3				
Bothriochloa spp.	0.6	15	GG				0.6					
Linum marginale	1	25	FG					1				
Wahlenbergia communis	0.1	3	FG					0.1				
Brachyscome dentata	0.1	2	FG					0.1				
Taraxacum officinale	0.1	2	EX								0.1	
Brunoniella australis	0.1	1	FG					0.1				
Pomax umbellata	1	60	FG					1				
Stackhousia viminea	0.2	15	FG					0.2				
Goodenia bellidifolia subsp. bellidifoli	0.1	1	FG					0.1				
Sporobolus creber	1.5	30	GG				1.5					
Verbena bonariensis	0.4	3	EX								0.4	
Panicum spp.	0.6	30	GG				0.6					
Paspalum dilatatum	0.3	4	HT									0.3
Dianella revoluta	0.8	13	FG					0.8				
Gamochaeta purpurea	0.7	50	EX								0.7	
Euphorbia drummondii	0.1	2	FG					0.1				
Carex inversa	0.4	10	GG				0.4					
Eremophila debilis	0.1	1	SG			0.1						
Chrysocephalum apiculatum	0.2	10	FG					0.2				
Sida rhombifolia	0.2	3	EX								0.2	
Bothriochloa spp.	0.1	1	GG				0.1					
Richardia humistrata	0.2	6	EX								0.2	
Aristida spp.	0.5	12	GG				0.5					
Centaurium tenuiflorum	0.1	6	EX								0.1	
Calotis lappulacea	1	15	FG					1				
Sida corrugata	0.2	3	FG					0.2				
Fimbristylis dichotoma	0.2	10	GG				0.2					

Easting	304440
Northing	6406077
Orientation	225
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	1
BAM Attributes 1x1 plot (%)	4

A.1.1.5.6 TC33 – Thinned

Date	28/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC33		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3431	Thinned	39	34	3	8	7	14	1	1	3	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	62.6	59.7	41.4	4.7	6.5	6.9	0.1	0.1	0.8	2.1
Allocasuarina luehmannii	40	94	TG		40							
Acacia implexa	0.6	5	SG			0.6						
Acacia amblygona	2	13	SG			2						
Acacia saligna	0.4	2	EX								0.4	
Acacia decora	1	19	SG			1						
Bursaria spinosa	0.4	8	SG			0.4						
Notelaea microcarpa	0.8	1	TG		0.8							
Geijera salicifolia	0.6	3	TG		0.6							
Teucrium junceum	0.2	2	SG			0.2						
Solanum prinophyllum	0.1	1	FG					0.1				
Poa sieberiana	0.3	8	GG				0.3					
Pimelea linifolia	0.1	2	SG			0.1						
Senecio madagascariensis	2	300	HT									2
Lepidium africanum	0.3	25	EX								0.3	
Hybanthus vernonii	0.1	15	FG					0.1				
Phyllanthus gunnii	0.1	8	SG			0.1						
Einadia nutans	3	60	FG					3				
Cymbopogon refractus	0.7	10	GG				0.7					
Cyperus gracilis	2	100	GG				2					
Galenia pubescens	0.1	1	HT									0.1
Entolasia stricta	1	25	GG				1					
Eremophila debilis	0.3	8	SG			0.3						
Lomandra multiflora subsp. multiflora	0.3	6	GG				0.3					
Brunoniella australis	0.2	8	FG					0.2				
Dichondra sp. Inglewood	0.2	10	FG					0.2				
Sida hackettiana	0.1	2	FG					0.1				
Glossocardia bidens	0.1	5	FG					0.1				
Sida corrugata	0.2	5	FG					0.2				
Stackhousia viminea	0.1	4	FG					0.1				
Lomandra confertifolia	0.2	3	GG				0.2					
Glycine clandestina	0.1	3	OG							0.1		
Themeda triandra	2	11	GG				2					
Goodenia bellidifolia subsp. bellidifoli	0.1	3	FG					0.1				
Scaevola ramosissima	2	53	FG					2				
Chrysocephalum apiculatum	0.2	10	FG					0.2				
Calotis lappulacea	0.4	23	FG					0.4				
Wahlenbergia communis	0.1	1	FG					0.1				
Cheilanthes sieberi	0.1	5	EG						0.1			
Opuntia stricta	0.1	1	EX								0.1	

Easting	304506
Northing	6406054
Orientation	225
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	8
BAM Attributes 1x1 plot (%)	36

A.1.1.6.1 DL_44 – Mod-good

Date	29/02/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	DL_44		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3444 - mod-good		37	35	7	10	9	5	1	3	2	0	
Paired With	TC07		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	118.8	118.6	71.5	34.3	9.7	2.2	0.1	0.8	0.2	0	
Eucalyptus fibrosa	10	3	TG		10								
Corymbia maculata	20	14	TG		20								
Eucalyptus punctata	25	5	TG		25								
Eucalyptus moluccana	5	4	TG		5								
Callitris glaucophylla	10	25	TG		10								
Notelaea longifolia	0.5	2	TG		0.5								
Dodonaea sinuolata	25	80	SG			25							
Exocarpos strictus	5	20	SG			5							
Olearia elliptica	1	10	SG			1							
Grevillea montana	0.2	2	SG			0.2							
Acacia parramattensis	1	3	TG		1								
Styphelia triflora	0.5	3	SG			0.5							
Bursaria spinosa	1	3	SG			1							
Persoonia linearis	0.1	2	SG			0.1							
Acacia amblygona	0.2	3	SG			0.2							
Solanum cinereum	0.3	3	SG			0.3							
Lepidosperma cf. laterale	1	20	GG				1						
Gahnia aspera	0.6	4	GG				0.6						
Rytidosperma fulvum	0.2	5	GG				0.2						
Glycine tabacina	0.1	5	OG							0.1			
Entolasia stricta	5	50	GG				5						
Pseuderanthemum variabile	0.3	100	FG					0.3					
Monotoca scoparia	1	6	SG			1							
Stylidium graminifolium	0.2	5	FG					0.2					
Eragrostis leptostachya	0.5	10	GG				0.5						
Glycine microphylla	0.1	2	OG							0.1			
Conyza bonariensis	0.1	2	EX								0.1		
Aristida vagans	0.4	6	GG				0.4						
Lomandra filiformis subsp. filiform	0.9	40	GG				0.9						
Lomandra multiflora subsp. multifl	1	30	GG				1						
Brunoniella australis	1	100	FG					1					
Goodenia rotundifolia	0.1	4	FG					0.1					
Lobelia purpurascens	0.6	100	FG					0.6					
Macrozamia communis	0.6	1	OG							0.6			
Cheilanthes sieberi	0.1	30	EG						0.1				
Richardia stellaris	0.1	10	EX								0.1		
Rytidosperma spp.	0.1	1	GG				0.1						

Easting	326231
Northing	6378182
Orientation	312
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	5
20-29	y
10-19	y
5-9	y
<5	y
Regen	
Hollows	0
Length logs (m)	21
BAM Attributes 1x1 plot (%)	61
Litter (%)	

A.1.1.6.2 TC07 – Easement

Date	10/09/2024		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC-07		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444 - easement		27	23	2	7	7	6	1	0	3	1
Paired With	DL_44		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	90.1	89.6	0.3	48.2	40.4	0.6	0.1	0	0.4	0.1
Eucalyptus moluccana	0.2	2	TG		0.2							
Acacia elongata	35	60	SG			35						
Casuarina glauca	0.1	1	TG		0.1							
Grevillea montana	1	10	SG			1						
Dodonaea sinuolata	10	20	SG			10						
Lobelia purpurascens	0.1	30	FG					0.1				
Acacia falcata	1	10	SG			1						
Dichondra repens	0.1	15	FG					0.1				
Cheilanthes sieberi	0.1	30	EG						0.1			
Senecio madagascariensis	0.1	10	HT									0.1
Callistemon linearis	1	5	SG			1						
Lysimachia arvensis	0.2	30	EX								0.2	
Wahlenbergia communis	0.1	5	FG					0.1				
Lomandra multiflora subsp. multiflora	3	20	GG				3					
Melichrus urceolatus	0.1	1	SG			0.1						
Gahnia aspera	15	40	GG				15					
Eragrostis brownii	0.1	20	GG				0.1					
Lepidosperma gunnii	7	30	GG				7					
Cymbopogon refractus	0.3	30	GG				0.3					
Conyza bilbaoana	0.1	10	EX								0.1	
Cyperus gracilis	7	60	GG				7					
Digitaria diffusa	8	40	GG				8					
Cyclospermum leptophyllum	0.1	10	EX								0.1	
Oxalis perennans	0.1	5	FG					0.1				
Centella asiatica	0.1	10	FG					0.1				
Chorizema parviflorum	0.1	2	SG			0.1						
Laxmannia gracilis	0.1	5	FG					0.1				

Easting	326388
Northing	6378325
Orientation	120
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	19

A.1.1.6.3 TC26 – Easement

Date	26/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC26		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Easement	36	29	4	6	9	8	1	1	5	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	117.7	116.7	3.6	10.8	50.8	50.9	0.5	0.1	0.8	0.2
Eucalyptus crebra	3	13	TG		3							
Corymbia maculata	0.2	1	TG		0.2							
Eucalyptus moluccana	0.2	1	TG		0.2							
Allocasuarina luehmannii	0.2	2	TG		0.2							
Grevillea montana	10	70	SG			10						
Acacia falcata	0.2	3	SG			0.2						
Callistemon linearis	0.2	2	SG			0.2						
Dodonaea viscosa	0.1	3	SG			0.1						
Acacia ulicifolia	0.1	2	SG			0.1						
Micromyrtus ciliata	0.2	1	SG			0.2						
Cymbopogon refractus	15	60	GG				15					
Lomandra confertifolia	30	100	GG				30					
Dianella revoluta	50	4	FG					50				
Cynodon dactylon	1	30	GG				1					
Gahnia aspera	2	40	GG				2					
Cheilanthes sieberi	0.5	40	EG						0.5			
Laxmannia compacta	0.3	30	FG					0.3				
Verbena bonariensis	0.1	1	EX								0.1	
Verbena rigida var. rigida	0.2	6	EX								0.2	
Taraxacum officinale	0.2	15	EX								0.2	
Oxalis perennans	0.1	3	FG					0.1				
Hypericum gramineum	0.1	1	FG					0.1				
Daucus spp.	0.1	1	FG					0.1				
Richardia humistrata	0.2	6	EX								0.2	
Conyza spp.	0.1	2	EX								0.1	
Glycine clandestina	0.1	3	OG							0.1		
Lobelia purpurascens	0.1	3	FG					0.1				
Eragrostis curvula	0.1	1	HT									0.1
Lomandra multiflora subsp. multiflora	2	20	GG				2					
Sphaeromorphaea australis	0.1	1	FG					0.1				
Senecio madagascariensis	0.1	1	HT									0.1
Stackhousia viminea	0.1	5	FG					0.1				
Digitaria diffusa	0.2	20	GG				0.2					
Sporobolus creber	0.2	15	GG				0.2					
Eragrostis elongata	0.1	10	GG				0.1					
Aristida vagans	0.3	30	GG				0.3					

Easting	327060
Northing	6377523
Orientation	330
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	8

A.1.1.6.4 TC27 – Mod-good

Date	26/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC27		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Mod-good	42	39	8	10	8	9	1	3	1	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	120.6	120.2	59.2	37.1	2.4	21	0.2	0.3	0.1	0.3
Corymbia maculata	15	12	TG		15							
Eucalyptus moluccana	35	9	TG		35							
Allocasuarina luehmannii	2	7	TG		2							
Eucalyptus crebra	1	3	TG		1							
Eucalyptus fibrosa	3	2	TG		3							
Melaleuca nodosa	16	32	SG			16						
Eucalyptus punctata	1	1	TG		1							
Olearia elliptica	3	80	SG			3						
Dodonaea viscosa	3	30	SG			3						
Breynia oblongifolia	0.1	1	SG			0.1						
Exocarpos strictus	12	40	SG			12						
Denhamia silvestris	2	16	SG			2						
Acacia amblygona	0.2	3	SG			0.2						
Acacia parramattensis	2	5	TG		2							
Acacia linearifolia	0.2	1	TG		0.2							
Callistemon linearis	0.5	1	SG			0.5						
Monotoca scoparia	0.2	6	SG			0.2						
Cymbopogon refractus	0.5	25	GG				0.5					
Lobelia purpurascens	0.2	10	FG					0.2				
Arthropodium milleflorum	0.1	1	FG					0.1				
Parsonsia straminea	0.1	2	OG							0.1		
Lepidosperma laterale	1	12	GG				1					
Dichondra sp. Inglewood	20	0.2	FG					20				
Grona varians	0.1	5	OG							0.1		
Goodenia rotundifolia	0.1	4	FG					0.1				
Lomandra multiflora subsp. multiflora	0.2	4	GG				0.2					
Plantago debilis	0.1	5	FG					0.1				
Cheilanthes sieberi	0.2	20	EG						0.2			
Eremophila debilis	0.1	1	SG			0.1						
Dianella revoluta	0.1	2	FG					0.1				
Senecio madagascariensis	0.1	2	HT									0.1
Aristida ramosa	0.1	8	GG				0.1					
Euphorbia drummondii	0.1	5	FG					0.1				
Rytidosperma fulvum	0.2	15	GG				0.2					
Entolasia stricta	0.2	16	GG				0.2					
Microlaena stipoides	0.1	5	GG				0.1					
Echinopogon ovatus	0.1	8	GG				0.1					
Brunoniella australis	0.2	10	FG					0.2				
Richardia humistrata	0.1	3	EX								0.1	
Ehrharta erecta	0.2	10	HT									0.2
Commelina cyanea	0.1	1	FG					0.1				
Cassytha glabella	0.1	1	OG							0.1		

Easting	326997
Northing	6377471
Orientation	315
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	11
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	10
BAM Attributes 1x1 plot (%)	76

A.1.1.6.5 TC28 – Easement

Date	27/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC28		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Easement	40	34	3	7	14	7	1	2	3	3
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	64.3	62.4	0.9	49.8	7.3	2.1	2	0.3	1.3	0.6
Eucalyptus moluccana	0.2	1	TG		0.2							
Eucalyptus crebra	0.3	2	TG		0.3							
Callistemon linearis	45	98	SG			45						
Grevillea montana	2	33	SG			2						
Breynia oblongifolia	2	24	SG			2						
Denhamia silvestris	0.2	5	SG			0.2						
Acacia parramattensis	0.4	8	TG		0.4							
Bursaria spinosa	0.2	5	SG			0.2						
Macrozamia communis	0.2	2	OG							0.2		
Monotoca scoparia	0.1	1	SG			0.1						
Dodonaea viscosa	0.3	7	SG			0.3						
Cymbopogon refractus	1	30	GG				1					
Gahnia aspera	1	20	GG				1					
Cheilanthes sieberi	2	200	EG						2			
Richardia humistrata	0.5	20	EX								0.5	
Senecio madagascariensis	0.2	15	HT									0.2
Verbena rigida var. rigida	0.5	30	EX								0.5	
Eragrostis elongata	0.2	8	GG				0.2					
Pomax umbellata	0.2	15	FG					0.2				
Lobelia purpurascens	0.3	30	FG					0.3				
Daucus spp.	0.1	10	FG					0.1				
Paspalum dilatatum	0.1	1	HT									0.1
Eragrostis brownii	0.1	12	GG				0.1					
Sphaeromorphaea australis	0.8	45	FG					0.8				
Aristida ramosa	0.1	8	GG				0.1					
Conyza spp.	0.1	3	GG				0.1					
Imperata cylindrica	2	35	GG				2					
Sigesbeckia orientalis subsp. orientalis	0.1	2	FG					0.1				
Cynodon dactylon	0.3	9	GG				0.3					
Eragrostis curvula	0.3	4	HT									0.3
Echinopogon ovatus	0.1	2	GG				0.1					
Glossocardia bidens	0.3	30	FG					0.3				
Laxmannia compacta	0.3	30	FG					0.3				
Aristida vagans	1	20	GG				1					
Bothriochloa macra	0.2	7	GG				0.2					
Sporobolus creber	0.1	4	GG				0.1					
Lomandra multiflora subsp. multiflora	1	23	GG				1					
Tragus australianus	0.1	3	GG				0.1					
Gamochaeta purpurea	0.3	22	EX								0.3	
Grona varians	0.1	1	OG							0.1		

Easting	325118
Northing	6379803
Orientation	315
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	5

A.1.1.6.6 TC29 – Mod-good

Date	27/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC29		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Mod-good	41	40	7	16	7	5	1	4	0	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	80.7	80.6	32	20.7	25.8	1.4	0.2	0.5	0	0.1
Corymbia maculata	15	14	TG		15							
Eucalyptus fibrosa	12	3	TG		12							
Eucalyptus crebra	4	3	TG		4							
Allocasuarina torulosa	0.2	1	TG		0.2							
Brachychiton populneus	0.1	1	TG		0.1							
Acacia parramattensis	0.3	2	TG		0.3							
Bursaria spinosa	1	5	SG			1						
Breynia oblongifolia	2	10	SG			2						
Dodonaea viscosa	2	32	SG			2						
Exocarpos strictus	2	38	SG			2						
Dillwynia retorta	0.3	5	SG			0.3						
Lissanthe strigosa	0.3	4	SG			0.3						
Notelaea longifolia	0.4	1	TG		0.4							
Pimelea linifolia	0.2	3	SG			0.2						
Olearia elliptica	6	41	SG			6						
Monotoca scoparia	0.6	8	SG			0.6						
Pultenaea spinosa	3	13	SG			3						
Macrozamia communis	0.2	2	OG							0.2		
Grevillea montana	0.5	5	SG			0.5						
Denhamia silvestris	0.3	7	SG			0.3						
Pultenaea euchila	2	30	SG			2						
Acacia amblygona	0.1	1	SG			0.1						
Melichrus urceolatus	0.2	2	SG			0.2						
Daviesia genistifolia	0.2	1	SG			0.2						
Goodenia paniculata	0.1	1	FG					0.1				
Lepidosperma laterale	15	65	GG				15					
Cassytha glabella	0.1	3	OG							0.1		
Poa sieberiana	6	12	GG				6					
Entolasia stricta	2	18	GG				2					
Lomandra multiflora subsp. multiflora	0.5	8	GG				0.5					
Sphaeromorphaea australis	1	30	FG					1				
Brunoniella australis	0.1	5	FG					0.1				
Vernonia cinerea	0.1	2	FG					0.1				
Aristida vagans	0.2	10	GG				0.2					
Senecio madagascariensis	0.1	1	HT									0.1
Gahnia aspera	2	10	GG				2					
Rytidosperma fulvum	0.1	4	GG				0.1					
Cheilanthes sieberi	0.2	20	EG						0.2			
Glycine clandestina	0.1	5	OG							0.1		
Clematis glycinoides	0.1	1	OG							0.1		
Pomax umbellata	0.1	6	FG					0.1				

Easting	325072
Northing	6379741
Orientation	308
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	4
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	13
BAM Attributes 1x1 plot (%)	66

A.1.1.6.7 TC30 – Easement

Date	27/03/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	TC30		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Easement	38	33	3	11	10	6	1	2	3	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	58.5	56.4	0.8	25.4	28	1.6	0.3	0.3	1.2	0.9
Corymbia maculata	0.1	1	TG		0.1							
Allocasuarina torulosa	0.5	4	TG		0.5							
Grevillea montana	9	35	SG			9						
Callistemon linearis	12	19	SG			12						
Macrozamia communis	0.2	1	OG							0.2		
Dodonaea viscosa	1.5	15	SG			1.5						
Denhamia silvestris	0.3	5	SG			0.3						
Acacia parramattensis	0.2	5	TG		0.2							
Acacia amblygona	0.2	2	SG			0.2						
Acacia falcata	0.8	4	SG			0.8						
Dillwynia retorta	0.4	4	SG			0.4						
Euryomyrtus ramosissima	0.4	3	SG			0.4						
Phyllanthus hirtellus	0.2	2	SG			0.2						
Lantana camara	0.1	1	HT									0.1
Lasiopetalum ferrugineum var. cordatum	0.5	12	SG			0.5						
Lepidosperma laterale	8	116	GG				8					
Cheilanthes sieberi	0.3	40	EG						0.3			
Senecio madagascariensis	0.8	40	HT									0.8
Gahnia aspera	14	119	GG				14					
Goodenia paniculata	0.6	40	FG					0.6				
Cymbopogon refractus	4	50	GG				4					
Eragrostis brownii	0.2	15	GG				0.2					
Cynodon dactylon	1	20	GG				1					
Gamochaeta purpurea	0.3	10	EX								0.3	
Richardia humistrata	0.8	30	EX								0.8	
Pomax umbellata	0.1	4	FG					0.1				
Aristida vagans	0.2	6	GG				0.2					
Glycine clandestina	0.1	1	OG							0.1		
Chloris ventricosa	0.1	2	GG				0.1					
Eragrostis leptostachya	0.2	10	GG				0.2					
Sphaeromorphaea australis	0.3	12	FG					0.3				
Euphorbia drummondii	0.2	6	FG					0.2				
Lobelia purpurascens	0.3	20	FG					0.3				
Conyza spp.	0.1	3	EX								0.1	
Eremophila debilis	0.1	1	SG			0.1						
Lomandra multiflora subsp. multiflora	0.2	3	GG				0.2					
Oxalis perennans	0.1	2	FG					0.1				
Entolasia stricta	0.1	1	GG				0.1					

Easting	326087
Northing	6378670
Orientation	315
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	3

A.1.1.6.8 TC31 – Mod-good

Plot Name	TC31		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3444	Mod-good	28	28	6	13	2	3	1	3	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	78.2	78.2	30.3	24.5	20	2.4	0.3	0.7	0	0
Corymbia maculata	10	17	TG		10							
Eucalyptus fibrosa	18	45	TG		18							
Callitris endlicheri	1	1	TG		1							
Allocasuarina torulosa	0.5	4	TG		0.5							
Eucalyptus punctata	0.5	1	TG		0.5							
Persoonia linearis	0.3	1	SG			0.3						
Olearia elliptica	2	34	SG			2						
Pultenaea spinosa	16	54	SG			16						
Lissanthe strigosa	2	12	SG			2						
Acacia amblygona	0.8	16	SG			0.8						
Phyllanthus hirtellus	0.3	8	SG			0.3						
Exocarpos strictus	2	14	SG			2						
Acacia parramattensis	0.3	3	TG		0.3							
Denhamia silvestris	0.2	6	SG			0.2						
Macrozamia communis	0.5	2	OG							0.5		
Acacia falcata	0.1	1	SG			0.1						
Macrozamia flexuosa	0.1	1	OG							0.1		
Grevillea montana	0.3	3	SG			0.3						
Ozothamnus diosmifolius	0.1	2	SG			0.1						
Dodonaea viscosa	0.1	2	SG			0.1						
Lepidosperma laterale	18	103	GG				18					
Cheilanthes sieberi	0.3	20	EG						0.3			
Dianella revoluta	2	35	FG					2				
Marsdenia spp.	0.1	3	OG							0.1		
Entolasia stricta	2	40	GG				2					
Phyllanthus spp.	0.3	10	SG			0.3						
Pomax umbellata	0.2	8	FG					0.2				
Sphaeromorphaea australis	0.2	8	FG					0.2				

Northing	6378626
Orientation	320
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	3
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	21
BAM Attributes 1x1 plot (%)	84

A.1.1.7 3636 – Warkworth Sands Woodland

A.1.1.7.1 HTP-MS-84 – Thinned

Date	12/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-84		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3636 - thinned		52	35	4	5	10	13	2	1	13	4
Paired With	HTP-MS-85		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	94.6	81.9	30	1.6	43.9	3.8	2.2	0.4	5.3	7.4
Eucalyptus crebra	25	40	TG		25							
Geijera salicifolia	3	10	TG		3							
Notelaea microcarpa	1	1	TG		1							
Allocasuarina luehmannii	1	3	TG		1							
Aristida ramosa	20	100	GG				20					
Opuntia aurantiaca	0.4	10	EX								0.4	
Opuntia stricta	1	10	EX								1	
Senecio madagascariensis	5	200	HT									5
Commelina cyanea	1	40	FG					1				
Lomandra multiflora subsp. multiflora	1	50	GG				1					
Cheilanthes sieberi	2	100	EG						2			
Carex inversa	1	100	GG				1					
Cheilanthes distans	0.2	20	EG						0.2			
Plantago lanceolata	0.4	20	EX								0.4	
Fimbristylis dichotoma	1	100	GG				1					
Eremophila debilis	0.8	10	SG			0.8						
Eragrostis curvula	1	10	HT									1
Conyza bonariensis	0.8	40	EX								0.8	
Enchylaena tomentosa	0.4	10	SG			0.4						
Cirsium vulgare	0.6	20	EX								0.6	
Brunoniella australis	0.2	10	FG					0.2				
Euchiton involucratus	1	50	FG					1				
Einadia nutans subsp. linifolia	0.4	20	FG					0.4				
Lycium ferocissimum	1	3	HT									1
Dianella revoluta	0.1	5	FG					0.1				
Hybanthus vernonii	0.2	10	FG					0.2				
Glycine tabacina	0.4	20	OG							0.4		
Einadia trigonos	0.2	10	FG					0.2				
Galenia pubescens	0.4	10	HT									0.4
Solanum cinereum	0.2	5	SG			0.2						
Gomphocarpus fruticosus	0.4	10	EX								0.4	
Verbena bonariensis	1	10	EX								1	

Easting	320350
Northing	6394591
Orientation	7
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	0
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	1
Length logs (m)	14
BAM Attributes 1x1 plot (%)	66

Cymbopogon refractus	5	50	GG				5								
Vittadinia cuneata	0.1	5	FG					0.1							
Sida corrugata	0.1	5	FG					0.1							
Juncus usitatus	0.1	1	GG				0.1								
Dichondra repens	0.2	10	FG					0.2							
Lepidium africanum	0.1	5	EX								0.1				
Dichondra sp. Inglewood	0.1	5	FG					0.1							
Cyclospermum leptophyllum	0.1	5	EX								0.1				
Stackhousia viminea	0.1	1	FG					0.1							
Lactuca saligna	0.1	1	EX								0.1				
Sida rhombifolia	0.1	2	EX								0.1				
Bidens subalternans	0.1	1	EX								0.1				
Microlaena stipoides var. stipoides	5	100	GG				5								
Phyllanthus virgatus	0.1	5	FG					0.1							
Myoporum montanum	0.1	1	SG			0.1									
Sporobolus creber	10	100	GG				10								
Acacia amblygona	0.1	1	SG			0.1									
Solanum nigrum	0.2	10	EX								0.2				
Austrostipa verticillata	0.4	5	GG				0.4								
Bothriochloa decipiens var. decipiens	0.4	10	GG				0.4								

A.1.1.7.2 HTP-MS-85 – Easement

Date	12/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-85		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3636 - easement		32	19	1	0	8	6	2	2	10	3
Paired With	HTP-MS-85		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	103.3	67.6	3	0	62.6	1	0.7	0.3	24.6	11.1
Eucalyptus crebra	3	20	TG		3							
Sporobolus creber	25	200	GG				25					
Cynodon dactylon	20	100	GG				20					
Aristida ramosa	15	100	GG				15					
Gamochaeta purpurea	5	100	EX								5	
Verbena bonariensis	15	100	EX								15	
Senecio madagascariensis	10	200	HT									10
Cyclospermum leptophyllum	0.4	40	EX								0.4	
Kickxia elatine	0.4	50	EX								0.4	
Plantago lanceolata	0.8	30	EX								0.8	
Paspalum dilatatum	1	20	HT									1
Centaurea solstitialis	0.4	20	EX								0.4	
Conyza bonariensis	1	50	EX								1	
Chrysocephalum semipapposum	0.1	5	FG					0.1				
Wahlenbergia gracilis	0.2	20	FG					0.2				
Carex inversa	0.4	20	GG				0.4					
Cheilanthes sieberi	0.6	40	EG						0.6			
Glycine tabacina	0.2	10	OG							0.2		
Sida rhombifolia	1	20	EX								1	
Cheilanthes distans	0.1	5	EG						0.1			
Richardia humistrata	0.4	10	EX								0.4	
Einadia nutans subsp. linifolia	0.4	20	FG					0.4				
Romulea rosea var. australis	0.1	5	HT									0.1
Eragrostis leptostachya	1	50	GG				1					
Fimbristylis dichotoma	0.1	10	GG				0.1					
Lomandra multiflora subsp. multiflora	0.1	5	GG				0.1					
Phyllanthus virgatus	0.1	10	FG					0.1				
Opuntia aurantiaca	0.2	4	EX								0.2	
Stackhousia viminea	0.1	5	FG					0.1				
Glycine clandestina	0.1	5	OG							0.1		
Bothriochloa decipiens var. decipiens	1	40	GG				1					
Oxalis perennans	0.1	3	FG					0.1				

Easting	320436
Northing	6394552
Orientation	171
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	3.4

A.1.1.7.3 HTP-TB-01 – Thinned

Date	1/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-TB-01		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3636		35	27	4	2	12	5	2	2	4	4	
Paired With	HTP-MS-86		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	73.4	72.2	24.2	0.2	46.5	0.5	0.6	0.2	0.4	0.8	
Eucalyptus crebra	20	40	TG		20								
Angophora floribunda	4	8	TG		4								
Allocasuarina luehmannii	0.1	1	TG		0.1								
Cassinia sifton	0.1	1	SG			0.1							
Brachychiton populneus subsp. populneus	0.1	1	TG		0.1								
Lantana camara	0.1	1	HT									0.1	
Cymbopogon refractus	20	500	GG				20						
Eragrostis leptostachya	3	100	GG				3						
Glycine clandestina	0.1	3	OG							0.1			
Aristida ramosa	4	100	GG				4						
Calotis lappulacea	0.1	1	FG					0.1					
Sporobolus creber	5	100	GG				5						
Laxmannia gracilis	0.1	3	FG					0.1					
Cheilanthes sieberi	0.5	100	EG						0.5				
Plantago lanceolata	0.1	1	EX								0.1		
Olea europaea subsp. cuspidata	0.2	10	HT									0.2	
Paspalidium spp.	0.2	30	GG				0.2						
Eragrostis brownii	0.2	30	GG				0.2						
Leiocarpa panaetioides	0.1	1	FG					0.1					
Aristida vagans	3	50	GG				3						
Sida rhombifolia	0.1	1	EX								0.1		
Cynodon dactylon	2	50	GG				2						
Microlaena stipoides var. stipoides	6	200	GG				6						
Cheilanthes distans	0.1	30	EG						0.1				
Richardia humistrata	0.1	5	EX								0.1		
Rytidosperma spp.	1	30	GG				1						
Austrostipa verticillata	2	20	GG				2						
Commelina cyanea	0.1	1	FG					0.1					
Opuntia aurantiaca	0.1	2	EX								0.1		
Galenia pubescens	0.3	20	HT									0.3	
Einadia hastata	0.1	2	FG					0.1					
Glycine tabacina	0.1	3	OG							0.1			
Breynia oblongifolia	0.1	1	SG			0.1							
Lomandra confertifolia	0.1	1	GG				0.1						
Senecio madagascariensis	0.2	30	HT									0.2	

Easting	318739
Northing	6395768
Orientation	337
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	2
50-79	0
30-49	0
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	3
Length logs (m)	37
BAM Attributes 1x1 plot (%)	28
Litter (%)	

A.1.1.7.4 HTP-MS-86 – Easement

Date	12/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-86		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3636 - easement		31	18	1	0	11	5	1	0	11	2
Paired With	HTP-TB-01		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	95.5	77.3	0.2	0	70.7	1.4	5	0	9.2	9
Sporobolus creber	15	100	GG				15					
Eragrostis brownii	3	50	GG				3					
Bothriochloa decipiens var. decipiens	5	100	GG				5					
Cynodon dactylon	40	200	GG				40					
Setaria parviflora	2	50	EX								2	
Cheilanthes sieberi	5	100	EG						5			
Senecio madagascariensis	8	200	HT									8
Hypochaeris radicata	2	100	EX								2	
Heliotropium amplexicaule	1	40	HT									1
Phyllanthus virgatus	0.4	20	FG					0.4				
Cymbopogon refractus	2	50	GG				2					
Chrysocephalum semipapposum	0.4	20	FG					0.4				
Cyperus brevifolius	0.4	20	EX								0.4	
Gamochaeta purpurea	2	100	EX								2	
Geranium homeanum	0.4	20	FG					0.4				
Cyclospermum leptophyllum	0.8	40	EX								0.8	
Fimbristylis dichotoma	0.8	50	GG				0.8					
Opuntia aurantiaca	0.1	1	EX								0.1	
Sida rhombifolia	0.4	10	EX								0.4	
Opuntia stricta	0.1	1	EX								0.1	
Angophora floribunda	0.2	1	TG		0.2							
Melinis repens	0.4	10	EX								0.4	
Panicum effusum	0.8	10	GG				0.8					
Eragrostis leptostachya	2	50	GG				2					
Aristida vagans	1	30	GG				1					
Richardia humistrata	0.2	20	EX								0.2	
Digitaria divaricatissima	1	10	GG				1					
Conyza bonariensis	0.8	20	EX								0.8	
Juncus usitatus	0.1	1	GG				0.1					
Oxalis perennans	0.1	5	FG					0.1				
Wahlenbergia gracilis	0.1	1	FG					0.1				

Easting	318639
Northing	6395741
Orientation	339
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	N
<5	Y
Regen	Y
Hollows	0
Length logs (m)	0

BAM Attributes 1x1 plot (%)	2.2

A.1.1.7.5 HTP-TB-02 – Thinned

Date	1/11/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	56
Plot Name	HTP-TB-02		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
PCT	3636		48	40	4	6	13	14	1	2	6	2	
Paired With	HTP-MS-87		Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
Species	Cover	Abundance	72.5	71.7	31.1	5.7	32.9	1.5	0.3	0.2	0.6	0.2	
Eucalyptus crebra	22	20	TG		22								
Angophora floribunda	3	4	TG		3								
Allocasuarina luehmannii	6	30	TG		6								
Acacia falcata	2	20	SG			2							
Acacia amblygona	0.5	4	SG			0.5							
Breynia oblongifolia	2	8	SG			2							
Cymbopogon refractus	10	300	GG				10						
Hibbertia linearis	0.1	5	SG			0.1							
Brunoniella australis	0.1	5	FG					0.1					
Aristida ramosa	4	100	GG				4						
Senecio madagascariensis	0.1	20	HT									0.1	
Dianella longifolia	0.1	1	FG					0.1					
Aristida calycina var. calycina	1	40	GG				1						
Opuntia aurantiaca	0.1	10	EX								0.1		
Vernonia cinerea var. cinerea	0.1	2	FG					0.1					
Lomandra confertifolia	0.1	5	GG				0.1						
Lomandra multiflora subsp. multiflora	0.2	10	GG				0.2						
Glycine tabacina	0.1	10	OG							0.1			
Goodenia rotundifolia	0.1	8	FG					0.1					
Cheilanthes sieberi subsp. sieberi	0.3	100	EG						0.3				
Olea europaea subsp. cuspidata	0.1	2	HT									0.1	
Plantago lanceolata	0.1	4	EX								0.1		
Eragrostis brownii	1	50	GG				1						
Rytidosperma spp.	4	100	GG				4						
Veronica plebeia	0.2	30	FG					0.2					
Euchiton sphaericus	0.1	2	FG					0.1					
Calotis lappulacea	0.1	10	FG					0.1					
Richardia humistrata	0.1	5	EX								0.1		
Eragrostis leptostachya	4	100	GG				4						
Conyza bonariensis	0.1	1	EX								0.1		
Notelaea microcarpa	0.1	1	TG		0.1								
Opercularia diphylla	0.1	3	FG					0.1					
Verbascum virgatum	0.1	1	EX								0.1		
Austrostipa scabra	2	50	GG				2						
Dichondra sp. Inglewood	0.1	5	FG					0.1					
Lomandra glauca	0.1	4	GG				0.1						
Digitaria diffusa	0.5	30	GG				0.5						
Echinopogon caespitosus	5	100	GG				5						
Aristida vagans	1	40	GG				1						
Einadia nutans	0.1	6	FG					0.1					
Stackhousia muricata	0.1	2	FG					0.1					
Solanum cinereum	0.1	1	SG			0.1							
Goodenia heterophylla subsp. heterophylla	0.1	4	FG					0.1					
Glycine clandestina	0.1	2	OG							0.1			
Hibbertia diffusa	1	30	SG			1							
Dianella revoluta var. revoluta	0.1	1	FG					0.1					
Opuntia stricta var. stricta	0.1	2	EX								0.1		
Oxalis perennans	0.1	1	FG					0.1					

Easting	318924
Northing	6395241
Orientation	9
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	1
30-49	2
20-29	Y
10-19	Y
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	47

BAM Attributes 1x1 plot (%)	61
Litter (%)	

A.1.1.7.6 HTP-MS-87 – Easement

Date	12/02/2025		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	HTP-MS-87		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	3636 - easement		32	20	3	2	11	3	1	0	10	2
Paired With			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	81.8	75.9	3	5.4	64.3	2.2	1	0	4.5	1.4
Angophora floribunda	1	1	TG		1							
Eucalyptus crebra	1	5	TG		1							
Allocasuarina luehmannii	1	10	TG		1							
Acacia amblygona	5	40	SG			5						
Acacia falcata	0.4	3	SG			0.4						
Aristida vagans	20	200	GG				20					
Cymbopogon refractus	10	100	GG				10					
Sporobolus creber	15	200	GG				15					
Eragrostis leptostachya	5	100	GG				5					
Bothriochloa decipiens var. decipiens	1	30	GG				1					
Cynodon dactylon	10	100	GG				10					
Axonopus compressus	0.4	5	EX								0.4	
Fimbristylis dichotoma	0.8	50	GG				0.8					
Chrysocephalum semipapposum	2	100	FG					2				
Melinis repens	1	20	EX								1	
Cheilanthes sieberi	1	50	EG						1			
Senecio madagascariensis	1	40	HT									1
Conyza bonariensis	0.4	20	EX								0.4	
Dichelachne micrantha	0.4	10	GG				0.4					
Aristida ramosa	1	40	GG				1					
Cyperus brevifolius	0.4	30	EX								0.4	
Richardia humistrata	0.2	10	EX								0.2	
Setaria parviflora	0.4	10	EX								0.4	
Hypochaeris radicata	0.8	30	EX								0.8	
Gamochaeta purpurea	0.6	20	EX								0.6	
Eragrostis curvula	0.4	2	HT									0.4
Oxalis perennans	0.1	5	FG					0.1				
Gomphrena celosioides	0.1	5	EX								0.1	
Cyclospermum leptophyllum	0.2	20	EX								0.2	
Zornia dyctiocarpa var. dyctiocarpa	0.1	5	FG					0.1				
Carex inversa	0.1	1	GG				0.1					
Digitaria divaricatissima	1	20	GG				1					

Easting	318849
Northing	6395126
Orientation	165
Plot size	20 X 20 X 50
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	N
10-19	N
5-9	Y
<5	Y
Regen	Y
Hollows	0
Length logs (m)	3
BAM Attributes 1x1 plot (%)	4.6

PEC			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 80	Veg Zone ID: remnant		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 17/01/23			32	21	2	2	10	7	0	0	11	2
Species	**Cover**	**Abundance**	**Sum cover**	**Sum**	Sum	Sum	Sum	Sum	Sum	Sum	**Sum**	Sum
			71.2	**60.3**	8	6	31.8	14.5	0	0	**10.9**	2
Alternanthera denticulata	0.5	100	FG					0.5				
Atriplex semibaccata	1	10	SG			1						
Austrostipa scabra subsp. falcata	2	200	GG				2					
Avena sp.	1	20	EX								1	
Boerhavia coccinea	2	100	FG					2				
Carex inversa	2	50	GG				2					
Chloris truncata	0.8	20	GG				0.8					
Cirsium vulgare	0.3	5	EX								0.3	
Conyza sp.	0.3	20	EX								0.3	
Dianella revoluta	0.9	10	FG					0.9				
Digitaria divaricatissima	1	20	GG				1					
Ehrharta calycina	1	100	HT									1
Einadia nutans	5	20	FG					5				
Eleocharis sp.	1	100	GG				1					
Elymus scaber	1	20	GG				1					
Enchylaena tomentosa	5	20	SG			5						
Enteropogon sp.	10	100	GG				10					
Eriochloa pseudoacrotricha	5	200	GG				5					
Eucalyptus blakelyi	1	1	TG		1							
Eucalyptus microcarpa	7	2	TG		7							
Juncus sp.	1	20	GG				1					
Lactuca serriola	2	100	EX								2	
Lepidium africanum	2	50	EX								2	
Marrubium vulgare	1	1	EX								1	
Paspalum dilatatum	1	10	HT									1
Rumex crispus	1	20	EX								1	
Rytidosperma caespitosum	8	200	GG				8					
Sida corrugata	2	100	FG					2				
Solanum esuriale	4	100	FG					4				
Trifolium arvense	1	20	EX								1	
Trifolium campestre	0.3	20	EX								0.3	
Vittadinia sp.	0.1	10	FG					0.1				

Easting	448089
Northing	6143266
Orientation	207
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	1
20-29	Y
10-19	Y
5-9	Y
<5	N
Hollows	0
Length logs (m)	1
Attributes 1x1 plot (%)	
Litter (%)	49
	36.75

PEC			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 80	0		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 17/01/23			32	17	1	0	8	7	0	1	15	3
Species	**Cover**	**Abundance**	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
			60.9	38.3	2	0	27.1	9.1	0	0.1	22.6	15.1
Alternanthera denticulata	2	500	FG					2				
Avena sp.	2	50	EX								2	
Boerhavia coccinea	0.8	30	FG					0.8				
Carex inversa	3	100	GG				3					
Chloris truncata	0.1	10	GG				0.1					
Cirsium vulgare	1	20	EX								1	
Convolvulus sp.	0.1	10	OG							0.1		
Dianella revoluta	1	10	FG					1				
Echium plantagineum	0.1	20	EX								0.1	
Ehrharta calycina	5	500	HT									5
Einadia nutans	1	10	FG					1				
Eleocharis sp.	2	200	GG				2					
Elymus scaber	1	20	GG				1					
Enteropogon sp.	6	200	GG				6					
Eucalyptus microcarpa	2	11	TG		2							
Euphorbia drummondii	0.1	10	FG					0.1				
Hypericum perforatum	0.1	10	HT									0.1
Juncus sp.	3	100	GG				3					
Lactuca serriola	0.8	20	EX								0.8	
Modiola caroliniana	1	200	EX								1	
Panicum decompositum	7	100	GG				7					
Paspalum dilatatum	10	100	HT									10
Rumex crispus	1	20	EX								1	
Rytidosperma penicillatum	5	100	GG				5					
Sida corrugata	0.2	10	FG					0.2				
Solanum esuriale	4	100	FG					4				
Solanum nigrum	0.1	10	EX								0.1	
Sonchus oleraceus	0.1	10	EX								0.1	
Trifolium arvense	0.1	10	EX								0.1	
Trifolium campestre	0.1	10	EX								0.1	
Verbascum thapsus	1	10	EX								1	
Zinnia peruviana	0.2	10	EX								0.2	

Easting	448119
Northing	6143283
Orientation	332
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	N
20-29	N
10-19	N
5-9	Y
<5	Y
Hollows	0
Length logs (m)	0
Attributes 1x1 plot (%)	
Litter (%)	60

PEC			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 76	Veg Zone ID: remnant		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 21/01/23			29	19	1	2	9	6	1	0	10	1
Species	**Cover**	**Abundance**	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
			87.7	85.5	15	5.8	57.6	7	0.1	0	2.2	0.3
Atriplex semibaccata	5	20	SG			5						
Austrostipa bigeniculata	40	200	GG				40					
Austrostipa elegantissima	0.8	20	GG				0.8					
Austrostipa scabra subsp. Falcata	5	20	GG				5					
Avena sp.	0.1	1	EX								0.1	
Bromus catharticus	0.1	10	EX								0.1	
Calotis cuneifolia	5	100	FG					5				
Centaurea solstitialis	0.8	10	EX								0.8	
Cheilanthes sieberi	0.1	1	EG						0.1			
Chloris truncata	0.1	10	GG				0.1					
Conyza sp.	0.1	1	EX								0.1	
Einadia nutans	0.4	2	FG					0.4				
Elymus scaber	0.1	5	GG				0.1					
Enteropogon acicularis	0.8	10	GG				0.8					
Eucalyptus microcarpa	15	3	TG		15							
Hypericum perforatum	0.3	2	HT									0.3
Lactuca serriola	0.1	1	EX								0.1	
Lomandra multiflora	0.8	5	GG				0.8					
Maireana enchylaenoides	0.1	1	FG					0.1				
Oxalis perennans	0.1	10	FG					0.1				
Plantago lanceolata	0.1	1	EX								0.1	
Romulea sp.	0.1	20	EX								0.1	
Rytidosperma laeve	6	200	GG				6					
Rytidosperma setaceum	4	100	GG				4					
Sclerolaena muricata var. semiglabra	0.8	1	SG			0.8						
Sida corrugata	1	20	FG					1				
Sonchus oleraceus	0.1	1	EX								0.1	
Trifolium striatum	0.4	20	EX								0.4	
Vittadinia cuneata var. hirsuta	0.4	10	FG					0.4				

Easting	
Northing	6106914
Orientation	250
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	3
50-79	1
30-49	N
20-29	Y
10-19	N
5-9	N
<5	N
Hollows	2
Length logs (m)	2
	1.5
Attributes 1x1 plot (%)	
Litter (%)	63
	47.25

			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 76	Veg Zone ID: DNG		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 21/01/23			27	16	0	2	11	3	0	0	11	1
Species	**Cover**	**Abundance**	**Sum cover**	**Sum**	Sum	Sum	Sum	Sum	Sum	Sum	**Sum**	Sum
			81.2	**75.5**	0	11	60.1	4.4	0	0	**5.7**	3
Atriplex semibaccata	10	100	SG			10						
Austrostipa bigeniculata	20	100	GG				20					
Austrostipa scabra subsp. Falcata	15	200	GG				15					
Avena sp.	0.4	30	EX								0.4	
Centaurea solstitialis	0.4	20	EX								0.4	
Centaurea solstitialis (branched thing with semi clasp)	0.1	1	ex								0.1	
Chloris truncata	10	200	GG				10					
Conyza sp.	0.1	20	EX								0.1	
Cyperus eragrostis	3	30	HT									3
Eleocharis sp.	3	100	GG				3					
Enteropogon acicularis	1	50	GG				1					
Eriochloa pseudoacrotricha	4	200	GG				4					
Hordeum sp.	0.4	20	EX								0.4	
Juncus usitatus	2	100	GG				2					
Cenchrus clandestinus	0.3	20	EX								0.3	
Linum marginale	0.3	100	FG					0.3				
Oxalis perennans	0.1	20	FG					0.1				
Panicum effusum	0.1	10	GG				0.1					
Rumex crispus	0.1	1	EX								0.1	
Rytidosperma caespitosum	3	100	GG				3					
Rytidosperma penicillatum	1	20	GG				1					
Rytidosperma setaceum	1	20	GG				1					
Sclerolaena muricata var. semiglabra	1	3	SG			1						
Sida corrugata	4	200	FG					4				
Sonchus oleraceus	0.1	1	EX								0.1	
Trifolium striatum	0.1	20	EX								0.1	
Vulpia myuros	0.7	100	EX								0.7	

Easting	521371
Northing	6106936
Orientation	80
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	N
20-29	N
10-19	N
5-9	N
<5	N
Hollows	0
Length logs (m)	12
Attributes 1x1 plot (%)	
Litter (%)	34

PEC			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 266	Veg Zone ID: remnant		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 21/01/23			33	23	3	0	9	8	1	2	10	1
Species	**Cover**	**Abundance**	**Sum cover**	**Sum**	Sum	Sum	Sum	Sum	Sum	Sum	**Sum**	Sum
			113.1	**97**	55	0	28.3	12.5	1	0.2	**16.1**	15
Acacia pycnantha	10	30	TG		10							
Arthropodium sp.	0.1	10	FG					0.1				
Austrostipa bigeniculata	5	200	GG				5					
Austrostipa elegantissima	0.1	1	GG				0.1					
Austrostipa scabra subsp. falcata	15	400	GG				15					
Brachychiton populneus	10	30	TG		10							
Briza maxima	0.1	10	EX								0.1	
Bromus catharticus	0.3	10	EX								0.3	
Cheilanthes sieberi	1	100	EG						1			
Cirsium vulgare	0.1	1	EX								0.1	
Conyza sp.	0.1	1	EX								0.1	
Desmodium sp.	0.1	10	OG							0.1		
Dianella revoluta	0.8	10	FG					0.8				
Dichelachne crinita	2	50	GG				2					
Einadia nutans	0.3	20	FG					0.3				
Elymus scaber	0.3	20	GG				0.3					
Eucalyptus albens	35	20	TG		35							
Glycine tabacina	0.1	10	OG							0.1		
Gonocarpus elatus	0.1	10	FG					0.1				
Hypericum perforatum	15	300	HT									15
Hypochaeris radicata	0.1	1	EX								0.1	
Lomandra filiformis subsp. Filiformis	0.1	1	GG				0.1					
Marrubium vulgare	0.1	1	EX								0.1	
Oxalis perennans	0.1	10	FG					0.1				
Petrorhagia nanteuilii	0.1	10	EX								0.1	
Rytidosperma bipartitum	0.5	20	GG				0.5					
Rytidosperma caespitosum	5	200	GG				5					
Sida corrugata	1	100	FG					1				
Sonchus oleraceus	0.1	5	EX								0.1	
Sporobolus creber	0.3	5	GG				0.3					
Trifolium arvense	0.1	10	EX								0.1	
Vittadinia cuneata var. hirsuta	0.1	10	FG					0.1				
Xerochrysum viscosum	10	300	FG					10				

Easting	528367
Northing	6111268
Orientation	20
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	2
50-79	3
30-49	Y
20-29	Y
10-19	Y
5-9	Y
<5	Y
Hollows	5
Length logs (m)	53
	39.75
Attributes 1x1 plot (%)	
Litter (%)	74
	55.5

PEC			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 266	Veg Zone ID: DNG		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 21/01/23			32	24	3	2	8	10	1	0	8	1
Species	**Cover**	**Abundance**	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
			112	95.7	4.3	3	47	39.4	2	0	16.3	15
Acacia baileyana	1	4	SG			1						
Acacia pycnantha	0.5	1	TG		0.5							
Acacia spectabilis	2	2	SG			2						
Aristida ramosa	35	200	GG				35					
Austrostipa bigeniculata	0.8	10	GG				0.8					
Austrostipa scabra subsp. falcata	3	100	GG				3					
Avena sp.	0.1	10	EX								0.1	
Briza maxima	0.7	20	EX								0.7	
Briza minor	0.1	10	EX								0.1	
Callitris glaucophylla	0.8	1	TG		0.8							
Calotis cuneata	1	50	FG					1				
Calotis lappulacea	0.1	1	FG					0.1				
Centaurium tenuiflorum	0.1	1	EX								0.1	
Cheilanthes sieberi	2	100	EG						2			
Chrysocephalum apiculatum	1	20	FG					1				
Conyza sp.	0.1	10	EX								0.1	
Dianella longifolia	0.5	2	FG					0.5				
Dianella revoluta	1	20	FG					1				
Dichelachne crinita	5	200	GG				5					
Digitaria divaricatissima	0.1	5	GG				0.1					
Elymus scaber	0.3	20	GG				0.3					
Eucalyptus albens	3		TG		3							
Euchiton sphaericus	0.1	5	FG					0.1				
Gonocarpus elatus	0.5	50	FG					0.5				
Hypericum perforatum	15	200	HT									15
Lomandra filiformis subsp. filiformis	0.8	20	GG				0.8					
Microtis sp.	0.1	10	FG					0.1				
Romulea sp.	0.1	20	EX								0.1	
Rytidosperma caespitosum	2	100	GG				2					
Sonchus oleraceus	0.1	10	EX								0.1	
Tricoryne elatior	0.1	20	FG					0.1				
Xerochrysum viscosum	35	500	FG					35				

Easting	528357
Northing	611122
Orientation	265
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	N
20-29	N
10-19	N
5-9	N
<5	Y
Hollows	0
Length logs (m)	10
Attributes 1x1 plot (%)	
Litter (%)	54

Date	5/2/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_636		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	281		34	25	4	1	14	5	1	0	7	2
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	94.7	92.1	10.3	4	77.2	0.5	0.1	0	2.4	0.2
Angophora floribunda	8	2	TG		8							
Callitris endlicheri	2	1	TG		2							
Cassinia sifton	4	20	SG			4						
Themeda triandra	0.5	10	GG				0.5					
Calotis lappulacea	0.1	5	FG					0.1				
Petrorhagia nanteuilii	0.1	5	EX								0.1	
Hypochaeris radicata	1	40	EX								1	
Wahlenbergia spp.	0.1	10	FG					0.1				
Sporobolus creber	20	200	GG				20					
Lomandra longifolia	1	5	GG				1					
Conyza bonariensis	0.1	5	EX								0.1	
Plantago lanceolata	0.5	20	EX								0.5	
Microlaena stipoides	5	100	GG				5					
Echinopogon caespitosus	0.1	10	GG				0.1					
Gahnia aspera	3	5	GG				3					
Casuarina cunninghamiana sul	0.2	3	TG		0.2							
Paspalum dilatatum	0.1	5	HT									0.1
Podolepis omissa	0.1	5	FG					0.1				
Aristida ramosa	20	200	GG				20					
Bothriochloa macra	0.1	5	GG				0.1					
Verbena bonariensis	0.1	10	EX								0.1	
Panicum effusum	0.2	10	GG				0.2					
Cheilanthes sieberi	0.1	10	EG						0.1			
Setaria parviflora	0.5	20	EX								0.5	
Austrostipa scabra	20	200	GG				20					
Dichelachne micrantha	2	30	GG				2					
Fimbristylis dichotoma	0.1	20	GG				0.1					
Hypericum perforatum	0.1	10	HT									0.1
Aristida vagans	5	50	GG				5					
Eragrostis leptostachya	0.2	20	GG				0.2					
Veronica plebeia	0.1	5	FG					0.1				
Laxmannia gracilis	0.1	5	FG					0.1				
Trifolium arvense	0.1	5	EX								0.1	
Eucalyptus blakelyi	0.1	1	TG		0.1							

Easting	767801
Northing	6422810
Orientation	300
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	1
50-79	2
30-49	4
20-29	yes
10-19	yes
5-9	no
<5	yes
Hollows	0
Length logs (m)	8
Attributes 1x1 plo	32
Litter (%)	45
	15
	40
	55
	5

Date	5/2/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_637		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	281 DNG		30	25	1	3	15	5	1	0	4	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	71.8	65.4	1	6	57.7	0.5	0.2	0	6.2	0.2
Sporobolus creber	30	300	GG				30					
Hypochaeris radicata	5	200	EX								5	
Melaleuca spp.	1	5	SG			1						
Austrostipa scabra	1	20	GG				1					
Eragrostis elongata	3	200	GG				3					
Fimbristylis dichotoma	0.1	10	GG				0.1					
Cheilanthes sieberi	0.2	50	EG						0.2			
Microtis spp.	0.1	5	FG					0.1				
Digitaria ramularis	1	100	GG				1					
Setaria parviflora	1	20	EX								1	
Aristida ramosa	20	100	GG				20					
Arundinella nepalensis	0.2	2	GG				0.2					
Cassinia sifton	1	5	SG			1						
Plantago lanceolata	0.1	10	EX								0.1	
Panicum effusum	0.1	10	GG				0.1					
Kunzea parvifolia	4	10	SG			4						
Themeda triandra	0.5	10	GG				0.5					
Chrysocephalum apicu	0.1	10	FG					0.1				
Angophora floribunda	1	5	TG		1							
Gahnia aspera	1	2	GG				1					
Calotis cuneifolia	0.1	10	FG					0.1				
Verbena bonariensis	0.1	20	EX								0.1	
Lomandra multiflora s	0.1	1	GG				0.1					
Paspalum dilatatum	0.2	5	HT									0.2
Stackhousia viminea	0.1	5	FG					0.1				
Laxmannia gracilis	0.1	5	FG					0.1				
Juncus flavidus	0.1	5	GG				0.1					
Carex appressa	0.2	5	GG				0.2					
Aristida vagans	0.2	10	GG				0.2					
Lomandra filiformis su	0.2	1	GG				0.2					

Easting	767733
Northing	6422767
Orientation	140
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	no
<5	yes
Hollows	0
Length logs (m)	0
Attributes 1x1 plo	9
Litter (%)	5
	10
	5
	15
	10

CWO			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	55	Easting	756385
PCT 461	Veg Zone ID: remnant		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count		Northing	6425691
Date: 29/03/23			41	38	5	9	9	13	1	1	3	0		Orientation	315
Species	Cover	Abundance	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum		Plot size	20 X 20 X 50
			68.3	68	18	15.9	15.6	17.8	0.5	0.2	0.3	0		Attributes 20x50m plot	
Angophora floribunda	10	5	TG		10									Stem classes	
Callitris endlicheri	5	20	TG		5									80+	1
Allocasuarina verticillata	2	10	TG		2									50-79	0
Exocarpos strictus	0.5	5	SG			0.5								30-49	Yes
Cassinia sifton	10	20	SG			10								20-29	Yes
Gonocarpus elatus	15	200	FG					15						10-19	Yes
Cheilanthes sieberi	0.5	100	EG						0.5					5-9	No
Austrostipa scabra	5	200	GG				5							<5	Yes
Hypericum gramineum	0.5	20	FG					0.5						Hollows	0
Hibbertia obtusifolia	0.1	5	SG			0.1								Length logs (m)	23
Dichondra repens	0.1	20	FG					0.1							17.25
Persoonia linearis	2	10	SG			2								Attributes 1x1 plo	\
Dichelachne crinita	3	50	GG				3							Litter (%)	39
Melichrus urceolatus	1	10	SG			1									29.25
Rytidosperma caespitosum	0.8	20	GG				0.8								
Fimbristylis dichotoma	0.1	20	GG				0.1								
Aristida ramosa	5	100	GG				5								
Cymbopogon refractus	1	10	GG				1								
Astroloma humifusum	1	20	SG			1									
Solanum sp.	0.2	5	FG					0.2							
Panicum effusum	0.5	10	GG				0.5								
Eragrostis brownii	0.1	5	GG				0.1								
Euphorbia drummondii	0.1	5	FG					0.1							
Vittadinia cuneata	0.2	20	FG					0.2							
Grevillea triternata	0.1	5	SG			0.1									
Dianella caerulea	0.1	5	FG					0.1							
Acacia linearifolia	0.2	1	TG		0.2										
Goodenia hederacea	0.2	30	FG					0.2							
Styphelia triflora	1	20	SG			1									
Stypandra glauca	0.8	20	FG					0.8							
Eucalyptus dealbata	0.8	5	TG		0.8										
Podolepis omissa	0.1	5	FG					0.1							
Conyza sp.	0.1	5	EX								0.1				
Xerochrysum viscosum	0.1	5	FG					0.1							
Verbascum thapsus	0.1	1	EX								0.1				
Opuntia stricta	0.1	1	EX								0.1				
Hardenbergia violacea	0.2	1	OG							0.2					
Pomax umbellata	0.3	50	FG					0.3							
Lomandra filiformis subsp. filiformis	0.1	5	GG				0.1								
Cassinia quinquefaria	0.2	5	SG			0.2									
Dichondra sp. Inglewood	0.1	20	FG					0.1							

CWO			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
PCT 461	Veg Zone ID: DNG		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 29/03/23			46	41	4	11	12	11	1	2	5	0
Species	**Cover**	**Abundance**	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
			67.5	66.3	2.6	27.4	24	11.8	0.1	0.4	1.2	0
Persoonia linearis	2	10	SG			2						
Angophora floribunda	1	5	TG		1							
Callitris endlicheri	1	5	TG		1							
Cassinia sifton	20	100	SG			20						
Xerochrysum viscosum	10	100	FG					10				
Gonocarpus elatus	0.8	50	FG					0.8				
Cymbopogon refractus	5	50	GG				5					
Cheilanthes sieberi	0.1	20	EG						0.1			
Goodenia hederacea	0.1	20	FG					0.1				
Centaurium tenuiflorum	0.1	5	EX								0.1	
Austrostipa scabra	5	50	GG				5					
Digitaria ramularis	0.8	20	GG				0.8					
Astroloma humifusum	1	10	SG			1						
Dichondra repens	0.1	20	FG					0.1				
Melichrus urceolatus	0.8	10	SG			0.8						
Panicum effusum	0.1	10	GG				0.1					
Echinopogon caespitosus	1	20	GG				1					
Hypericum hypericoides	0.5	20	EX								0.5	
Acacia linearifolia	0.2	1	TG		0.2							
Hibbertia obtusifolia	0.2	20	SG			0.2						
Tricoryne elatior	0.1	10	FG					0.1				
Entolasia stricta	0.1	10	GG				0.1					
Vittadinia cuneata	0.1	10	FG					0.1				
Styphelia triflora	1	10	SG			1						
Exocarpos strictus	1	20	SG			1						
Aristida ramosa	10	100	GG				10					
Grevillea triternata	0.1	1	SG			0.1						
Bidens subalternans	0.1	10	EX								0.1	
Rytidosperma caespitosum	0.2	20	GG				0.2					
Austrostipa densiflora	1	20	GG				1					
Fimbristylis dichotoma	0.1	20	GG				0.1					
Themeda triandra	0.5	5	GG				0.5					
Pomax umbellata	0.1	10	FG					0.1				
Acacia penninervis	0.2	1	SG			0.2						
Allocasuarina verticillata	0.4	5	TG		0.4							
Calotis lappulacea	0.2	5	FG					0.2				
Cassinia laevis	0.6	3	SG			0.6						
Lomandra longifolia	0.2	1	GG				0.2					
Verbascum thapsus	0.1	1	EX								0.1	
Hardenbergia violacea	0.3	1	OG							0.3		
Solanum sp.	0.1	5	FG					0.1				
Wahlenbergia sp.	0.1	10	FG					0.1				
Podolepis omissa	0.1	10	FG					0.1				
Glycine clandestina	0.1	5	OG							0.1		
Opuntia stricta	0.4	1	EX								0.4	
Acacia implexa	0.5	3	SG			0.5						

55

Easting	756446
Northing	6425717
Orientation	305
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	No
20-29	No
10-19	No
5-9	No
<5	Yes
Hollows	0
Length logs (m)	125
Attributes 1x1 plot (%)	
Litter (%)	25

Date	5/1/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_628		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	618		30	21	1	2	9	8	0	1	8	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	71.9	70.1	10	1.1	55.2	3.7	0	0.1	1.4	0.4
Eucalyptus albens	10	3	TG		10							
Austrostipa verticillata	40	100	GG				40					
Austrostipa scabra	10	100	GG				10					
Digitaria diffusa	1	20	GG				1					
Calotis lappulacea	1	20	FG					1				
Aristida ramosa	2	30	GG				2					
Carex inversa	0.5	20	GG				0.5					
Eragrostis brownii	0.2	10	GG				0.2					
Einadia hastata	2	20	FG					2				
Dodonaea viscosa	0.1	1	SG			0.1						
Conyza bonariensis	0.1	10	EX								0.1	
Crassula sieberiana	0.1	30	FG					0.1				
Sporobolus creber	0.4	30	GG				0.4					
Chloris ventricosa	0.8	20	GG				0.8					
Hypochaeris radicata	0.1	5	EX								0.1	
Glycine clandestina	0.1	5	OG							0.1		
Dichondra repens	0.2	100	FG					0.2				
Hypericum perforatum	0.4	20	HT									0.4
Acacia falcata	1	2	SG			1						
Rumex brownii	0.1	1	FG					0.1				
Cirsium vulgare	0.2	2	EX								0.2	
Solanum nigrum	0.1	5	EX								0.1	
Geranium solanderi	0.1	5	FG					0.1				
Sida corrugata	0.1	1	FG					0.1				
Modiola caroliniana	0.1	5	EX								0.1	
Sida rhombifolia	0.4	5	EX								0.4	
Centaurea solstitialis	0.2	2	EX								0.2	
Oxalis perennans	0.1	1	FG					0.1				
Bidens subalternans	0.2	5	EX								0.2	
Panicum effusum	0.3	10	GG				0.3					

Easting	775265
Northing	6414614
Orientation	180
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	6
30-49	0
20-29	no
10-19	no
5-9	no
<5	yes
Hollows	1
Length logs (m)	28
Attributes 1x1 plo	46
Litter (%)	40
	30
	45
	55
	60

Date	5/1/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_629		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	618 DNG -Powerline		26	19	1	0	9	9	0	0	6	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	52.6	43.8	0.1	0	38.3	5.4	0	0	3.8	5
Eucalyptus albens	0.1	1	TG		0.1							
Austrostipa verticillata	20	100	GG				20					
Mentha satureioides	1	100	FG					1				
Einadia hastata	3	40	FG					3				
Chloris ventricosa	5	100	GG				5					
Sporobolus creber	5	100	GG				5					
Rumex brownii	0.1	1	FG					0.1				
Hypericum perforatum	5	20	HT									5
Modiola caroliniana	0.4	20	EX								0.4	
Dichondra sp. Inglewood	0.1	20	FG					0.1				
Carex inversa	2	100	GG				2					
Digitaria ramularis	1	50	GG				1					
Hypochaeris radicata	0.1	5	EX								0.1	
Cyperus gracilis	1	100	GG				1					
Calotis lappulacea	0.3	20	FG					0.3				
Oxalis perennans	0.2	100	FG					0.2				
Marrubium vulgare	1	20	EX								1	
Chondrilla juncea	0.1	1	EX								0.1	
Wahlenbergia spp.	0.1	5	FG					0.1				
Hydrocotyle spp.	0.5	50	FG					0.5				
Aristida ramosa	2	50	GG				2					
Bothriochloa macra	2	50	GG				2					
Euphorbia drummondii	0.1	5	FG					0.1				
Gahnia aspera	0.3	1	GG				0.3					
Verbena bonariensis	0.2	10	EX								0.2	
Opuntia stricta	2	5	EX								2	

Easting	775103
Northing	6414515
Orientation	165
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	no
<5	yes
Hollows	0
Length logs (m)	0
Attributes 1x1 plo	10
Litter (%)	10
	5
	5
	10
	20

Date	5/3/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_644		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT- 618?	Blue Sping Rd		34	32	3	10	12	6	0	1	2	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	57.2	56.6	25	16.9	14	0.6	0	0.1	0.6	0
Eucalyptus fibrosa	10	5	TG		10							
Eucalyptus moluccana	10	8	TG		10							
Eucalyptus blakelyi	5	1	TG		5							
Cassinia sifton	10	50	SG			10						
Melaleuca thymifolia	1	1	SG			1						
Cassytha spp.	0.1	5	OG							0.1		
Sannantha cunninghamii	5	50	SG			5						
Juncus planifolius	1	50	GG				1					
Juncus flavidus	5	50	GG				5					
Eragrostis leptostachya	0.8	20	GG				0.8					
Tricoryne elatior	0.1	10	FG					0.1				
Goodenia hederacea	0.1	20	FG					0.1				
Dichelachne micrantha	1	20	GG				1					
Rytidosperma spp.	1	30	GG				1					
Carex appressa	3	20	GG				3					
Setaria parviflora	0.5	20	EX								0.5	
Gahnia aspera	0.3	1	GG				0.3					
Dianella revoluta	0.1	10	FG					0.1				
Lachnagrostis filiformis	0.4	20	GG				0.4					
Acacia buxifolia	0.3	3	SG			0.3						
Senecio spp.	0.1	1	FG					0.1				
Styphelia triflora	0.1	2	SG			0.1						
Acacia spp.	0.1	1	SG			0.1						
Hibbertia spp.	0.1	5	SG			0.1						
Phyllanthus hirtellus	0.1	10	SG			0.1						
Aristida ramosa	0.8	20	GG				0.8					
Hypochaeris radicata	0.1	10	EX								0.1	
Eragrostis brownii	0.1	10	GG				0.1					
Pultenaea retusa	0.1	1	SG			0.1						
Astroloma humifusum	0.1	1	SG			0.1						
Echinopogon caespitosus	0.5	20	GG				0.5					
Lomandra filiformis subsp. filiformis	0.1	5	GG				0.1					
Gonocarpus elatus	0.1	10	FG					0.1				
Goodenia gracilis	0.1	20	FG					0.1				

Easting	746039
Northing	6428102
Orientation	90
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	2
30-49	4
20-29	yes
10-19	yes
5-9	no
<5	yes
Hollows	2
Length logs (m)	48
Attributes 1x1 plo	47
Litter (%)	75
	60
	30
	55
	15

Date	5/3/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_645		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT -618?	Blue Sping Rd		46	37	1	7	17	10	1	1	8	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	68.5	51.9	0.1	15.2	29.7	6.5	0.3	0.1	11.6	5
Eucalyptus blakelyi	0.1	2	TG		0.1							
Sannantha cunninghamii	5	40	SG			5						
Melaleuca thymifolia	0.2	1	SG			0.2						
Juncus flavidus	5	50	GG				5					
Juncus usitatus	3	50	GG				3					
Carex appressa	10	50	GG				10					
Setaria parviflora	10	1000	EX								10	
Cassytha spp.	0.1	5	OG							0.1		
Dichelachne micrantha	1	20	GG				1					
Eragrostis brownii	0.1	20	GG				0.1					
Opercularia diphylla	0.2	20	FG					0.2				
Panicum effusum	0.5	10	GG				0.5					
Dianella revoluta	5	100	FG					5				
Aristida ramosa	1	50	GG				1					
Sporobolus creber	5	100	GG				5					
Hypochaeris radicata	0.5	40	EX								0.5	
Cheilanthes sieberi	0.3	50	EG						0.3			
Eragrostis leptostachya	0.2	20	GG				0.2					
Aristida vagans	0.5	20	GG				0.5					
Fimbristylis dichotoma	0.1	20	GG				0.1					
Verbena bonariensis	0.2	10	EX								0.2	
Microlaena stipoides	1	100	GG				1					
Lissanthe strigosa	2	20	SG			2						
Acacia decora	3	5	SG			3						
Lachnagrostis filiformis	1	50	GG				1					
Calotis cuneifolia	0.1	10	FG					0.1				
Cassinia sifton	2	30	SG			2						
Acacia buxifolia	2	5	SG			2						
Styphelia triflora	1	5	SG			1						
Paspalum dilatatum	5	50	HT									5
Goodenia gracilis	0.2	50	FG					0.2				
Eriochilus cucullatus	0.1	5	FG					0.1				
Laxmannia gracilis	0.5	30	FG					0.5				
Echinopogon caespitosus	1	30	GG				1					
Wahlenbergia gracilis	0.1	5	FG					0.1				
Conyza bonariensis	0.1	5	EX								0.1	
Digitaria ramularis	0.1	5	GG				0.1					
Senecio spp.	0.1	5	FG					0.1				
Cirsium vulgare	0.1	5	EX								0.1	
Veronica plebeia	0.1	5	FG					0.1				
Plantago lanceolata	0.1	10	EX								0.1	
Haloragis heterophylla	0.1	10	FG					0.1				
Lysimachia arvensis	0.5	20	EX								0.5	
Sonchus oleraceus	0.1	5	EX								0.1	
Rytidosperma caespitosum	0.1	10	GG				0.1					
Paspalidium constrictum	0.1	5	GG				0.1					

Easting	746025
Northing	6428067
Orientation	100
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	no
<5	yes
Hollows	0
Length logs (m)	61
Attributes 1x1 plo	13
Litter (%)	10
	5
	10
	25
	15

Date	5/3/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_638		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	477_mod-good		35	34	3	10	15	4	1	1	1	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	66.2	66.1	14	27.8	23	1.1	0.1	0.1	0.1	0
Eucalyptus rossii	10	6	TG		10							
Eucalyptus crebra	2	1	TG		2							
Eucalyptus blakelyi	2	1	TG		2							
Cassinia sifton	15	50	SG			15						
Poa sieberiana	5	20	GG				5					
Dianella revoluta	0.1	5	FG					0.1				
Lomandra filiformis subsp. f	0.5	20	GG				0.5					
Gonocarpus elatus	0.5	20	FG					0.5				
Aristida vagans	1	40	GG				1					
Hypochaeris radicata	0.1	10	EX								0.1	
Pultenaea foliolosa	2	10	SG			2						
Cheilanthes sieberi subsp. si	0.1	10	EG						0.1			
Entolasia stricta	0.6	30	GG				0.6					
Grevillea sericea	2	10	SG			2						
Laxmannia gracilis	0.4	20	FG					0.4				
Sannantha cunninghamii	5	20	SG			5						
Cyperus gracilis	0.1	5	GG				0.1					
Hibbertia spp.	0.1	1	SG			0.1						
Cassytha spp.	0.1	5	OG							0.1		
Dichelachne micrantha	1	30	GG				1					
Aristida ramosa	5	100	GG				5					
Arundinella nepalensis	1	20	GG				1					
Lepidosperma laterale	5	20	GG				5					
Lissanthe strigosa	1	10	SG			1						
Euphorbia drummondii	0.1	1	FG					0.1				
Juncus flavidus	0.1	5	GG				0.1					
Acacia hakeoides	0.2	1	SG			0.2						
Pimelea spp.	1	20	SG			1						
Acacia spp.	0.5	1	SG			0.5						
Lomandra multiflora subsp.	1	20	GG				1					
Lomandra confertifolia subs	2	20	GG				2					
Lomandra filiformis subsp. c	0.1	10	GG				0.1					
Melaleuca thymifolia	1	1	SG			1						
Gahnia aspera	0.5	2	GG				0.5					
Rytidosperma caespitosum	0.1	5	GG				0.1					

Easting	751185
Northing	6424963
Orientation	225
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	8
30-49	4
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	3
Length logs (m)	36
Attributes 1x1 plo	61
Litter (%)	50
	65
	80
	40
	70

Date	5/3/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_639		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	477_DNG		28	28	2	11	9	3	1	2	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	53.1	53.1	2.5	42.3	5.9	2.1	0.1	0.2	0	0
Acacia spectabilis	1	5	SG			1						
Acacia hakeoides	1	5	SG			1						
Grevillea sericea	5	30	SG			5						
Lissanthe strigosa	5	30	SG			5						
Sannantha cunninghamii	10	500	SG			10						
Rytidosperma spp.	0.2	20	GG				0.2					
Gonocarpus elatus	1	50	FG					1				
Pimelea spp.	2	100	SG			2						
Wahlenbergia spp.	0.1	5	FG					0.1				
Aristida ramosa	2	100	GG				2					
Melaleuca erubescens	2	10	SG			2						
Cheilanthes sieberi	0.1	10	EG						0.1			
Laxmannia gracilis	1	50	FG					1				
Cassinia sifton	1	20	SG			1						
Eragrostis elongata	0.1	10	GG				0.1					
Eucalyptus spp.	2	20	TG		2							
Eucalyptus blakelyi	0.5	5	TG		0.5							
Cassytha spp.	0.1	5	OG							0.1		
Lomandra multiflora sub	0.2	5	GG				0.2					
Lomandra filiformis subs	0.1	10	GG				0.1					
Poa sieberiana	0.1	5	GG				0.1					
Lepidosperma laterale	2	20	GG				2					
Arundinella nepalensis	1	10	GG				1					
Acacia spp.	0.2	1	SG			0.2						
Isopogon anemonifolius	0.1	5	SG			0.1						
Macrozamia spp.	0.1	2	OG							0.1		
Pultenaea spp.	15	500	SG			15						
Gahnia aspera	0.2	1	GG				0.2					

Easting	751213
Northing	6424910
Orientation	255
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	yes
<5	yes
Hollows	0
Length logs (m)	4
Attributes 1x1 plo	9
Litter (%)	2
	10
	5
	25
	3

CWO			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	55
PCT 479	Veg Zone ID: remnant		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
Date: 28/02/2023			48	47	5	14	16	9	1	2	1	0	
Species	Cover	Abundance	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
			132.4	132.3	80	23.4	26.5	2	0.1	0.3	0.1	0	
Angophora floribunda	40	40	TG		40								
Eucalyptus rossii	5	2	TG		5								
Eucalyptus tereticornis	5	3	TG		5								
Eucalyptus macrorhyncha	10	3	TG		10								
Callitris endlicheri	20	30	TG		20								
Acacia ausfeldii	0.5	5	SG			0.5							
Exocarpos strictus	3	30	SG			3							
Cassinia sifton	5	50	SG			5							
Styphelia triflora	1	10	SG			1							
Leucopogon sp.	0.1	1	SG			0.1							
Lissanthe strigosa	5	50	SG			5							
Acacia implexa	1	5	SG			1							
Dianella longifolia	0.3	25	FG					0.3					
Sannantha cunninghamii	1	100	SG			1							
Gonocarpus elatus	0.1	1	FG					0.1					
Persoonia linearis	1	20	SG			1							
Hibbertia sp. riparia?	0.1	10	SG			0.1							
Brunoniella australis	0.1	10	FG					0.1					
Astroloma humifusum	5	500	SG			5							
Schoenus apogon	0.5	1000	GG				0.5						
Wahlenbergia gracilis	0.1	10	FG					0.1					
Laxmannia gracilis	0.1	25	FG					0.1					
Austrostipa densiflora	10	200	GG				10						
Lomandra gracilis	0.1	1	GG				0.1						
Lomandra multiflora	0.1	2	GG				0.1						
Aristida ramosa	10	200	GG				10						
Eragrostis sp.	1	25	GG				1						
Rytidosperma caespitosum	1	100	GG				1						
Juncus usitatus	0.1	1	GG				0.1						
Microtis sp.	0.1	1	FG					0.1					
Arundinella nepalensis	1	10	GG				1						
Echinopogon ovatus	0.2	25	GG				0.2						
Pomax umbellata	1	100	FG					1					
Conyza sp.	0.1	1	EX								0.1		
Hibbertia obtusifolia	0.5	50	SG			0.5							
Cheilanthes sieberi	0.1	10	EG						0.1				
Rytidosperma setaceum	0.1	10	GG				0.1						
Rytidosperma setaceum	0.1	10	GG				0.1						
Goodenia heterophylla	0.1	10	FG					0.1					
Clematis sp.	0.1	1	OG							0.1			
Macrozamia reducta	0.2	2	OG							0.2			
Chrysocephalum apiculatum	0.1	10	FG					0.1					
Brachyloma daphnoides	0.1	1	SG			0.1							
Acacia decora	0.1	1	SG			0.1							
Themeda triandra	2	25	GG				2						
Lachnagrostis filiformis	0.1	1	GG				0.1						
Panicum effusum	0.1	10	GG				0.1						
Fimbristylis dichotoma	0.1	1	GG				0.1						

Easting	754723
Northing	6426846
Orientation	182
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3 large trees
30-49	Yes
20-29	Yes
10-19	Yes
5-9	Yes
<5	Yes
Hollows	1
Length logs (m)	86
Attributes 1x1 plot (%)	
Litter (%)	70

CWO			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat	55
PCT 479	Veg Zone ID: DNG		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	
Date: 28/02/2023			49	43	2	11	19	9	1	1	6	0	
Species	**Cover**	**Abundance**	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	
			142.5	137	2	9.5	98.3	22.1	5	0.1	5.5	0	
Angophora floribunda	1	5	TG		1								
Eucalyptus blakelyi	1	6	TG		1								
Acacia decora	2	10	SG			2							
Acacia ulicifolia	1	10	SG			1							
Lissanthe strigosa	2	25	SG			2							
Cassinia sifton	0.5	10	SG			0.5							
Acacia ausfeldii	2	20	SG			2							
Kunzea sp.	1	20	SG			1							
Themeda triandra	5	25	GG				5						
Aristida personata	20	1000	GG				20						
Laxmannia gracilis	0.5	500	FG					0.5					
Fimbristylis dichotoma	0.1	10	GG				0.1						
Eragrostis alveiformis	5	500	GG				5						
Wahlenbergia gracilis	0.1	10	FG					0.1					
Echinopogon ovatus	5	100	GG				5						
Microtis sp.	0.1	1	FG					0.1					
Cheilanthes sieberi	5	500	EG						5				
Hypochaeris radicata	5	500	EX								5		
Eragrostis elongata	0.2	20	GG				0.2						
Lomandra multiflora	0.1	1	GG				0.1						
Austrostipa densiflora	25	2000	GG				25						
Haloragis heterophylla	20	2000	FG					20					
Aristida vagans	10	2000	GG				10						
Microlaena stipoides	5	500	GG				5						
Sporobolus creber	20	2000	GG				20						
Tricoryne elatior	0.1	1	FG					0.1					
Aristida sp.	0.2	20	GG				0.2						
Eulalia aurea	0.1	1	GG				0.1						
Goodenia heterophylla	0.1	10	FG					0.1					
Juncus usitatus	0.1	2	GG				0.1						
Eragrostis cilianensis	0.1	2	EX								0.1		
Rytidosperma caespitosum	0.1	10	GG				0.1						
Panicum effusum	0.2	10	GG				0.2						
Cymbopogon refractus	0.1	10	GG				0.1						
Styphelia triflora	0.2	2	SG			0.2							
Setaria parviflora	0.1	10	EX								0.1		
Calotis lappulacea	0.1	10	FG					0.1					
Podolepis omissa	1	500	FG					1					
Lomandra filiformis	0.1	1	GG				0.1						
Melichrus urceolatus	0.5	10	SG			0.5							
Brachyloma daphnoides	0.1	1	SG			0.1							
Bothriochloa macra	2	50	GG				2						
Conyza sp.	0.1	3	EX								0.1		
Glycine sp.	0.1	5	OG							0.1			
Schkuhria pinnata	0.1	5	EX								0.1		
Petrorhagia nanteuilii	0.1	10	EX								0.1		
Bossiaea prostrata	0.1	1	FG					0.1					
Sannantha cunninghamii	0.1	1	SG			0.1							
Acacia spectabilis	0.1	1	SG			0.1							

Easting	754702
Northing	6426912
Orientation	98
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	No
20-29	No
10-19	No
5-9	No
<5	Yes
Hollows	0
Length logs (m)	0
Attributes 1x1 plot (%)	
Litter (%)	20

Date	5/1/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_631		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	1606 mod good		25	24	3	9	6	5	1	0	1	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	65.2	65.1	15.1	46.3	2.6	1	0.1	0	0.1	0
Eucalyptus crebra	10	5	TG		10							
n	5	6	TG		5							
Cassinia sifton	35	100	SG			35						
Acacia spp.	2	10	SG			2						
Dodonaea viscosa	2	20	SG			2						
Cassinia quinquefaria	3	50	SG			3						
Dichelachne micrantha	0.2	10	GG				0.2					
Calotis cuneifolia	0.1	5	FG					0.1				
Eremophila debilis	0.1	1	SG			0.1						
Rytidosperma spp.	0.2	10	GG				0.2					
Solanum spp.	0.2	2	FG					0.2				
Dichondra repens	0.1	10	FG					0.1				
Euchiton sphaericus	0.1	10	FG					0.1				
Calotis lappulacea	0.5	20	FG					0.5				
Gahnia aspera	1	10	GG				1					
Eragrostis leptostachya	0.1	5	GG				0.1					
Opuntia stricta	0.1	1	EX								0.1	
Austrostipa scabra	1	30	GG				1					
Goodenia ovata	0.1	2	SG			0.1						
Cheilanthes sieberi	0.1	10	EG						0.1			
Lissanthe strigosa	0.1	2	SG			0.1						
Allocasuarina verticillata	0.1	2	TG		0.1							
Acacia spp.	2	10	SG			2						
Lomandra filiformis	0.1	5	GG				0.1					
Acacia spp.	2	10	SG			2						

Easting	774968
Northing	6414997
Orientation	350
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	1
50-79	2
30-49	0
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	14
Attributes 1x1 plo	36
Litter (%)	15
	10
	40
	55
	60

Date	5/1/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_632		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	1606 - powerline		28	23	0	5	13	4	1	0	4	1
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	77.7	69.1	0	13	55.5	0.4	0.2	0	6.6	2
Acacia spp.	2	10	SG			2						
Acacia spp.	2	10	SG			2						
Hypericum perforatum	2	20	HT									2
Dichelachne micrantha	1	20	GG				1					
Gahnia aspera	1	5	GG				1					
Dichondra repens	0.1	10	FG					0.1				
Hypochaeris radicata	0.1	10	EX								0.1	
Euphorbia drummondii	0.1	10	FG					0.1				
Cheilanthes sieberi	0.2	50	EG						0.2			
Sporobolus creber	5	100	GG				5					
Mentha satureioides	0.1	10	FG					0.1				
Chloris ventricosa	2	50	GG				2					
Aristida ramosa	15	500	GG				15					
Cassinia sifton	5	20	SG			5						
Cirsium vulgare	0.5	5	EX								0.5	
Juncus usitatus	0.1	10	GG				0.1					
Themeda triandra	1	20	GG				1					
Geranium solanderi	0.1	5	FG					0.1				
Dodonaea viscosa	2	10	SG			2						
Microlaena stipoides	10	500	GG				10					
Acacia spp.	2	10	SG			2						
Bidens subalternans	1	20	EX								1	
Lomandra filiformis	0.1	10	GG				0.1					
Setaria parviflora	5	100	EX								5	
Austrostipa verticillata	3	30	GG				3					
Eragrostis spp.	0.3	10	GG				0.3					
Austrostipa scabra	2	100	GG				2					
Aristida ramosa	15	500	GG				15					

Easting	774902
Northing	6414986
Orientation	155
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	no
<5	yes
Hollows	0
Length logs (m)	0
Attributes 1x1 plo	11
Litter (%)	5
	10
	15
	5
	20

Date	5/3/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_640		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	1674_mod-good		21	19	1	6	9	2	0	1	2	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	57.6	57.4	25	21	8.1	0.3	0	3	0.2	0
Eucalyptus sideroxylon	25	25	TG		25							
Cassinia sifton	5	20	SG			5						
Pultenaea foliolosa	5	40	SG			5						
Lomandra multiflora subsp. r	0.1	5	GG				0.1					
Lomandra filiformis subsp. fil	0.1	10	GG				0.1					
Aristida ramosa	3	40	GG				3					
Entolasia stricta	2	200	GG				2					
Acacia spectabilis	2	2	SG			2						
Lissanthe strigosa	5	30	SG			5						
Gonocarpus elatus	0.2	20	FG					0.2				
Laxmannia gracilis	0.1	20	FG					0.1				
Grevillea sericea	3	20	SG			3						
Rytidosperma caespitosum	0.3	30	GG				0.3					
Gahnia aspera	1	3	GG				1					
Conyza bonariensis	0.1	5	EX								0.1	
Amyema miquelii	3	3	OG							3		
Hypochaeris radicata	0.1	5	EX								0.1	
Poa sieberiana var. sieberian	1	2	GG				1					
Lomandra confertifolia subsp	0.1	5	GG				0.1					
Lepidosperma laterale	0.5	1	GG				0.5					
Melaleuca erubescens	1	1	SG			1						

Easting	751756
Northing	6424990
Orientation	250
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	3
30-49	5
20-29	yes
10-19	yes
5-9	yes
<5	yes
Hollows	0
Length logs (m)	6
Attributes 1x1 plo	56
Litter (%)	30
	40
	65
	85
	60

Date	5/3/2023		Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Plot Name	CWO_641		# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
PCT	1674_DNG		20	20	1	9	6	2	1	1	0	0
			Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
Species	Cover	Abundance	45.1	45.1	2	30.2	12.3	0.4	0.1	0.1	0	0
Eucalyptus sideroxylon	2	5	TG		2							
Cassinia sifton	5	50	SG			5						
Pultenaea foliolosa	5	30	SG			5						
Cassytha spp.	0.1	5	OG							0.1		
Aristida ramosa	10	100	GG				10					
Acacia hakeoides	1	20	SG			1						
Grevillea sericea	5	50	SG			5						
Lomandra multiflora subsp. m	0.1	10	GG				0.1					
Entolasia stricta	1	50	GG				1					
Cheilanthes sieberi	0.1	10	EG						0.1			
Melaleuca thymifolia	10	30	SG			10						
Laxmannia gracilis	0.3	20	FG					0.3				
Lomandra filiformis subsp. fil	0.1	5	GG				0.1					
Lissanthe strigosa	2	20	SG			2						
Gahnia aspera	1	5	GG				1					
Sannantha cunninghamii	2	30	SG			2						
Goodenia hederacea	0.1	5	FG					0.1				
Daviesia genistifolia	0.1	1	SG			0.1						
Rytidosperma spp.	0.1	10	GG				0.1					
Hakea spp.	0.1	1	SG			0.1						

Easting	751764
Northing	6425017
Orientation	250
Plot size	20 X 20 X 50
Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	no
10-19	no
5-9	yes
<5	yes
Hollows	0
Length logs (m)	3
Attributes 1x1 plo	9.6
Litter (%)	5
	3
	10
	20
	10

Appendix N

Cumulative biodiversity impact assessment

N1 Determination of excluded impacts

N1.1 Approach to cumulative impact assessment

The study area for the biodiversity cumulative impact assessment consists of the combined footprint of the relevant future projects considered to have potential for cumulative biodiversity impacts in combination with the Hunter Transmission Project (HTP, this project). Public road works have not been included in the assessment as environmental assessments for these works has not yet commenced and sufficient information is not available to assess the potential cumulative biodiversity impacts with this project.

A detailed, local assessment was carried out that involved:

- reviewing the nature and scale of potential biodiversity impacts, as described in supplied or publicly available planning and biodiversity documents for the relevant future projects
- quantitatively assessing potential regional cumulative impacts on native vegetation, threatened and migratory species and threatened ecological communities of the relevant future projects in combination with the project, in a tabulated form showing known or estimated impacts for each project and the total cumulative impact
- qualitatively assessing potential regional cumulative impacts on groundwater dependent ecosystems, wildlife connectivity and habitat corridors and protected and sensitive lands by reviewing regional habitat impacts for areas directly impacted by the project
- recommending mitigation measures as required.

The assessment is limited in the variability of biodiversity assessments for other projects and assumes the accuracy and reliability of biodiversity provided by these other assessments. It also assumes that cumulative impacts can be predicted for projects that are of a different impact nature.

N2 Impact assessment

This assessment considers the impacts of this project together with other nearby development projects of a similar nature and scale. Projects considered in this cumulative assessment are identified in Table N.1. All projects have been assessed quantitatively, except for Rix's Creek North Continuation Project and Edderton Solar Project, which were assessed on a qualitative basis, as these projects were still in the 'prepare EIS' phase at the time of the EIS preparation.

Table N.1 Relevant future projects considered in the cumulative biodiversity impact assessment

Project	Type of assessment
Bayswater Power Station Upgrade	Quantitative
Hunter Valley Operations Construction Project	Quantitative
Rix's Creek North Continuation Project	Qualitative
Edderton Solar Project	Qualitative
Restart of Redbank Power Station	Quantitative
Maison Dieu Solar Farm	Quantitative

N2.1 Cumulative impacts on native vegetation, threatened and migratory species and threatened ecological communities

This section provides an assessment of those projects with potential cumulative native vegetation and threatened species impacts (see Table N.2).

Where available, the total impact to native vegetation from each project is provided along with a list of the threatened ecological communities (TECs) and threatened species that would be impacted. The total ecosystem credit and species credit requirement for each project is also provided to provide an overview of cumulative offset requirements. A broad approach has been taken due to the variance in impacts between projects and the total native vegetation impact is considered the simplest way to represent impact to threatened species.

The results from the review of available information indicate the following:

- the known or estimated cumulative native vegetation impacts equate to 1505.67 hectares
- the cumulative ecosystem credit requirement equates to 27,956 credits
- the cumulative species credit requirement equates to 226,486 credits.

Table N.2 Cumulative biodiversity assessment

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
Bayswater Power Station Upgrade	270.85	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Valley eucalypt forest and woodland	*Delma impar* / Striped Legless Lizard *Diuris tricolor* / Pine Donkey Orchid *Myotis macropus* / Southern Myotis *Petaurus norfolkensis* / Squirrel Glider *Prasophyllum petilum* / Tarengo Leek Orchid	5240	8870
Hunter Valley Operations Construction Project	397	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions Hunter Valley Footslopes Slaty Gum Woodland Warkworth Sands Woodland in the Sydney Basin Bioregion	Not identified in report	*Delma vescolineata* / Hunter Valley Delma *Eucalyptus camaldulensis* - endangered population / *Eucalyptus camaldulensis* population in the Hunter catchment *Myotis macropus* / Southern Myotis *Phascogale tapoatafa* / Brush-tailed Phascogale	4809	6130

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
Rix's Creek North Continuation Project	Unknown This project is in the 'prepare EIS' stage; limited information available	Not identified in Scoping Report	Not identified in Scoping Report	Unknown	Unknown	Unknown
Edderton Solar Project	Unknown This project is in the 'prepare EIS' stage; limited information available	Not identified in Scoping Report	Not identified in Scoping Report	Unknown	Unknown	Unknown
Restart of Redbank Power Station	None	N/A	N/A	None	0	0
Maison Dieu Solar Farm	75.84	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Valley eucalypt forest and woodland Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (Coastal Swamp Oak Forest)	*Delma impar* / Striped Legless Lizard *Myotis macropus* / Southern Myotis *Phascogale tapoatafa* / Brush-tailed Phascogale *Ninox strenua* / Powerful Owl	820	1490

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
Sub-totals						
Relevant future development, proposed and approved projects	743.69	N/A	N/A	N/A	10,869	16,490
Hunter Transmission Project (this project)						
This project	761.98	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	Central Hunter Valley eucalypt forest and woodland River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria Warkworth Sands Woodland of the Hunter Valley	*Acacia bynoeana* / Bynoe's Wattle *Acacia pendula* - endangered population / Acacia pendula population in the Hunter catchment *Angophora inopina* / Charmhaven Apple *Anthochaera phrygia* / Regent Honeyeater *Asperula asthenes* / Trailing Woodruff *Callistemon linearifolius* / Netted Bottle Brush *Callocephalon fimbriatum* / Gang-gang Cockatoo *Calyptorhynchus lathami lathami* / South-eastern Glossy Black-Cockatoo *Cercartetus nanus* / Eastern Pygmy-possum	17,087	209,996

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
		River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Warkworth Sands Woodland in the Sydney Basin Bioregion		*Chalinolobus dwyeri* / Large-eared Pied Bat *Corybas dowlingii* / Red Helmet Orchid *Cymbidium canaliculatum* - endangered population / *Cymbidium canaliculatum* population in the Hunter Catchment *Cynanchum elegans* / White-flowered Wax Plant *Delma vescolineata* / Hunter Valley Delma *Dillwynia tenuifolia* / Dillwynia tenuifolia *Diuris tricolor* / Pine Donkey Orchid *Eucalyptus camaldulensis* - endangered population / *Eucalyptus camaldulensis* population in the Hunter catchment *Eucalyptus castrensis* / Singleton Mallee *Eucalyptus fracta* / Broken Back Ironbark *Eucalyptus glaucina* / Slaty Red Gum *Eucalyptus pumila* / Pokolbin Mallee *Grammitis stenophylla* / Narrow-leaf Finger Fern *Grevillea parviflora* subsp. *parviflora* / Small-flower Grevillea		

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
				Heleioporus australiacus / Giant Burrowing Frog *Hoplocephalus bitorquatus* / Pale-headed Snake *Hoplocephalus stephensii* / Stephens' Banded Snake *Lathamus discolor* / Swift Parrot *Litoria littlejohni* / Littlejohn's Tree Frog *Melaleuca biconvexa* / Biconvex Paperbark *Melaleuca groveana* / Grove's Paperbark *Mixophyes balbus* / Stuttering Frog *Mixophyes iteratus* / Giant Barred Frog *Myotis macropus* / Southern Myotis *Ninox connivens* / Barking Owl *Ninox strenua* / Powerful Owl *Notamacropus parma* / Parma Wallaby *Olearia cordata* / Olearia cordata *Ozothamnus tesselatus* / Ozothamnus tesselatus *Persoonia hirsuta* / Hairy Geebung *Petauroides volans* / Southern Greater Glider		

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
				Petaurus norfolkensis / Squirrel Glider *Petrogale penicillata* / Brush-tailed Rock-wallaby *Phascogale tapoatafa* / Brush-tailed Phascogale *Phascolarctos cinereus* / Koala *Planigale maculata* / Common Planigale *Pomaderris queenslandica* / Scant Pomaderris *Potorous tridactylus* / Long-nosed Potoroo *Prasophyllum petilum* / Tarengo Leek Orchid *Prasophyllum* sp. Wybong / Prasophyllum sp. Wybong *Prostanthera cineolifera* / Singleton Mint Bush *Pseudophryne australis* / Red-crowned Toadlet *Pterostylis chaetophora* / Pterostylis chaetophora *Pterostylis gibbosa* / Illawarra Greenhood *Rhizanthella slateri* / Eastern Australian Underground Orchid		

Project	Known or estimated native vegetation impacts (ha)	TECs impacted		Species credit species impacted	Native vegetation offsets (ecosystem credits) total	Threatened species offsets (species credits) total
		BC Act	EPBC Act			
				Rhodamnia rubescens / Scrub Turpentine *Rhodomyrtus psidioides* / Native Guava *Rutidosis heterogama* / Heath Wrinklewort *Senna acclinis* / Rainforest Cassia *Syzygium paniculatum* / Magenta Lilly Pilly *Tetratheca juncea* / Black-eyed Susan *Tyto novaehollandiae* / Masked Owl *Tyto tenebricosa* / Sooty Owl *Velleia perfoliata* / Velleia perfoliata *Vespadelus troughtoni* / Eastern Cave Bat *Zieria involucrata* / Zieria involucrata		
Cumulative biodiversity impacts						
Cumulative totals	1505.67	N/A	N/A	N/A	27,956	226,486

N2.2 Cumulative impacts on groundwater dependent ecosystems

Table N.3 outlines the potential cumulative impacts to groundwater dependent ecosystems (GDEs). The results from the review of available information indicate the following:

- The Atlas of GDEs (Bureau of Meteorology, 2024) and relevant water sharing plans for the relevant future project identifies many potential GDEs in and around these projects.
- Hunter Valley Operations Construction Project is the project that would impact, or potentially impact, GDEs.
- The remaining projects, including this project, are not anticipated to impact groundwater during construction, operation or decommissioning due to the limited amount of subsurface disturbance activities required during the installation and decommissioning of project infrastructure.

The HTP would not contribute to the cumulative impacts on GDEs.

Table N.3 Potential cumulative impacts of relevant future projects on GDEs

Project	Impacts on groundwater dependent ecosystems
Bayswater Power Station Upgrade	No potential GDE's identified within the study area boundary for Bayswater Power Station Upgrade. Some of the vegetation is considered to be opportunistically groundwater dependent.
Hunter Valley Operations Construction Project	Potential decline in health of river red gum stands and *Hunter Floodplain Red Gum Woodland EEC* along the Hunter River and decline in health of other GDEs in the locality. However, a significant impact is not considered likely.
Rix's Creek North Continuation Project	Impacts on GDEs not yet assessed.
Edderton Solar Project	Impacts on GDEs not yet assessed.
Restart of Redbank Power Station	No potential GDE's identified within the study area boundary for the Restart of Redbank Power Station.
Maison Dieu Solar Farm	No significant impacts to groundwater are expected during the construction or operational phases for the Maison Dieu Solar Farm.
Hunter Transmission Project	
This project	Impacts on groundwater associated with this project include the construction of concrete pilings and switching stations. These potential impacts on groundwater and subsequent GDEs are considered very low and restricted to direct impact areas. In terms of impacts, concrete pilings may intercept the local water table where the water table is close to the surface. During construction concrete would be poured into the excavated pile, and the water removed from the pile as it is displaced by the concrete. There is no permanent take of water, and therefore, there is no permanent change to groundwater levels and associated sensitive receivers, during the project construction or operation. Switching station construction are considered unlikely to lead to groundwater level decline at surrounding sensitive receivers because of any hillside excavation. If shallow groundwater is encountered, it is likely to be perched, non-permanent and localised (that is, not connected regionally). Therefore, there would be very limited to no groundwater inflow to the hillslope cuttings and no change in groundwater levels at nearby receivers.

Project	Impacts on groundwater dependent ecosystems
	None of the structures or construction activities would result in any permanent groundwater take that would alter the groundwater flow outside of the direct impact areas. Given this, the native vegetation assessment under the NSW Biodiversity Assessment Method 2020 (BAM) as presented in this biodiversity development assessment report is considered adequate to address the direct impacts on terrestrial GDE native vegetation and this project is considered unlikely to result in any indirect additional impact on GDEs.

N2.3 Cumulative impacts on wildlife connectivity and habitat corridors

Table N.4 outlines the potential cumulative impacts to wildlife connectivity and habitat corridors. The results from the review of available information indicate the following:

- Many of the projects occur on land where the connectivity of native vegetation and habitat corridors has been previously compromised by clearing for agricultural land uses.
- The projects are likely to result in short term impacts resulting in species relocating outside of the development footprints. Once construction is completed, species are expected to move back into habitats adjacent to the relevant project. Long term impacts could include permanent breaks in connectivity due to installation of fence lines and access roads across large intact blocks of habitat.
- The projects are likely to reduce the integrity of current corridors and connectivity.

The HTP would contribute to the cumulative impacts to wildlife connectivity and habitat corridors and would potentially have one of the largest impacts to connectivity. This is due to this project bisecting large areas of native vegetation associated with Olney, Watagan, Corrabare and Pokolbin State forests and Corrabare North Flora Reserve. It should be noted that the project traverses a relatively disturbed landscape that contains cleared paddocks, 3 working coal mines and existing power lines that cut through areas of vegetation. Functional connectivity for bird and bat species remains despite these developments having occurred and it is likely that a similar level of functional habitat connectivity would remain after the project is built.

This HTP would result in a highly permeable structure for biodiversity and connectivity is expected to remain largely unaffected for all species. The impacts to connectivity area expected to be permanent, though minor. They are likely to reduce over time as biodiversity acclimatises to the presence of the proposed transmission line towers and powerlines. The consequence of the impacts would be minor and non-significant due to the design development process.

Table N.4 Potential impacts of key relevant future projects on wildlife connectivity and habitat corridors

Project	Impacts on wildlife connectivity and habitat corridors
Bayswater Power Station Upgrade	The study area for the Bayswater Power Station Upgrade is not mapped as occurring within any regional corridors. On a local level the development site is situated in the vicinity of infrastructure associated with Bayswater, interspersed with land leased for grazing purposes. Some areas of intact native vegetation occur across the site, particularly in the western portions where it connects to patchy vegetation in the broader landscape. Much of the vegetation within the development site and surrounds is fragmented by roads, infrastructure (e.g. pipelines), and areas cleared for agriculture and mining.

Project	Impacts on wildlife connectivity and habitat corridors
Hunter Valley Operations Construction Project	The removal of native vegetation from within the development footprints associated with the Hunter Valley Operations Construction Project could affect the ability of some local fauna species to move throughout the landscape by removing patches of native vegetation that provide a fragmented 'stepping-stone' corridor in an already highly disturbed landscape. The loss of 'stepping stone' habitat areas for some species could result in an increased level of isolation of populations where species are unable or unwilling to travel across the increased distance between habitat areas. A potential fauna movement corridor occurs in highly fragmented woodland and rehabilitation between the Mitchell Pit and Carrington Pit, as well as the riparian corridor of the Hunter River to the south. A potential larger regional corridor in the locality, connecting Mt Royal/Barrington Tops World Heritage Area with the Wollemi World Heritage Area via Lake Liddell is not likely to be severed as a result of the Project.
Rix's Creek North Continuation Project	Impacts to habitat connectivity not yet assessed. Project is in the 'prepare EIS' stage so there is limited information available.
Edderton Solar Project	Impacts to habitat connectivity not yet assessed. Project is in the 'prepare EIS' stage so there is limited information available.
Restart of Redbank Power Station	The Restart of Redbank Power Station will not remove any native vegetation and therefore, the project will not drive a change in the pre-existing local connectivity or exacerbate fragmentation within the wider region.
Maison Dieu Solar Farm	The Maison Dieu Solar Farm would increase the current level fragmentation within the subject land and assessment area by introducing further cleared areas. However, for species that utilise trees, this is the removal of 'stepping stone' type connectivity rather than significantly vegetated connectivity features. No barrier to the movement of ground dwelling fauna would be introduced.
Hunter Transmission Project	
This project	This project is likely to have impacts on habitat connectivity where the alignment bisects vegetation associated with Olney, Watagan, Corrabare and Pokolbin State forests and Corrabare North Flora Reserve.

N2.4 Cumulative impacts on protected lands

Protected areas are set aside for conservation and managed by the NSW National Parks and Wildlife Service, and include areas such as national parks, nature reserves, regional parks and State conservation areas. Table N.5 outlines the cumulative impacts to protected and sensitive lands. The results from the review of available information indicate the following:

- None of the projects occur within or adjacent to protected lands.
- Project designs have been altered to avoid impacts on protected lands where possible.

The HTP would directly impact the Corrabare North Flora Reserve and would contribute to cumulative impacts to protected lands.

Table N.5 Potential impacts of relevant future projects on protected lands

Project	Impacts on protected lands
Bayswater Power Station Upgrade	No impacts on protected lands.
Hunter Valley Operations Construction Project	No impacts on protected lands.
Rix's Creek North Continuation Project	No impacts on protected lands.
Edderton Solar Project	No impacts on protected lands.
Restart of Redbank Power Station	No impacts on protected lands.
Maison Dieu Solar Farm	No impacts on protected lands.
Hunter Transmission Project	
This project	This project directly impacts the Corrabare North Flora Reserve. The Jilliby State Conservation Area, Corrabare Nature Reserve and Watagans National Park are located directly adjacent to this project, but there would be no direct impacts to these areas. Other protected lands near this project include Pokolbin State Conservation Area, Werakata State Conservation Area, Wollemi National Park and Warrawolong Flora Reserve, however there would be no direct impacts to these areas.

N2.5 Summary

The assessment of cumulative impacts, the incremental effect of multiple sources of impact (past, present and future), provides an opportunity to consider the HTP within a strategic context. The accumulating impacts of multiple projects, continuing agricultural activities, and development and maintenance of infrastructure would likely result in continued loss of biodiversity.

Taking into account the cumulative vegetation removal impacts of the relevant future projects considered in this cumulative assessment, an estimated 1505.67 hectares of remnant vegetation would be removed. Two of these projects are in the early planning stages and the likely impacts of these projects are currently unknown, but biodiversity impacts from all these projects can be expected. Table N.6 provides a summary.

Table N.6 Summary of the cumulative biodiversity impact assessment

Project	Known or estimated native vegetation impacts (ha)	Native vegetation offsets (ecosystem credits)	Threatened species offsets (species credits)
Future relevant development, proposed and approved projects and changes to existing projects	743.69	10,869	16,490
Hunter Transmission Project	761.98	17,087	209,996
Cumulative totals	**1505.67**	**27,956**	**226,486**

This project would not contribute to the cumulative impacts on GDEs.

This project would contribute to the cumulative impacts to wildlife connectivity and habitat corridors and would potentially have one of the largest impacts to connectivity of the projects considered. This is due to this project bisecting large areas of native vegetation associated with Olney, Watagan, Corrabare and Pokolbin State forests and Corrabare North Flora Reserve.

This project would contribute to the cumulative impacts to protected lands, as it would directly impact the Corrabare North Flora Reserve.

Appendix O

Koala thermal drone survey report

Nightvision Ecology
Drone & Fauna Surveying | Consultancy

Our Reference: NVE_053

Nathan Stewart | Ecologist
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Hunter Transmission Project – Thermal Drone Survey Methodology

1 METHODOLOGY

1.1 SURVEY METHODOLOGY

Surveys were conducted based on s4.5.3 of the 'Koala (*Phascolarctos cinereus*) BAM Survey Guide' (DPE, 2022).

The drone was piloted along a preprogrammed flight path in a lawnmower pattern which consisted of parallel linear transects spaced 50 metres apart, at a constant height of 65 metres, and a maximum speed of 8m/s to provide a 30% overlap in survey field of view (15% each side).

Surveys were initiated as the BAM guidelines suggest and undertaken between 21:00 and 06:00 where daily minimum temperatures were expected to be ≤18°C. This allows for heat to move out of the structure/s (such as trees and rocks) and improves thermal homogeneity of the environment allowing visualization of a higher thermal differential between fauna and the environments. The pilots conducting the surveys have experience conducting thermal drone surveys successfully detecting numerous Koalas and individually judge acceptable environmental thermal homogeneity for each survey.

Where thermal signatures were identified, an attached spotlight was toggled on, and camera mode switched to colour (RGB) zoom to allow for real-time visual identification of the fauna detected from the digital display. Both thermal and zoom video footage are simultaneously recorded and stored for each detection. If necessary to gain a better view of a detection, the drone was lowered to a distance ≥20 metres, from the detected animal and hovered with the light on to observe animal movements not exceeding 2 minutes, for identification.

Survey 123 is used to record survey location, weather conditions from a Kestrel 5000 Environmental Meter, detection identification, and detection timestamp. After surveys, data is compiled by NSW Drone Hub from flight information recorded by the aircraft (video and SRT file), GPS pins from the controller, and Survey123 for results. Location of detections for non-threatened fauna is determined from the drone's GPS position. For positive detection of a threatened species, the laser rangefinder of the M30T drone is used to record a more accurate GPS pin, reported accuracy ≥5m.

1.2 Drone Specifications

The specifications of drone equipment are shown in *Table 1*.

Table 1. Specifications of drones used in thermal survey

Serial Number	Make and Model	Year of Manufacture	Thermal camera
1581F5BKB23C700F016A (ID: NVEM30T001)	Drone DJI Matrice 30T	Dec 7th, 2023	**M30T Thermal Camera Sensitivity:** ≤50 mK@F1.0 **Temperature Measurement Range:** High Gain Mode: -20° to 150° C **Spectral Range:** 12 µm **Resolution:** Infrared Image Super-resolution Mode: 1280×1024 (used) @30 Hz Normal Mode: 640×512 **Focal Length:** 9.1 mm (equivalent: 40 mm)
1581F5BKB23C900F0104 (ID: NVEM30T002)	Drone DJI Matrice 30T	Dec 9th, 2023	**M30T Thermal Camera Sensitivity:** ≤50 mK@F1.0 **Temperature Measurement Range:** High Gain Mode: -20° to 150° C **Spectral Range:** 12 µm **Resolution:** Infrared Image Super-resolution Mode: 1280×1024 (used) @30 Hz Normal Mode: 640×512 **Focal Length:** 9.1 mm (equivalent: 40 mm)
2PNL309ATA (ID: NVE_LP12_001)	Spotlight CZI LP12	April, 2023	**Control:** on/off PSDK switch **Luminous Flux**: 2122±3%lm **Searchlight FOV:** 13° **Spot Diametre:** 34m (distance: 150m), 22.8m (distance: 100m), 29.6m (distance: 130m), 11.4m (distance: 50m) **Central Illuminance:** 25Lux (distance: 50m), 6.3Lux (distance: 100m), 2.5Lux (distance: 130m), 1.7Lux (distance: 150m)
T6SEUF583000CEF0 (ID: NVE_JZ_001)	Spotlight JZ_T60S MATRIX LAMP	March, 2024	**Control:** on/off PSDK switch **Lighting Power:** 60W **Luminous flux:** 4068lm (est.) **Searchlight FOV:** 14° **Spot Diameter:** 113m^2 (distance: 50m), 471m^2 (distance: 100m), 1063m^2 (distance: 150m) **Central Illuminance:** 36Lux (distance: 50m), 8.7Lux (distance: 100m), 3.7Lux (distance: 150m)

1.3 Personnel – RPAS Pilots

All drones were operated by qualified staff (*Table 2*) who hold a valid CASA Remote Pilots License (RePL) class multirotor <25kg, and Aeronautical Radio Operator Certificate (AROC). All pilots have completed additional industry specific training in drone survey under the NSW Wildlife Drone Hub, DCCEEW.

Each faunal identification was made by an ecologist with >5 years' experience in threatened mammal surveys including spotlighting, and camera trapping of the likely target species.

Table 2. Personnel qualifications

Personnel	Qualifications
Stephen Mahony (Pilot / Ecologist)	- Completed training in Koala drone survey under NSW Wildlife Drone Hub, DCCEEW. - Over 300 drone flight hours for Koala and arboreal mammal survey. - Eight years' experience in threatened mammal surveys including spotlighting for Koala, Squirrel Gliders and other arboreal mammals. - Bachelor of Science Major in Biology, University of Newcastle - RePL. ARN: 1196087 Multirotor <25kg, Powered Lift <25kg
Rebecca Seeto (Pilot / Ecologist)	- Completed training in Koala drone survey under NSW Wildlife Drone Hub, DCCEEW. - Over 200 drone flight hours for Koala and arboreal mammal survey. - Five years' experience in threatened mammal surveys including spotlighting for Koala, Squirrel Gliders and other arboreal mammals. - Bachelor of Biotechnology, University of Newcastle - RePL. ARN: 1221096 Multirotor <25kg
Nathan Stewart (Pilot / Ecologist)	- Trained in Koala drone and arboreal mammal survey under Stephen Mahony, Nightvision Ecology. - Six years' experience in threatened mammal surveys including spotlighting for Koala, Squirrel Gliders and other arboreal mammals. - Over 50 drone flight hours for Koala and arboreal mammal survey. - Bachelor of Biotechnology, University of Newcastle - RePL. ARN: 1248149 Multirotor <25kg
Oliver Brynes (Pilot / Ecologist)	- Completed training in Koala drone survey under NSW Wildlife Drone Hub, DCCEEW. - Over 150 drone flight hours for Koala and arboreal mammal survey. - Four years' experience in threatened mammal surveys including spotlighting for Koala, Squirrel Gliders and other arboreal mammals. - Bachelor of Biotechnology, University of Newcastle - RePL. ARN: 1197984 Multirotor <25kg

1 REFERENCES

DPE. (2022). *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide* (EHG 2022/0249). Environment and Heritage Group Department of Planning and Environment

Appendix P

HVOCP Category 1 – exempt land

umwelt
Environmental & Social Consultants

APPENDIX B – CATEGORY 1 – EXEMPT LAND MAPPING

FINAL

November 2022

APPENDIX B – CATEGORY 1 – EXEMPT LAND MAPPING

FINAL

Prepared by
Umwelt (Australia) Pty Limited

Project Director: Allison Riley
Project Manager: Kate Connolly
Report No. 4948/R01/Appendix B
Date: November 2022

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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Table of Contents

1.0 Category 1 – Exempt Land 1

1.1 Background 1

1.2 BCD Advice – August 2021 1

1.3 Land Categories 2

1.3.1 Category 1 – Exempt land 2

1.3.2 Category 2 – Regulated Land 2

1.3.3 Category 2 – Vulnerable Regulated Land 3

1.3.4 Category 2 – Sensitive Regulated Land 3

1.3.5 Excluded Land 3

2.0 Methodology 4

2.1 Example of Review Methods for Geo-rectified Aerial Imagery 5

3.0 Results 8

3.1 Category 1 – Exempt Land Mapping 8

3.2 Assessment for Critically Endangered Ecological Communities and Flora Species 10

3.3 Relevant Prescribed Impacts 11

4.0 References 12

Figures

Figure 2.1 Land Category Mapping Process 6

Figure 3.1 Category 1 – Exempt land map 9

Tables

Table 2.1 Methodology for Determining Category 1 – exempt land 4

Table 3.1 Land Map Categories in the Development Footprints 8

Table 3.2 Justification for Category 1 – exempt land mapping 10

Appendices

Appendix 1 Metadata List

Appendix 2 Coverage of Historical Aerial Imagery

Appendix 3 BCD Response Letter

1.0 Category 1 – Exempt Land

1.1 Background

Umwelt has been commissioned to undertake a biodiversity assessment for the Hunter Valley Operations (HVO) Continuation Project (the Project) under the *Biodiversity Conservation Act 2016* (BC Act) and in accordance with the Biodiversity Assessment Method (BAM). Section 6.8(3) of the BC Act states that:

"the biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the Local Land Services Act 2013)".

This exclusion means the Biodiversity Offsets Scheme (BOS) and credit obligations under the BC Act does not apply to areas identified as *Category 1 – exempt land* and therefore formal biodiversity surveys under the BAM are not required. An assessment of prescribed impacts is required on *Category 1 – exempt land* for clearing or development proposals when the BOS applies (refer to Section 6.3 of the BDAR).

At the time of writing, the Native Vegetation Regulatory (NVR) Map and related Guidance Document have not yet been finalised and the mapping of *Category 1 – exempt land* in and around the Project has not been released to the public. A transitional NVR Map has been published however this map doesn't include *Category 1 – exempt land* and only partly includes *Category 2 – regulated land*. As such, landholders are responsible for determining the categorisation of their land in accordance with the *Local Land Services Act 2013* (LLS Act).

1.2 BCD Advice – August 2021

In December 2020, Umwelt provided the draft Category 1 – Exempt Land mapping layer and methods for the Project for comment to the Biodiversity and Conservation Division (BCD) of the NSW Department of Planning and Environment (DPE). Advice from the BCD was received in August 2021 including a range of recommendations which are subsequently addressed in this report. This advice included:

- Category 2 – Vulnerable Regulated land shown on the Transitional NVR Map on the Project Area should be updated through a Map Review Request – addressed in **Section 3.1**.
- Excluded Land should be shown on the map for the Project Area. It should not be grouped with Category 1 land as it has its own rules for biodiversity assessment – addressed on **Figure 3.1** in this report and Figure 2.3 of the BDAR.
- A summary table should be prepared that summarising how much land of each NVR map category occurs in the Project area, and how much of that land is covered by existing development consents - refer to **Table 3.1** of this report.
- The proponent should follow the approach to estimating NVR map categories as closely as possible to BCD's approach, and the briefing note and GIS shapefile are updated to summarise the revised work - addressed in **Section 2.0** of this report.

1.3 Land Categories

1.3.1 Category 1 – Exempt land

Areas of *Category 1 – exempt land* includes those where vegetation was cleared as at 1 January 1990 or there has been a lawful removal of all native vegetation (all strata) prior to the commencement of Part 5A of the LLS Act, being 25 August 2017. 'Cleared as at 1990' has been interpreted as areas where there is clear evidence of the complete removal of all vegetation or evidence of compositional change in the grassland prior to 1990 and in which shrubs or trees had not regrown prior to 1990.

Complete removal of native vegetation has been interpreted as being areas where complete removal of ground cover has occurred, namely areas:

- that have been cropped/ploughed or significantly disturbed (as per clause 114 of the LLS Regulation) for agricultural purposes,
- extensively disturbed through land contouring works, and/or
- disturbed by approved mining, road construction or other approved activities.

Land is also considered *Category 1 – exempt land* if it contains low conservation value grasslands, however, at the time of mapping, the Project occurs in an area that was drought declared from mid-2017 up until October 2020 (DPI 2020). Drought conditions limited the ability to assess the conservation value of grasslands during field surveys, and therefore this criterion was not considered in the process. Since vegetation integrity (VI) data has already been collected as part of the Project, these potential low conservation grasslands were included in the BAM assessment.

1.3.2 Category 2 – Regulated Land

Areas of *Category 2 – regulated land* (that is not Vulnerable or Sensitive) includes land that has not been cleared of native vegetation before 1 January 1990 or was unlawfully cleared of native vegetation after 1 January 1990. This can include areas containing:

- native vegetation grown or preserved using public funds
- land in the proximity area of a coastal wetland or littoral rainforest areas
- land subject to (or previously subject to) a private native forestry plan
- medium conservation value grasslands
- low conservation grasslands beneath the canopy or drip line of woody vegetation and
- a travelling stock reserve (unless the land is located in the Western Division).

1.3.3 Category 2 – Vulnerable Regulated Land

Areas of *Category 2 – vulnerable regulated land* includes those where clearing of native vegetation may not be permitted under the Land Management (Native Vegetation) Code 2018 and includes:

- steep or highly erodible land
- protected riparian areas
- land susceptible to erosion, or land that is otherwise environmentally sensitive.

1.3.4 Category 2 – Sensitive Regulated Land

Areas of *Category 2 – sensitive regulated land* is land where clearing is not permitted under the Land Management Code (Native Vegetation) Code 2018, and a limited range of allowable activities is permitted. These areas include (but are not limited to):

- Land subject to private land conservation agreements, biocertification conservation measures, offsets under a Property Vegetation Plan (PVP), Biodiversity Stewardship sites.
- Coastal wetlands and littoral rainforests.
- Critically endangered communities and plants.
- High conservation grasslands.

1.3.5 Excluded Land

Excluded land are areas to which Part 5A of the LLS Act and the Land Management (Native Vegetation) Code 2018 do not apply, which includes:

- areas of the state to which the Vegetation SEPP applies
- national park estate and other conservation areas
- state forestry land.

2.0 Methodology

The method used to map *Category 1 – exempt land* was based on advice from the BCD in June 2020 and in August 2021. This advice included an overview of the process of mapping *Category 1 – exempt land* and draft text from the forthcoming Guidance Document which is currently in preparation and BCD's response to the draft *Category 1 – exempt land* mapping provided by Umwelt, respectively.

The draft *Category 1 – exempt land* mapping provided to BCD in December 2020 included an assessment across a wider Project Area for the Project that included existing and approved disturbance areas for HVO, Ravensworth Operations, Liddell Coal Operations and United Wambo JV mines. These areas were included in the assessment to document the extent of current and historical removal of native vegetation within the wider Project Area, however it is acknowledged that only areas of *Category 1 – exempt land* mapped outside of approved disturbance areas are relevant to the BAM assessment for the Project.

Following a range of Project updates and evolution of the project boundaries, the final *Category 1 – exempt land* mapping presented in this report covers the relevant HVO North and South Development Footprints only (i.e. areas subject to impacts that require development approval under the NSW EP&A Act assessment).

Areas confidently identified as meeting the criteria for *Category 1 – exempt land* were mapped directly into GIS and categorised as either:

- Agricultural Disturbance – Pre 1990
- Agricultural Disturbance – Post 1990
- Other Disturbance – Pre 1990
- Other Disturbance – Post 1990.

Later revisions to the mapping also included areas categorised as roads and access tracks, buildings, or farm dams, which were established prior to 25 August 2017.

Table 2.1 outlines the BCD's advice on the correct method for determining *Category 1 – exempt land* in August 2021 and the corresponding method undertaken by Umwelt. **Figure 2.1** illustrates this process.

Table 2.1 Methodology for Determining Category 1 – exempt land

BCD Advice (August 2021)	Umwelt Method and Resources
Identifying rural areas where the NVR map applies by compiling layers representing land that becomes excluded areas in the map and therefore no further analysis or mapping is done – used to identify excluded land	Review of Transitional NVR Map for areas categorised as *Excluded land* sourced from SEED portal.
Identifying and mapping existing and historical agricultural land use – used to identify category 1 land	Review of the 2017 land use layer showing Australian land use and management land classes (DPIE 2020).

BCD Advice (August 2021)	Umwelt Method and Resources
Supplementing the mapping of agricultural land use by applying a tool that is a time series analysis of satellite imagery and identifies non-woody vegetation that has been significantly disturbed or modified for agricultural use since 1 January 1990 – used to identify category 1 land	Potential *Category 1 – exempt land* areas were identified using geo-rectified aerial imagery over several years between 1958 and May 2020, in addition to online historical imagery contained in Google Earth and Nearmap and several non-geo-rectified aerial images. Images were reviewed to determine areas which were identified as having been completely cleared or extensively disturbed through land contouring works or ploughing. The process included the identification of areas which showed clear terrain changes between two images evidencing clearance of any vegetation which may have existed in that area. An example of this process is provided below (**Photo 2.1**).
Identifying and mapping woody vegetation cleared since 1 January 1990, based on satellite images and circa 1990 aerial photographs – used to identify category 1 land	Review of the *NSW Native Vegetation Extent 5m Raster v1.2* available from the SEED Portal.
Applying any additional prescribed area criteria listed in the LLS Act that allocate land to either category 1 or category 2	Assessment of likelihood of occurrence of critically endangered ecological communities (CEECs) and critically endangered flora species (refer to **Section 3.2**).
Applying any additional prescribed area criteria listed in the LLS Act that allocate land to category 2 - sensitive regulated land	Review of Transitional NVR Map for areas identified as *Category 2 – vulnerable regulated land* or *sensitive regulated land* (DPIE 2019) except where those areas have been mapped based on data that predated approved mining related disturbance which has since changed the terrain such as the features driving the Category 2 classification (as mapped) are no longer present. In this case, a request for a Map Review will be submitted to DPE to ensure the *Category 1 – exempt land* mapping is updated for future use.
Applying any additional prescribed area criteria listed in the LLS Act that allocate land to category 2 - vulnerable regulated land	

2.1 Example of Review Methods for Geo-rectified Aerial Imagery

An area in the north-west of the HVO North Development Footprint was identified as *Category 1 – exempt land* and rather than evidence coming from aerial imagery taken shortly after the disturbance occurred, the justification for *Category 1 – exempt land* mapping came from the identification of tillage in grassland (refer to **Photo 2.1**). Evidence of tillage was not in other aerial imagery and it is hypothesised that historic tillage became more evident during the drought conditions in 2018.

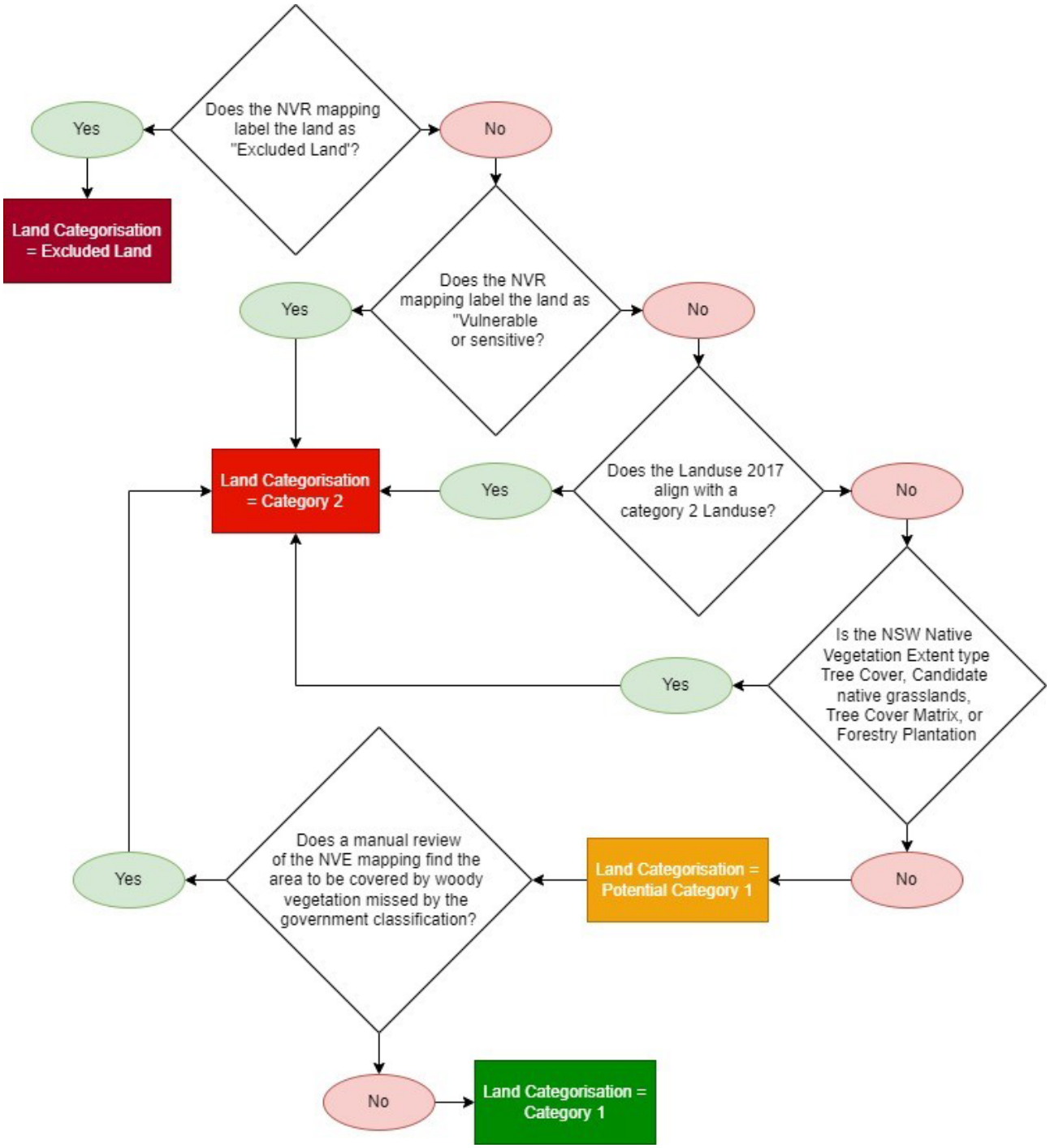


Figure 2.1 Land Category Mapping Process

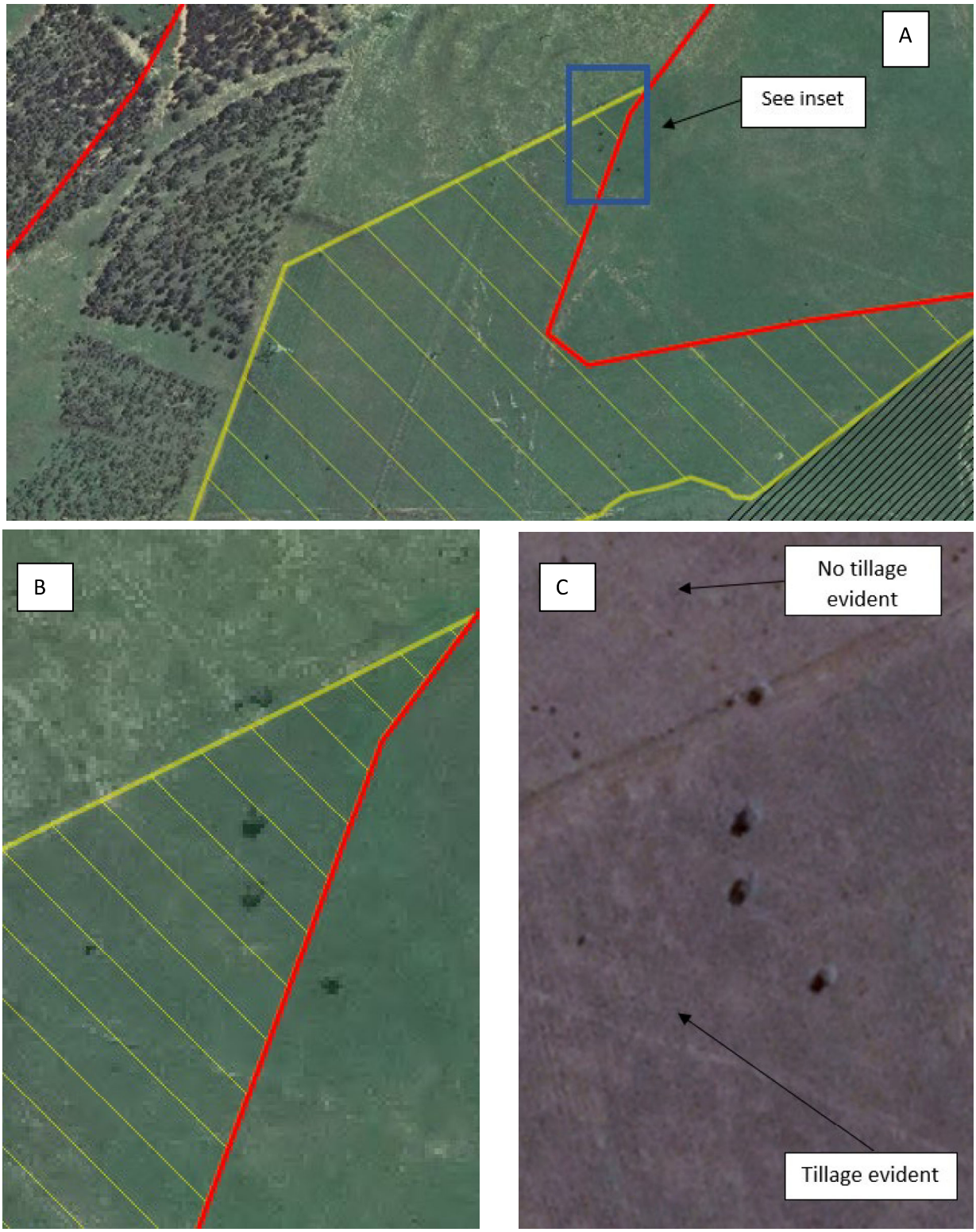


Photo 2.1 Justification for mapping of Category 1 – exempt land in north-west of HVO North Development Footprint

Comparison is shown between a) and b) aerial imagery taken in February 2020 (image "HVO_RGB_ECW_Mosaic_1m") and c) imagery taken on 9 September 2018 (source: Google Earth).

3.0 Results

3.1 Category 1 – Exempt Land Mapping

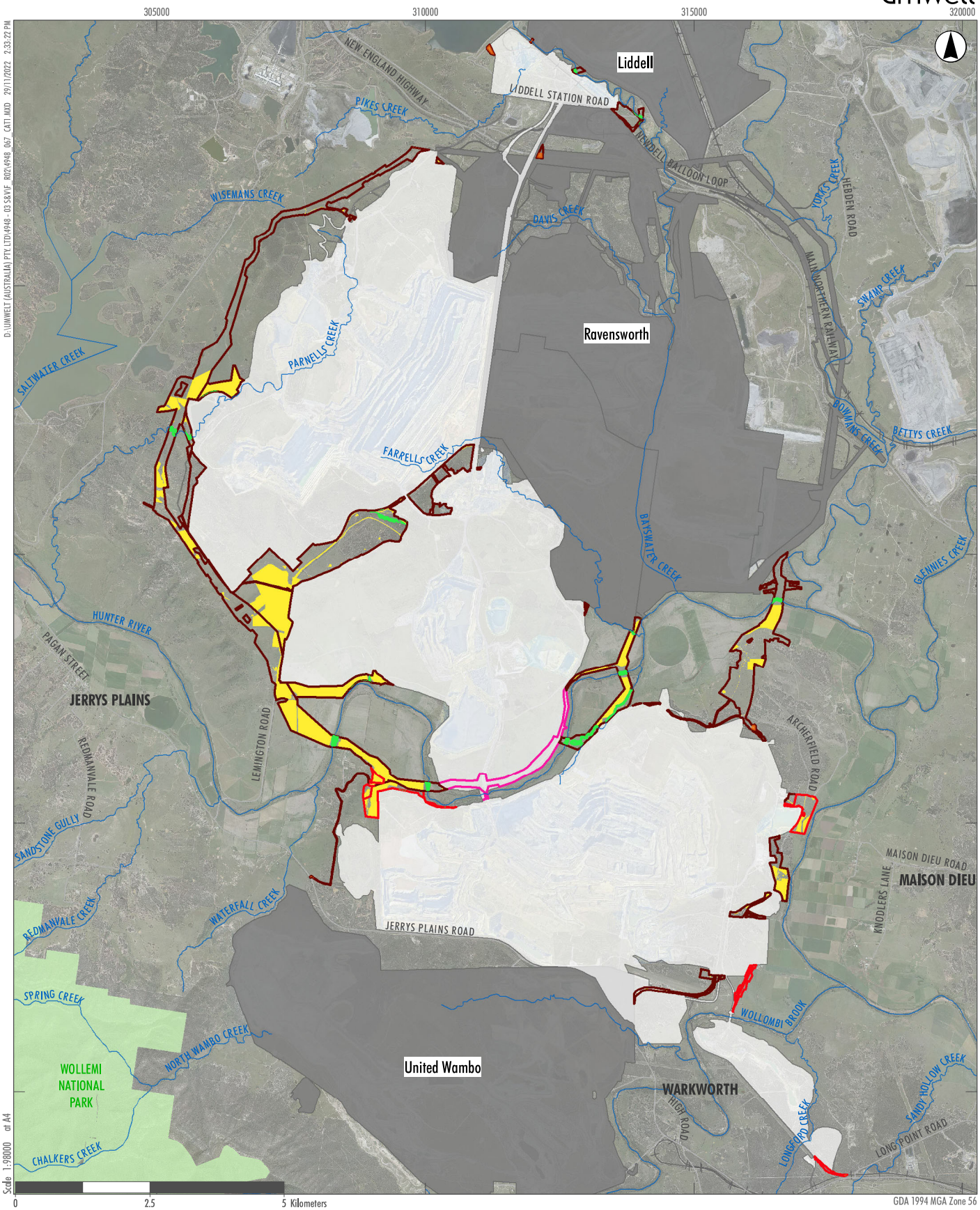
The mapping identified a total of approximately 360 ha of *Category 1 – exempt land* within the Development Footprints (refer to **Figure 3.1** below – replicated from Figure 2.3 in the BDAR). The majority of *Category 1 – exempt land* mapped areas include those that have undergone agricultural disturbance, particularly in proximity to the Hunter River, or historical disturbance associated with road works or mining related disturbance.

The review of the NVR Map components identified approximately 26 ha of *Category 2 – vulnerable regulated land*, and approximately 3.5 ha of *Excluded land* within the Development Footprints (refer to **Table 3.1** below).

Table 3.1 Land Map Categories in the Development Footprints

Land Category	HVO North (ha)	HVO South (ha)	Total
Category 1 – exempt land	334.6	25.0	359.6
Category 2 – regulated land	0.0	0.0	0.0
Category 2 – vulnerable regulated land	26.0	0.1	26.1
Category 2 – sensitive regulated land	0.0	0.0	0.0
Excluded land	3.3	0.2	3.5
Total	**363.9**	**25.3**	**389.2**

Approximately 1 ha of land mapped on the NVR Map as *Category 2 – vulnerable regulated land* was determined to be incorrect due to previously approved mining disturbance. A request for a Map Review will be submitted to DPE for these areas.



Legend

- HVO North Development Footprint
- HVO South Development Footprint
- HVO Existing and Approved Disturbance Areas
- Approved Disturbance Area - Other Mine
- River Red Gum Additional Disturbance Area
- Category 1 - Exempt Land

Native Vegetation Regulatory (NVR) within Development Footprints

- Category 2 - Vulnerable Regulated Land
- Excluded Land

- Drainage Line
- Road
- Railway Line
- National Parks (NPWS Estate)

FIGURE 3.1

Category 1 – Exempt Land

Image Source: HVO (2021) Data source: NSW DFSI (2021), Geoscience Australia; Forestry Corporation of NSW (2019), NPWS Estate (2019), © State Government of NSW and Department of Planning and Environment 2022

3.2 Assessment for Critically Endangered Ecological Communities and Flora Species

Critically endangered ecological communities (CEECs) and critically endangered flora species are designated as *Category 2-sensitive regulated land* on the NVR Map. No State-wide comprehensive mapping of all CEECs and critically endangered species of plants is available. During the NVR Map transitional period, it is expected that the proponent provides an assessment to demonstrate whether a CEEC and/or critically endangered plants are present or absent.

No critically endangered flora species have been recorded in or in proximity to the Development Footprints. No CEECs listed under the BC Act have been recorded in the Development Footprints however three CEECs listed under the Commonwealth EPBC Act have been recorded in the Development Footprints being:

- *Central Hunter Valley Eucalypt Forest and Woodland CEEC*
- *Warkworth Sands Woodland of the Hunter Valley CEEC*
- *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.*

Following the detailed review of geo-rectified aerial imagery it is expected that only grassland components of CEECs would have the potential to occur in *Category 1 - exempt land* mapping. Of the CEECs recorded in the Development Footprints *Central Hunter Valley Eucalypt Forest and Woodland CEEC* and *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC* include a derived native grassland component subject to condition thresholds as per the relevant listing and conservation advices. 88 vegetation integrity plots and 72 rapid vegetation assessment were undertaken across the Development Footprints, with an additional 203 rapid vegetation assessments undertaken in the wider locality.

Table 3.2 below provides justification for the *Category 1 - exempt land* mapping and evidence to demonstrate these areas do not contain CEECs.

Table 3.2 Justification for Category 1 – exempt land mapping

Critically Endangered Ecological Community	Derived Native Grassland Component Description	Justification
Central Hunter Valley Eucalypt Forest and Woodland CEEC	Derived native grasslands and shrublands are included in the CEEC where they are situated in a gap in, or at the edge of a patch, or between two patches where they are separated by a distance up to 30 m (TSSC 2015).	A review of the mapping of the CEEC locational to the proposed *Category 1 - exempt land* mapping indicates that there are no areas of potentially CEEC-conforming DNG mapped as *Category 1 – exempt land*. Areas where *Category 1 – exempt land* occurs near the CEEC in the Development Footprint represent cleared areas such as dams, tracks and roads. DNG areas that conform to the CEEC in gaps or on the edge of a patch have not been included in the *Category 1 – exempt land* mapping.

Critically Endangered Ecological Community	Derived Native Grassland Component Description	Justification
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC	Grasslands that conform to this CEEC must occur in an area where the characteristic canopy species have been removed and native species-rich understorey remains. It must have a predominately native understorey (i.e. more than 50% of the perennial vegetative groundlayer must comprise native species). The patch must be greater than 0.1 ha and contain 12 or more native understorey species (excluding grasses), including one or more 'important' species as per the Listing Advice (TSSC 2006).	A DNG component of this community has not been recorded within the Development Footprints primarily due to a lack of characteristic and 'important' native species in the understorey. The community was recorded in one discrete location in the HVO North Development Footprint. Areas of *Category 1 -exempt land* mapped in proximity to this patch represents cleared areas consisting of dams.

3.3 Relevant Prescribed Impacts

As per the requirements of Section 6.12 of the BC Act, the BAM assessment has excluded impacts relating to native vegetation and habitat loss on *Category 1 – exempt land*. In the Hunter Valley and within the Development Footprints this most often relates to clearance from agricultural practices or historic mining consents. As such, these areas are usually characterised by derived native or exotic grasslands, which may be suitable for the occupation of Hunter Valley delma (*Delma vescolineata*). This species has been recorded in the native grassland and thinned woodland habitats of the Development Footprints.

Due to the nature of the historic disturbance, it is expected that a large proportion of the Category 1 – exempt land is characterised by exotic grasslands which represents less suitable habitat for the species, as evidenced by the targeted survey results. Nonetheless the species may utilise this habitat for movement between areas of higher quality native grassland. Prescribed impacts on the Hunter Valley delma in relation to *Category 1 – exempt land* are assessed in Table 6.6 of the BDAR.

4.0 References

Department of Planning, Industry and Environment (DPIE) (2015). NSW Woody Vegetation Extent & FPC 2011. Available at https://datasets.seed.nsw.gov.au/dataset/nsw-woody-vegetation-extent-fpc-20119bb42, accessed June 2020.

Department of Planning, Industry and Environment (DPIE) (2019) Native Vegetation Regulatory Map Viewer. Available at https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap, accessed September 2022.

Department of Planning, Industry and Environment (DPIE) (2020). NSW Landuse 2017 v1.2. Available at https://datasets.seed.nsw.gov.au/dataset/nsw-landuse-2017-v1p2-f0ed, accessed June 2020.

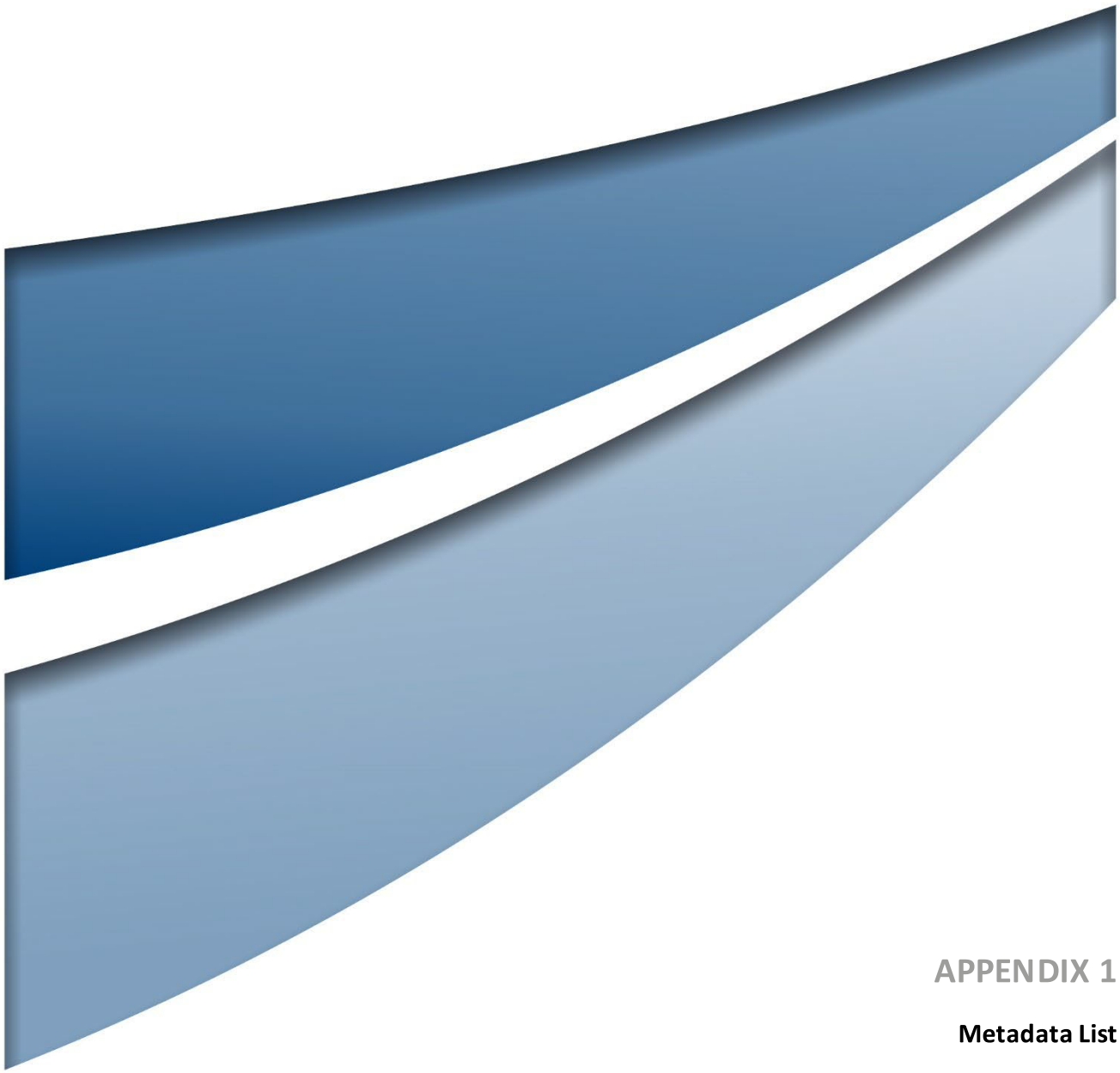
Department of Primary Industries (DPI) (2020). Seasonal Conditions Information Portal – Ravensworth Parish, Durham County (Hunter LLS). Accessed June 2020.

Native vegetation regulatory map land categorisation and the Biodiversity Offsets Scheme - Native vegetation regulatory map land categorisation and the Biodiversity Offsets Scheme | NSW Environment and Heritage accessed October 2022.

Office of Environment and Heritage (OEH) (2017). Interim Grasslands and other Groundcover Assessment Method Calculator: User Guide. Available at: https://www.lmbc.nsw.gov.au/gamcalc/app/assets/GGAMTools_UserGuide.pdf

Threatened Species Scientific Committee (TSSC) (2006). 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/system/files/pages/dcad3aa6-2230-44cb-9a2f-5e1dca33db6b/files/box-gum.pdf

Threatened Species Scientific Committee (TSSC) (2015). Approved Conservation Advice (including listing advice) for the Central Hunter Valley eucalypt forest and woodland ecological community. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/130-conservation-advice.pdf



APPENDIX 1

Metadata List

Images	Year	Source
1958_215_4M_029_MGA56	1958	NSW LPI Historical Aerial Photography
1963_1186_01_140_MGA56	1963	NSW LPI Historical Aerial Photography
1967_Combined_Aerials_rev1_georef_MGA56	1967	NSW LPI Historical Aerial Photography
1974_2242_3M_04__8_09_MGA56	1974	NSW LPI Historical Aerial Photography
1974_2242_3M_045	1974	NSW LPI Historical Aerial Photography
1974_2242_3M_047	1974	NSW LPI Historical Aerial Photography
1979_2784_01_064__30_06_MGA56	1979	NSW LPI Historical Aerial Photography
Cessnock 30Jun79	1979	Glencore
1983_Combined_Aerials_rev1_georef_mga56 2	1983	NSW LPI Historical Aerial Photography
1983_3360_01_047	1983	NSW LPI Historical Aerial Photography
1987_3573_01_211_MGA56	1987	NSW LPI Historical Aerial Photography
1987_3573_01_213_MGA56	1987	NSW LPI Historical Aerial Photography
Cessnock 29May87	1987	Glencore
1989_3707_11_076_MGA56	1989	NSW LPI Historical Aerial Photography
1989_3707_11_077_MGA56	1989	NSW LPI Historical Aerial Photography
1989_3707_12_032_MGA56	1989	NSW LPI Historical Aerial Photography
1989_3707_R13_9033_3707_13_022_MGA56	1989	NSW LPI Historical Aerial Photography
1990_3763_01_044_MGA56	1990	NSW LPI Historical Aerial Photography
1990_3763_01_047_MGA56	1990	NSW LPI Historical Aerial Photography
1990_9132_3763_01_045_MGA56	1990	NSW LPI Historical Aerial Photography
Cessnock 11Nov90	1990	Glencore

Images	Year	Source
1992_4089_01_087_MGA56	1992	NSW LPI Historical Aerial Photography
1993_4170_13_174_27_11_MGA56	1993	NSW LPI Historical Aerial Photography
1993_4106_13_145_MGA56	1993	NSW LPI Historical Aerial Photography
1993_4109_11_172_MGA56	1993	NSW LPI Historical Aerial Photography
1993_4170_11_123_MGA56	1993	NSW LPI Historical Aerial Photography
1993_4170_13_173_MGA56	1993	NSW LPI Historical Aerial Photography
1993_4170_13_175	1993	NSW LPI Historical Aerial Photography
1993_Combined_MGA56	1993	NSW LPI Historical Aerial Photography
1994_4236_02_238_MGA56	1994	NSW LPI Historical Aerial Photography
1994_4237_01_005_MGA56	1994	NSW LPI Historical Aerial Photography
Cessnock 3Sep94	1994	Glencore
Cessnock 3Sep94_2	1994	Glencore
1997_3573_01_213	1997	NSW LPI Historical Aerial Photography
1998_4440_10_170_MGA56	1998	NSW LPI Historical Aerial Photography
1998_4440_11_122_MGA56	1998	NSW LPI Historical Aerial Photography
1998_4440_13_118	1998	NSW LPI Historical Aerial Photography
1998_4457_01_112_MGA56	1998	NSW LPI Historical Aerial Photography
1998_4457_01_133_MGA56	1998	NSW LPI Historical Aerial Photography
Cessnock 21Oct98	1998	Glencore
2005_Dec_HVO_orthophoto_MGA56	2005	Glencore
15417A_RTCA_HVO_Tile1_16122008	2008	Rio Tinto Coal Australia (RTCA)
15417A_RTCA_HVO_Tile2_16122008	2008	RTCA

Images	Year	Source
15417A_RTCA_HVO_Tile3_16122008	2008	RTCA
15417A_RTCA_HVO_Tile4_16122008	2008	RTCA
EPSG28356_Date20140701_Lat-32.495674_Lon151.034374_Mpp4.777	2014	Nearmap
HVO_RGB_ECW_Mosaic_1m	2020 (Feb)	Glencore
EPSG28356_Date20200503_Lat-32.500875_Lon151.007423_Mpp4.777	2020	Nearmap
EPSG28356_Date20200503_Lat-32.403878_Lon151.001415_Mpp0.299	2020	Nearmap
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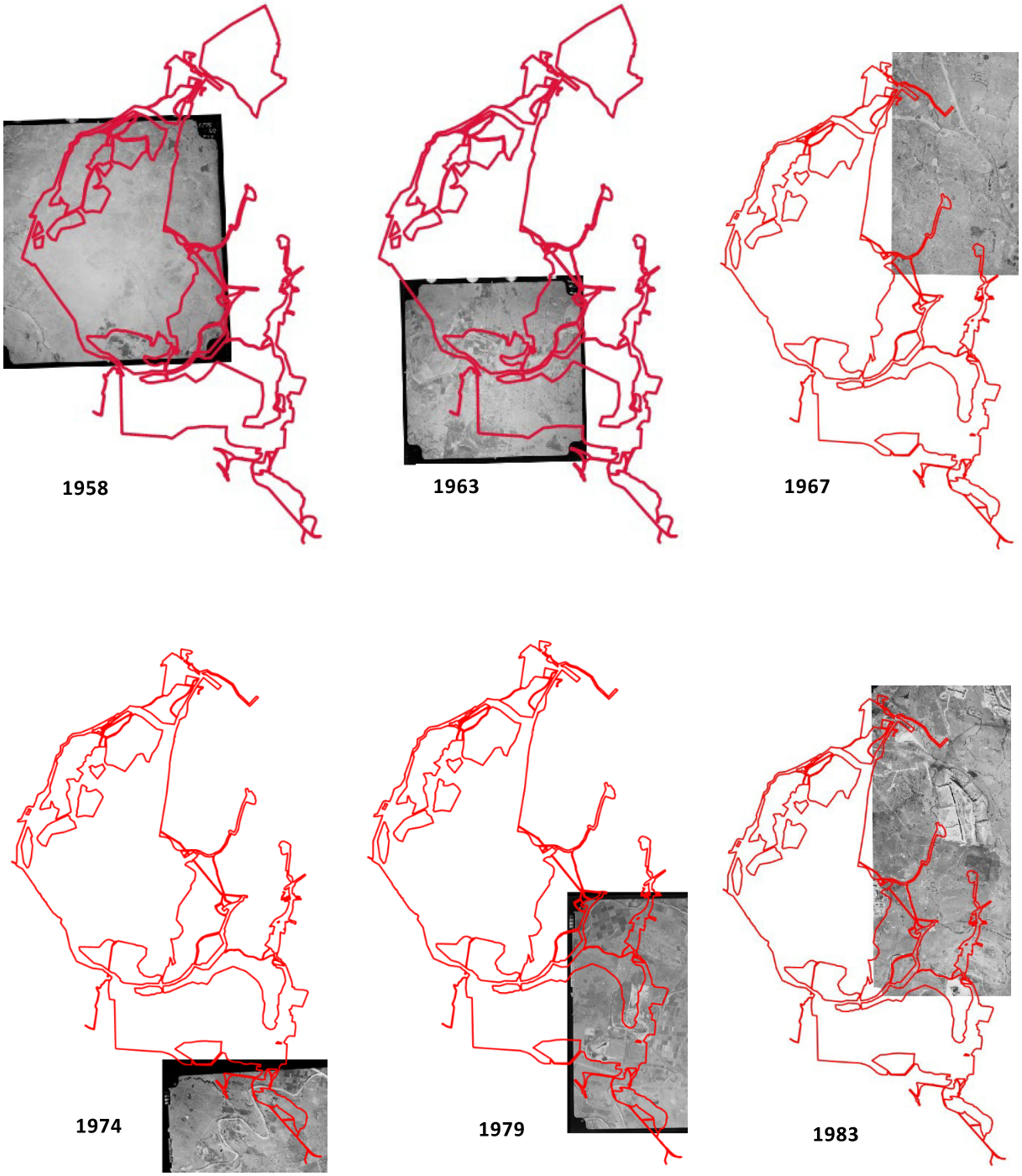
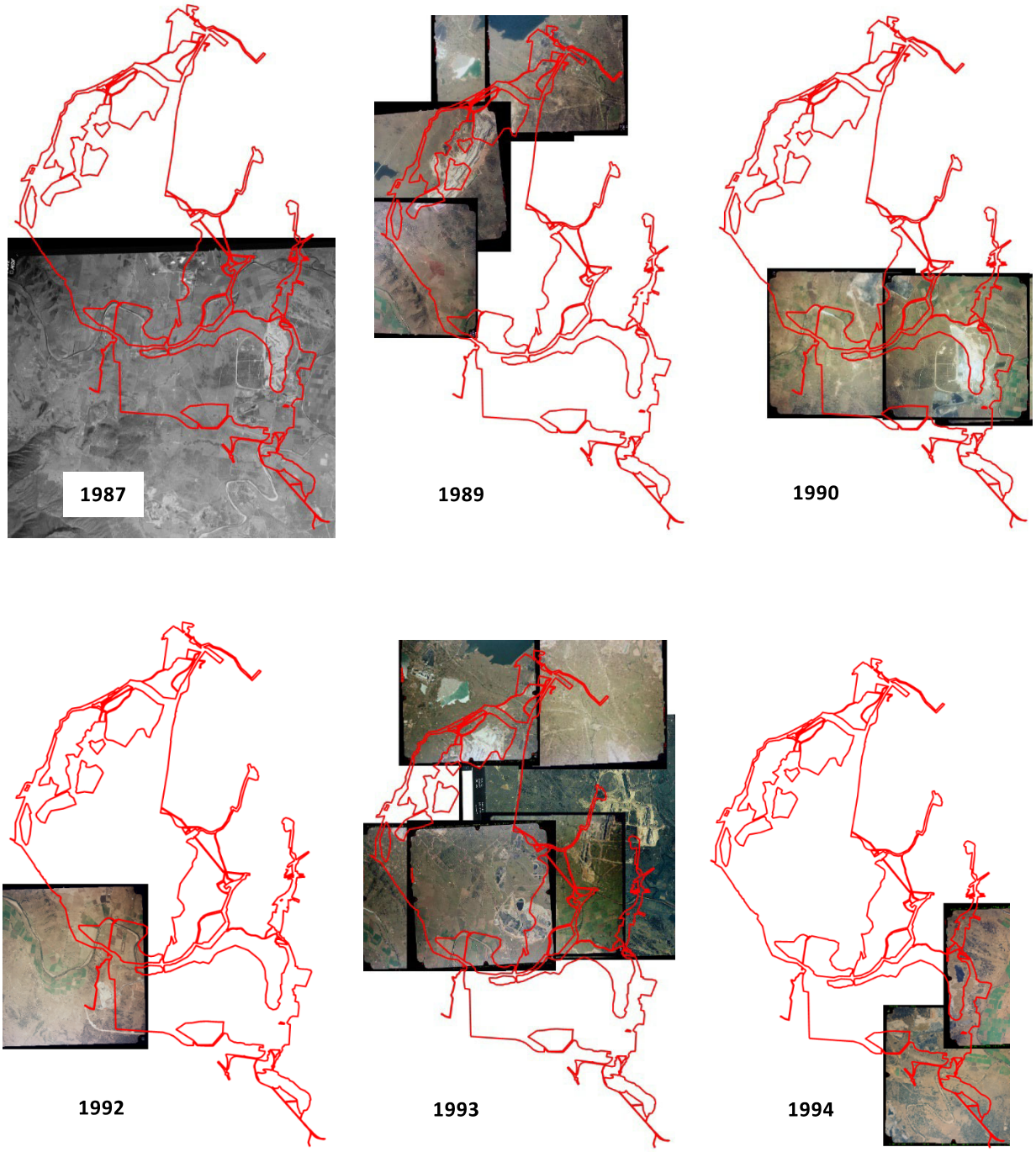
https://www.google.com/earth/	multiple	Google Earth
http://maps.six.nsw.gov.au/arcgis/services/public/NSW_Imagery/MapServer/WMSServer	multiple	NSW LPI Imagery Best

APPENDIX 2

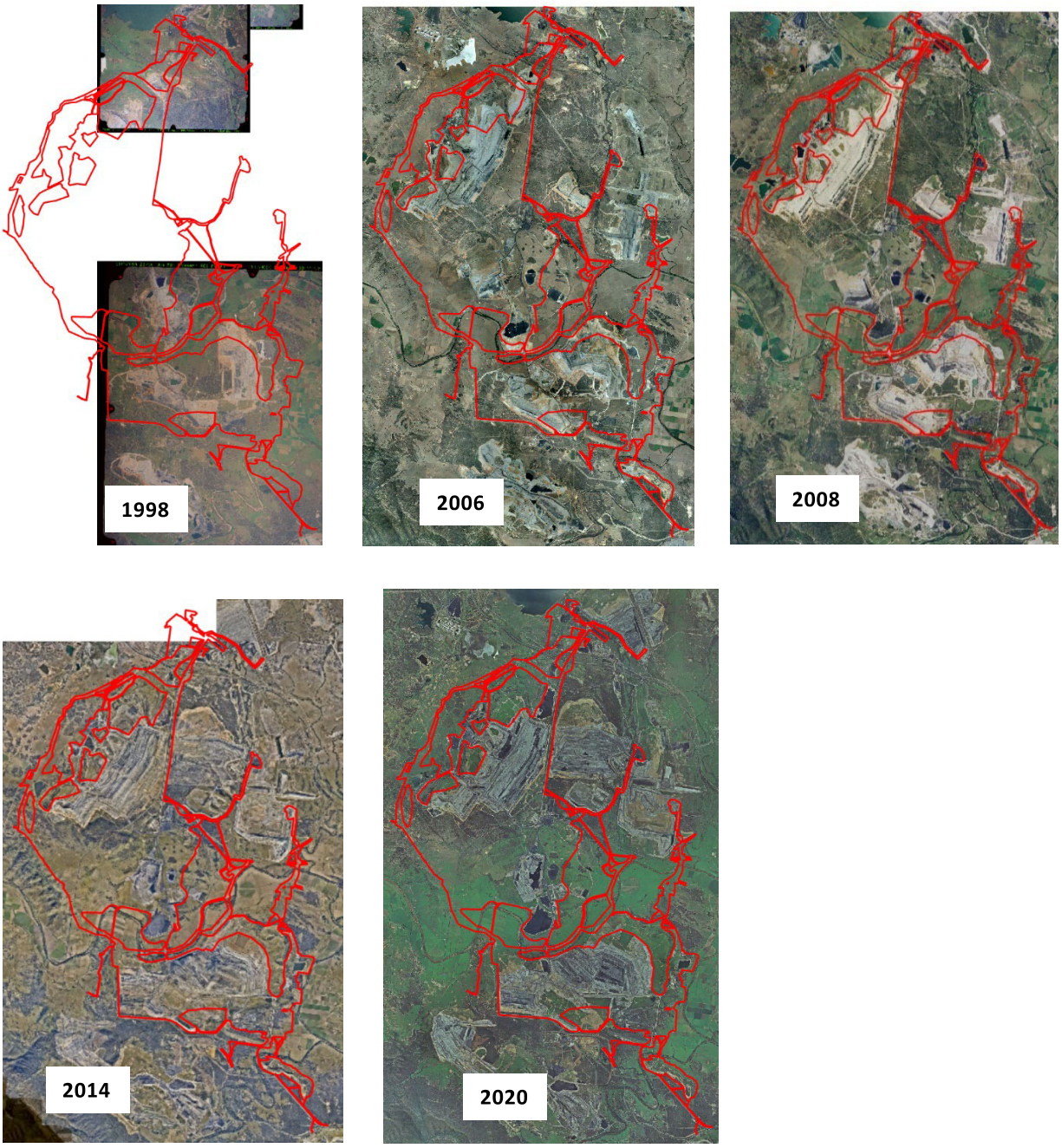
Coverage of Historical Aerial Imagery



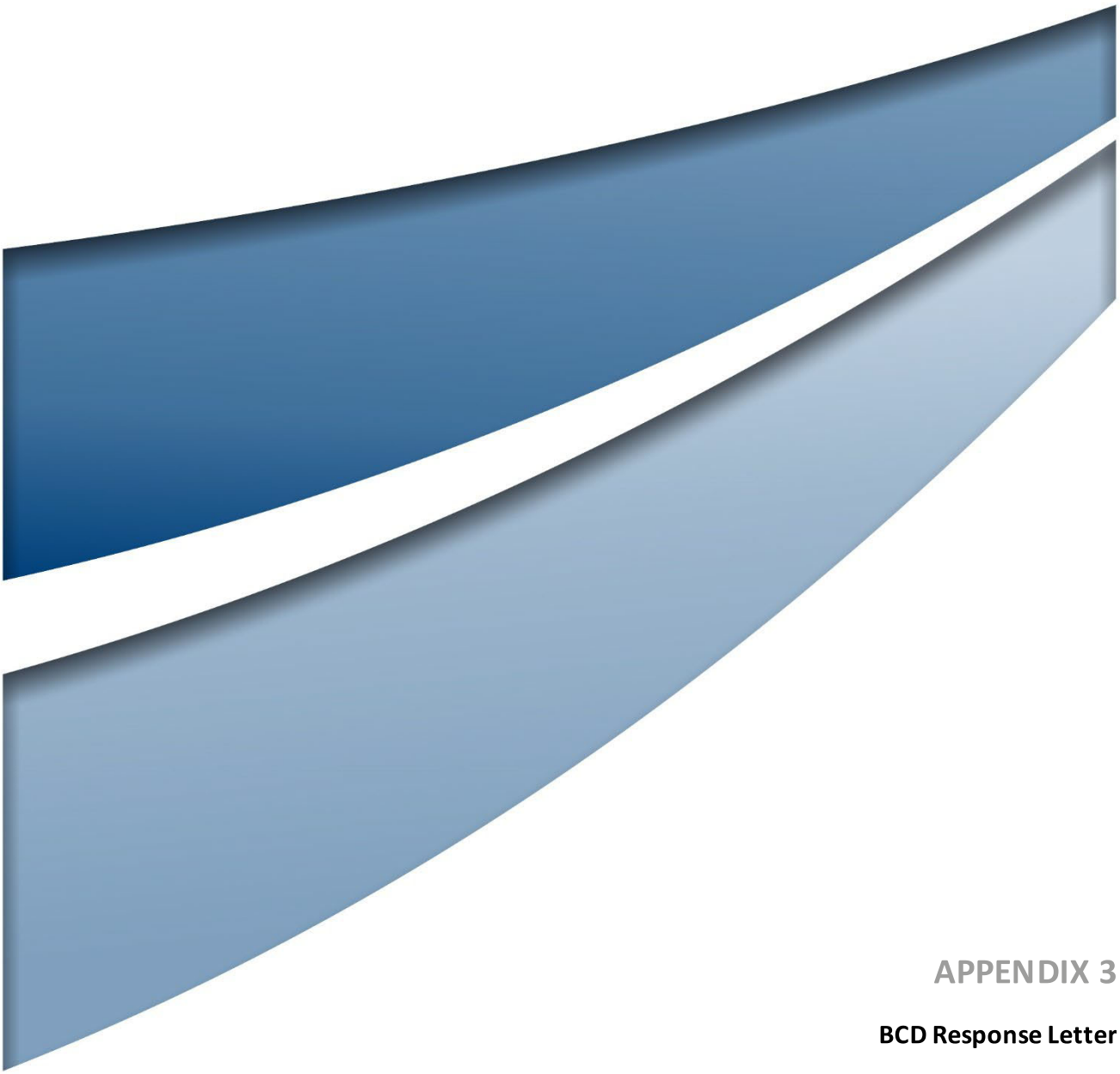
Project Footprint (V12) and coverage of aerial imagery from 1958, 1963, 1967, 1974, 1979 and 1983



Project Footprint (V12) and coverage of aerial imagery from 1987, 1989, 1990, 1992, 1993 and 1994



Project Footprint (V12) and coverage of aerial imagery from 1998, 2006, 2008, 2014 and 2020



APPENDIX 3

BCD Response Letter

Planning, Industry & Environment

Our ref: DOC20/954523-11
Your ref: 4948_R02_HVO_Armit_20201211a_bn.docx

Ms Nicole Armit

Director
EMM Consulting
narmit@emmconsulting.com.au

Dear Ms Armit

Hunter Valley Operations Continuation Project (SSD-11826621) – Category 1 - exempt land mapping

I refer to your e-mail dated 23 December 2020, which included a Briefing Note (dated 11 December 2020) that describes how Umwelt (Australia) Pty Limited has estimated the extent of Category 1 – exempt land (Cat-1 land) mapped for the proposed Hunter Valley Operations Continuation Project (SSD-11826621). You also provided a copy of the Geographic Information System (GIS) shapefiles of the estimated Cat-1 land. Biodiversity and Conservation Division (BCD) has reviewed the Briefing Note and shapefiles and provides comments below.

Your inquiry arises from the Native Vegetation Regulatory (NVR) Map, which is a product of Division 2 or Part 5A of the *Local Land Services Act 2013* (LLS Act). The NVR map has five classes of land (all but one triggers a Biodiversity Assessment Method (BAM) assessment):

- Category 1 – exempt land (no BAM assessment required)
- Category 2 – regulated land (BAM assessment required)
- Category 2 – vulnerable regulated land (BAM assessment required)
- Category 2 – sensitive regulated land (BAM assessment required)
- Excluded Land – land that is excluded from Part 5 of the LLS Act (BAM assessment required)

The Transitional NVR Map [available at https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap] does not show Category-1 land or Category 2-regulated land, which instead must be estimated. The Transitional NVR Map shows Category 2 – vulnerable regulated land and land excluded from the operation of the LLS Act within the Project area. Umwelt (Australia) Pty Limited's map (provided as GIS shapefiles) only has Category-1 land, but it includes Category 2- regulated land and Excluded Land. The Briefing Note states that this approach was taken due to existing development consents for mining operations that cover most of the Project area, however, this is a separate factor to the categories in the NVR map.

BCD has reviewed the Briefing Note and GIS shapefiles provided. BCD's recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B.** A summary of how the NVR categories are determined for a property is provided in **Attachment C**.

If you require any further information regarding this matter, please contact Robert Gibson, Regional Biodiversity Conservation Officer, on 4927 3154 or via email at huntercentralcoast@environment.nsw.gov.au

Yours sincerely

STEVEN CRICK
Acting Senior Team Leader Planning
Hunter Central Coast Branch
Biodiversity and Conservation Division

Date: 5 August 2021

Enclosure: Attachments A, B and C

Attachment A

BCD's recommendations

Hunter Valley Operations Continuation Project (SSD-11826621)

1. Category 2 - vulnerable regulated land shown on the Transitional NVR Map on the Project area should be updated through a map review request.

2. Excluded Land should be shown on the map for the Project area. It should not be grouped with Category 1 land as it has its own rules for biodiversity assessment.

3. A summary table should be prepared that summarises how much land of each NVR map category occurs in the Project area, and how much of that land is covered by existing development consents.

4. The proponent should follow the approach to estimating NVR map categories as closely as possible to BCD's approach, and that the Briefing Note and GIS shapefiles are updated to summarise the revised work.

Attachment B

BCD's detailed comments

Hunter Valley Operations Continuation Project (SSD-11826621)

Biodiversity

1. Mapped Category 2 land in the Project area needs to be addressed

The Transitional Native Vegetation Regulatory (NVR) Map shows Category 2 - vulnerable regulated land mapped in the Project area, and this needs to be addressed. BCD notes that in the Project area Category 2 - vulnerable regulated land appears to be associated with steep slopes on waste dumps and on streams. Mining activities have changed most of those features since the date of the satellite image on which the NVR mapping is based was taken. To update the NVR map, a map review is be required. An application for this can be made at: https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/native-vegetation-regulatory-map/review If approved, such a review would update the NVR map for the project area. Any Category 2 - vulnerable regulated land removed from the Project area by the map review would then need to be reassigned to a different NVR map category.

The Geographic Information Sydney (GIS) shapefile of Category 2 – vulnerable land is available on the SEED portal [https://www.seed.nsw.gov.au/] at https://datasets.seed.nsw.gov.au/dataset/vulnerable-land-protected-riparian73a9e. Check the SEED portal for any other available Category 2 land mapping.

Recommendation 1

Category 2 - vulnerable regulated land shown on the Transitional NVR Map on the Project area should be updated through a map review request.

2. Excluded land must be shown for the Project area and considered in accordance with its own requirements

The Transitional NVR Map shows 'Excluded Land' mapped in the Project area, and this needs to be addressed. Areas of Excluded Land need to be shown on the map for the Project area. This data layer is available on the SEED portal [https://datasets.seed.nsw.gov.au/dataset/nvr-map-excluded-land-clone-63f7-clone-4927]. BCD recommends that Excluded Land is removed from the estimated Category 1 land layer for the project area.

Recommendation 2

Excluded Land should be shown on the map for the Project area. It should not be grouped with Category 1 land as it has its own rules for biodiversity assessment.

3. A table is required that summarises areas of each NVR map category for the Project area

The Briefing Note does not include a summary table of the areas of each of the NVR map category lands in the Project area. The GIS shapefiles provided do not show all NVR map categories. It is therefore difficult to reconcile the data provided. BCD recommends that a summary table is prepared following the format below, to summarise the findings of the NVR map exercise.

NVR Map Category	In Study Area (ha)	In Project area (ha)	Area covered by current consents (ha)
Category 1 – exempt land			
Category 2 – regulated land			
Category 2 – vulnerable regulated land			
Category 2 – sensitive regulated land			
Excluded land			
TOTAL			

Recommendation 3

A summary table should be prepared that summarises how much land of each NVR map category occurs in the Project area, and how much of that land is covered by existing development consents.

4. The process for estimating NVR land categories requires consideration of all factors stipulated in the *Local Land Services Act 2013*

The process by which BCD determined categories in the NVR map is summarised in **Attachment C.** Until the publication of the NVR map that shows all categories, the transitional arrangements described in Section 60F of the LLS Act apply, including consideration of low conservation value grasslands. NVR map categories are not affected by existing consents. BCD recommends that the process that Umwelt (Australia) Pty Limited uses to estimate the NVR map follows the approach used by BCD, with data sets from the SEED portal, and that the Briefing Note, and GIS shapefiles are revised to reflect this new approach.

Recommendation 4

The proponent should follow the approach to estimating NVR map categories as closely as possible to BCD's approach, and that the Briefing Note and GIS shapefiles are updated to summarise the revised work.

Attachment C

Summary of BCD's approach to determining the Native Vegetation Regulatory Map categories

The process for assigning a land category in the Native Vegetation Regulatory (NVR) Map involves combining and analysing multiple data layers and products, and the application of the various data sets specified in the *Local Land Services Act 2013* (LLS Act). It is not a linear process, as some layers will take precedence over others to develop the final map product for publication.

The NVR categorisation of land is done by the following steps:

- Identifying rural areas where the NVR map applies by compiling layers representing land that becomes excluded areas in the map and therefore no further analysis or mapping is done – used to identify excluded land
- Identifying and mapping existing and historical agricultural land use – used to identify category 1 land
- Supplementing the mapping of agricultural land use by applying a tool that is a time series analysis of satellite imagery and identifies non-woody vegetation that has been significantly disturbed or modified for agricultural use since 1 January 1990 – used to identify category 1 land
- Identifying and mapping woody vegetation cleared since 1 January 1990, based on satellite images and circa 1990 aerial photographs – used to identify category 1 land
- Applying any additional prescribed area criteria listed in the LLS Act that allocate land to either category 1 or category 2
- Applying any additional prescribed area criteria listed in the LLS Act that allocate land to category 2 - sensitive regulated land
- Applying any additional prescribed area criteria listed in the LLS Act that allocate land to category 2 - vulnerable regulated land

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Environmental & Social
Consultants

Umwelt (Australia) Pty Limited

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Appendix Q

Remote assessment

Memo

To:	Department of Climate Change, Energy, the Environment and Water
From:	Alex Cockerill
Subject:	**Application for Remote Assessment of biodiversity values – Hunter Transmission Project**
Our ref:	PS201156-ECO-NSW-Remote Assessment-RevAC
Date:	**30 June 2025**

This memo has been prepared by WSP Australia Pty Ltd on behalf of Energy Corporation of NSW (Energy Co) for the proposed Hunter Transmission Project (HTP) (the project).

WSP Australia Pty Ltd are currently undertaking a Biodiversity Development Assessment Report (BDAR) that accompanies an Environmental Impact Statement for the project. Due to the projects strategic importance, it has been declared as Critical State Significance Infrastructure (CSSI) under Section 5.13 of the EP&A Act.

The projects transmission corridor of around 100 kilometres, passes through areas of State Forest, Crown Land, active mine leases and private land holdings. Due to some limited access restrictions, EnergyCo have requested approval for the use of the recently released *Remote assessment of biodiversity values: Biodiversity Assessment Method guide* (DCCEEW, 2025) (the guide).

The guide is restricted to CSSI projects application of BAM in situations where access is not possible to land on which impacts are likely to occur. The guide allows for the remote assessment of biodiversity values using a combination of existing data, tools, information and surrogate sites, where appropriate.

EnergyCo's request on 8 May 2025 for application of the guide across limited private land holdings for a select number of threatened flora species was approved by CPHR on 14 May 2025 (refer to Attachment A).

This memo includes an assessment of environmental characteristics of the restricted areas through available relevant desktop resources and provides a comparison of these areas with surrogate areas of survey. The information considered includes:

- similarity in PCTs in the same broad condition state as well as patch size and connectivity to native vegetation for fauna species (see data below)
- similarity in land use history, soils, geology, landscape position, elevation, slope, rainfall etc (see data below)
- records of the species within the local area

The list of candidate species to be considered through surrogate survey information and why this approach is, with justification provided on ecology and life history traits is also provided n accordance with section 3.2.3 of the guide.

A summary of the proposed surrogate survey information used to inform assumptions with regard to species in the assessment area, including:

- where surrogate site/s are proposed to determine presence, information on:
- proximity to inaccessible area
- survey approach used in the surrogate site to determine the species presence in accordance with section 5.3 of the BAM
- limitations in relation to the application of the surrogate data to estimate presence of the species in the inaccessible areas
- all spatial data should be prepared with reference to Appendix D of the BAM Stage 2 Ops Manual.

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WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

WSP Australia Pty Limited ABN 80 078 004 798

1.1 Sites proposed for application of the guide

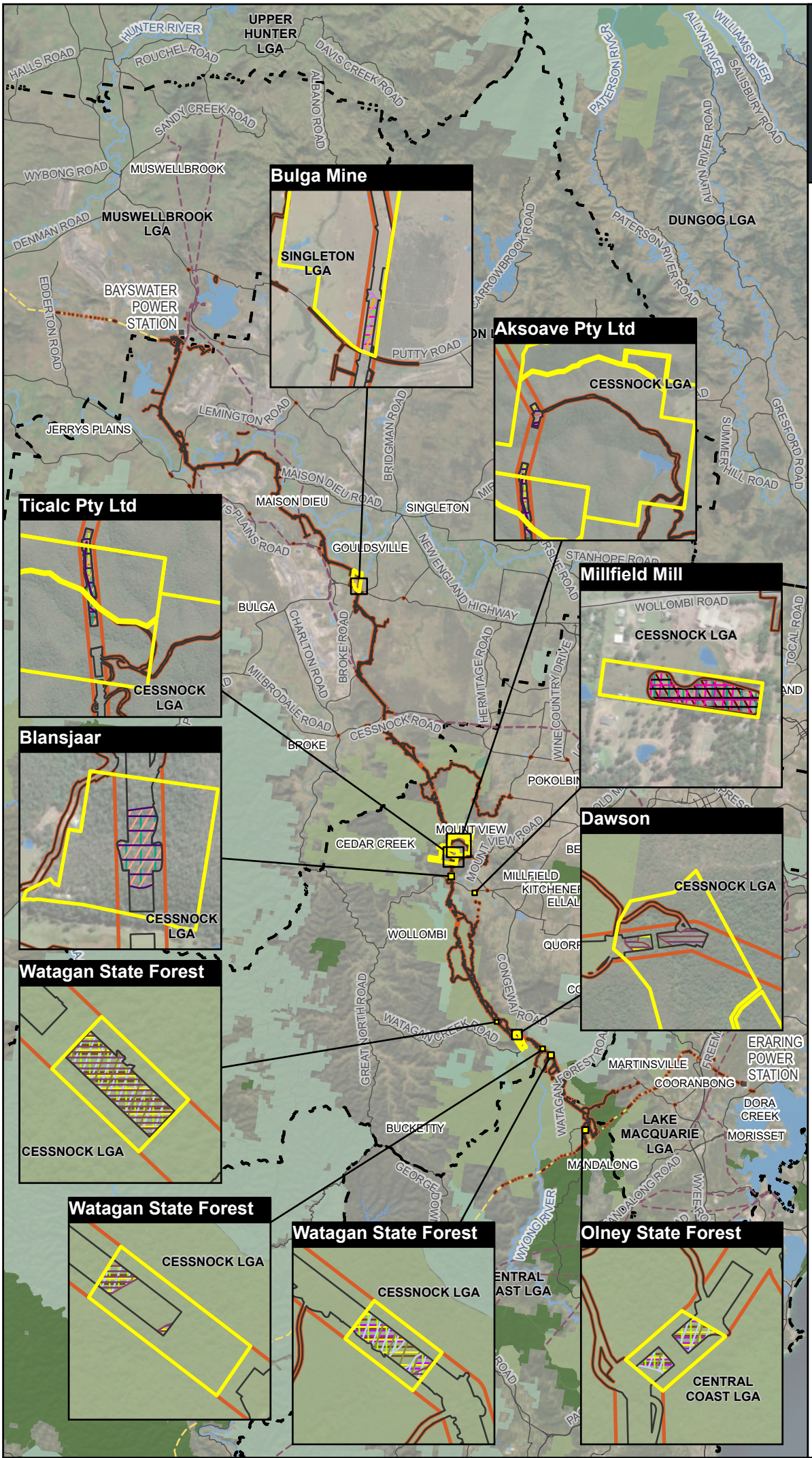
The application of the guide was restricted to six private landholdings and four minor areas of the State Forest that have restricted access for targeted surveys within the subject land (refer to Figure 1). These sites include:

- Watagan/Olney State Forest: Survey has been unable to be conducted within small areas due to steep topographic constraints, cliffs etc or heavy overgrowth of Native Raspberry (*Rubus rosifolius*) and other vine species following disturbance, which have made the site impenetrable for survey.
- Dawson Property: no flora surveys have been undertaken within this property due to access limitations during survey periods.
- Blansjaar Property: no survey has been undertaken within this property due to access restrictions over the course of the entire project.
- Aksoave Pty Ltd and Ticalc Pty Ltd: no survey has been undertaken within this property due to access restrictions over the course of the entire project.
- Millfield Mill (near the junction of Wollombi Rd and Hayes Rd): no survey has been undertaken within this property due to access restrictions over the course of the entire project.
- Bulga Mine (northern private lease): existing access agreements have not previously included a northern landholding. No survey to date has been undertaken within this restricted site.

1.1.1 Characteristics of the restricted access areas and surrogate survey areas proposed for application of the guide

Table 1 Location and size of restricted access areas

Restricted access area	IBRA subregion	Subject land within restricted access area (ha)	Proportion of restricted access area within total project subject land (%)
Olney SF	Wyong	1.28	0.10
Watagan SF	Wyong	4.80	0.38
Dawson Property	Wyong	4.07	0.32
Millfield Mill	Hunter	1.58	0.12
Blansjaar Property	Yengo	3.42	0.27
TICALC Pty Ltd	Yengo	11.75	0.93
Aksoave Pty Ltd	Yengo	10.29	0.81
Bulga Mine	Hunter	18.70	1.48
Total		**55.89**	**4.41**



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Hunter Transmission Project

Figure 1
Restricted access

Legend

- Biodiversity study area
- Subject land

Existing environment

- Road
- Power station
- 330 kV transmission line
- 500 kV transmission line
- River
- Waterbody
- NPWS reserve
- State conservation area
- Flora reserve
- State forest
- Local government area
- Restricted access area

Assumed flora polygons within restricted access area

- *Acacia pendula*
- *Asperula asthenes*
- *Commersonia rosea*
- *Corybas dowlingii*
- *Cynanchum elegans*
- *Diuris tricolor*
- *Dyllwynia tenuifolia*
- *Eucalyptus fracta*
- *Eucalyptus pumila*
- *Grammitis stenophylla*
- *Grevillea parviflora*
- *Melaleuca biconvexa*
- *Olearia cordata*
- *Ozothamnus tesselatus*
- *Pomaderris queenslandica*
- *Prasophyllum petilum*
- *Prasophyllum wybong*
- *Prostanthera cineolifera*
- *Pterostylis chaetophora*
- *Pterostylis gibbosa*
- *Rhizanthella slateri*
- *Rhodomyrtus psidioides*
- *Rutidosis heterogama*
- *Senna acclinis*
- *Tetratheca juncea*
- *Velleia perfoliata*
- *Zieria involucrata*

0 5 10
Kilometres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A4

GDA 2020 1:500,000 Date: 2/06/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Earthstar Geographics

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1.1.2 Mitchell landscape

A summary of the NSW (Mitchell) landscapes within the subject land and assessment area for each IBRA subregion is provided in Table 2 and Figure 2.

Table 2 Mitchell landscape summary

Restricted access area	IBRA subregion	Mitchell landscape name	Subject land within restricted access area (ha)	Area within proposed surrogate survey (ha)
Olney SF	Wyong	Watagan Ranges	1.28	145.32
Watagan SF	Wyong	Watagan Ranges	4.80	145.32
Dawson Property	Wyong	Watagan Ranges	4.07	145.32
Millfield Mill	Hunter	Central Hunter Foothills	1.58	603.80
Blansjaar Property	Yengo	Central Hunter Alluvial Plains	0.90	12.76
		Watagan Ranges	2.51	241.22
TICALC Pty Ltd	Yengo	Watagan Ranges	11.75	241.22
Aksoave Pty Ltd	Yengo	Watagan Ranges	10.29	241.22
Bulga Mine	Hunter	Central Hunter Alluvial Plains	5.30	88.01
		Central Hunter Foothills	13.39	603.80

1.1.3 Geology and elevation

The specific geology of the subject land is mapped by the Colquhoun et. al. (2025) as comprising the geological units presented in Table 3 and Figure 3. Elevation ranges of the restricted access areas are also provided in Table 4.

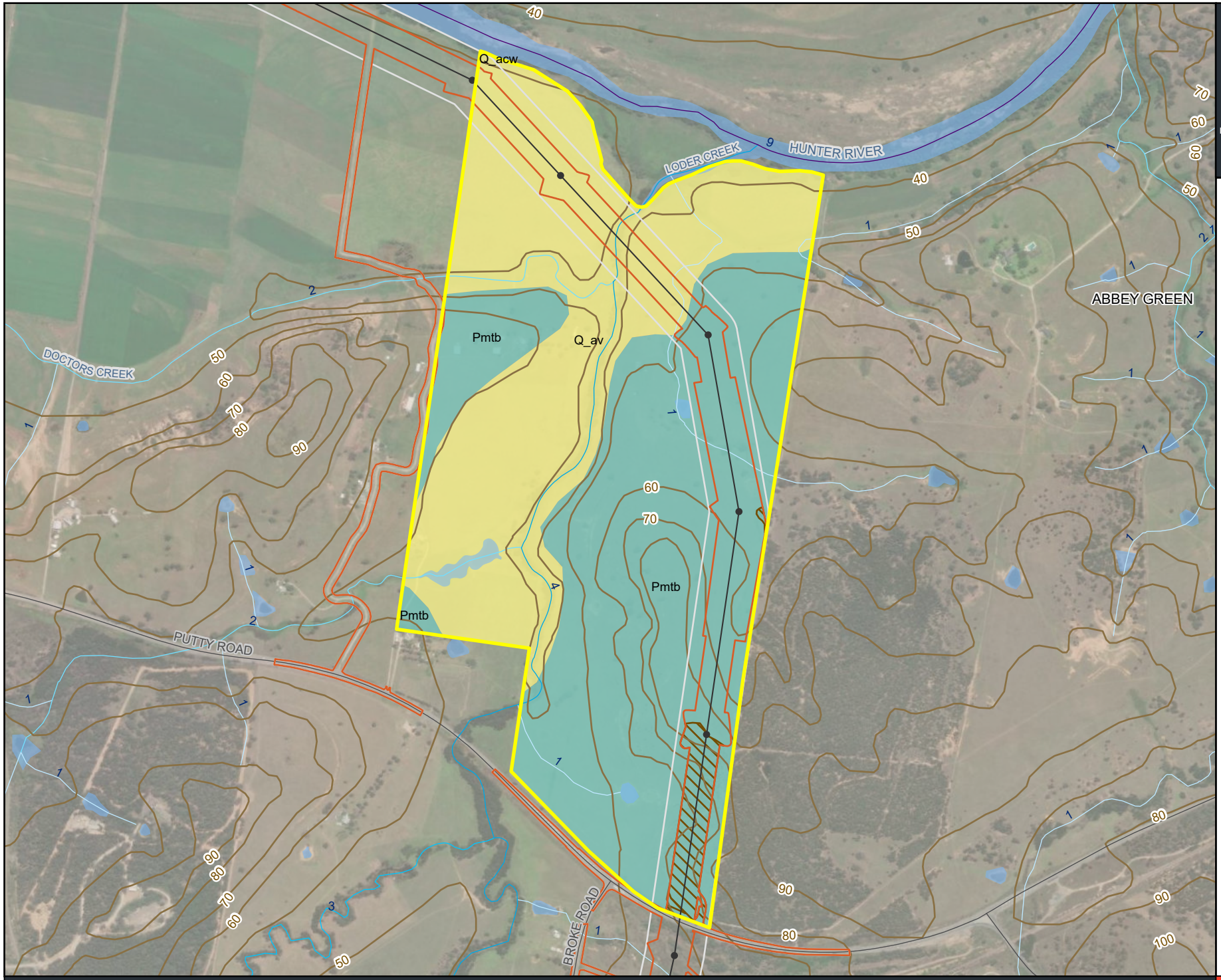
Table 3 Geology within subject land within restricted access properties

Property name	IBRA subregion	Stratigraphic unit	Parent unit	Subject land within restricted access area (ha)	Area within proposed surrogate survey (ha)
Olney SF	Wyong	Hawkesbury Sandstone	Ungrouped Triassic units	0.07	145.22
		Terrigal Formation	Gosford Subgroup	1.21	70.26
Watagan SF	Wyong	Hawkesbury Sandstone	Ungrouped Triassic units	1.53	145.22
		Terrigal Formation	Gosford Subgroup	3.27	70.26
Dawson Property	Wyong	Hawkesbury Sandstone	Ungrouped Triassic units	3.58	145.22
		Terrigal Formation	Gosford Subgroup	0.49	70.26
Millfield Mill	Hunter	Branxton Formation	Maitland Group	1.58	85.32

Property name	IBRA subregion	Stratigraphic unit	Parent unit	Subject land within restricted access area (ha)	Area within proposed surrogate survey (ha)
Blansjaar Property	Yengo	Alluvium	Quaternary	0.01	9.24
		Grose Subgroup	Narrabeen Group	3.19	176.37
		Newcastle Coal Measures	Singleton Supergroup	3.19	12.88
TICALC Pty Ltd	Yengo	Grose Subgroup	Narrabeen Group	11.75	176.37
Aksoave Pty Ltd	Yengo	Grose Subgroup	Narrabeen Group	7.61	176.37
		Newcastle Coal Measures	Singleton Supergroup	2.68	12.88
Bulga Mine	Hunter	Alluvial valley deposits	Alluvium	5.35	124.67
		Branxton Formation	Maitland Group	13.34	73.56

Table 4 Elevation ranges within subject land within restricted access properties

Property name	Minimum elevation (m)	Maximum elevation (m)	Surrogate survey area within elevation range (ha)
Olney SF	300	370	Yes
Watagan SF	300	410	Yes
Dawson Property	160	450	Yes
Millfield Mill	110	120	Yes
Blansjaar Property	150	210	Yes
TICALC Pty Ltd	290	390	Yes
Aksoave Pty Ltd	170	370	Yes
Bulga Mine	40	90	Yes



Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Bulga Mine (Restricted access)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line

Existing environment

- Road
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3
- 4
- 9

Geology - rock units

- Pmtb - Branxton Formation
- Q_acw - Alluvial channel deposits - subaqueous
- Q_av - Alluvial valley deposits

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:12,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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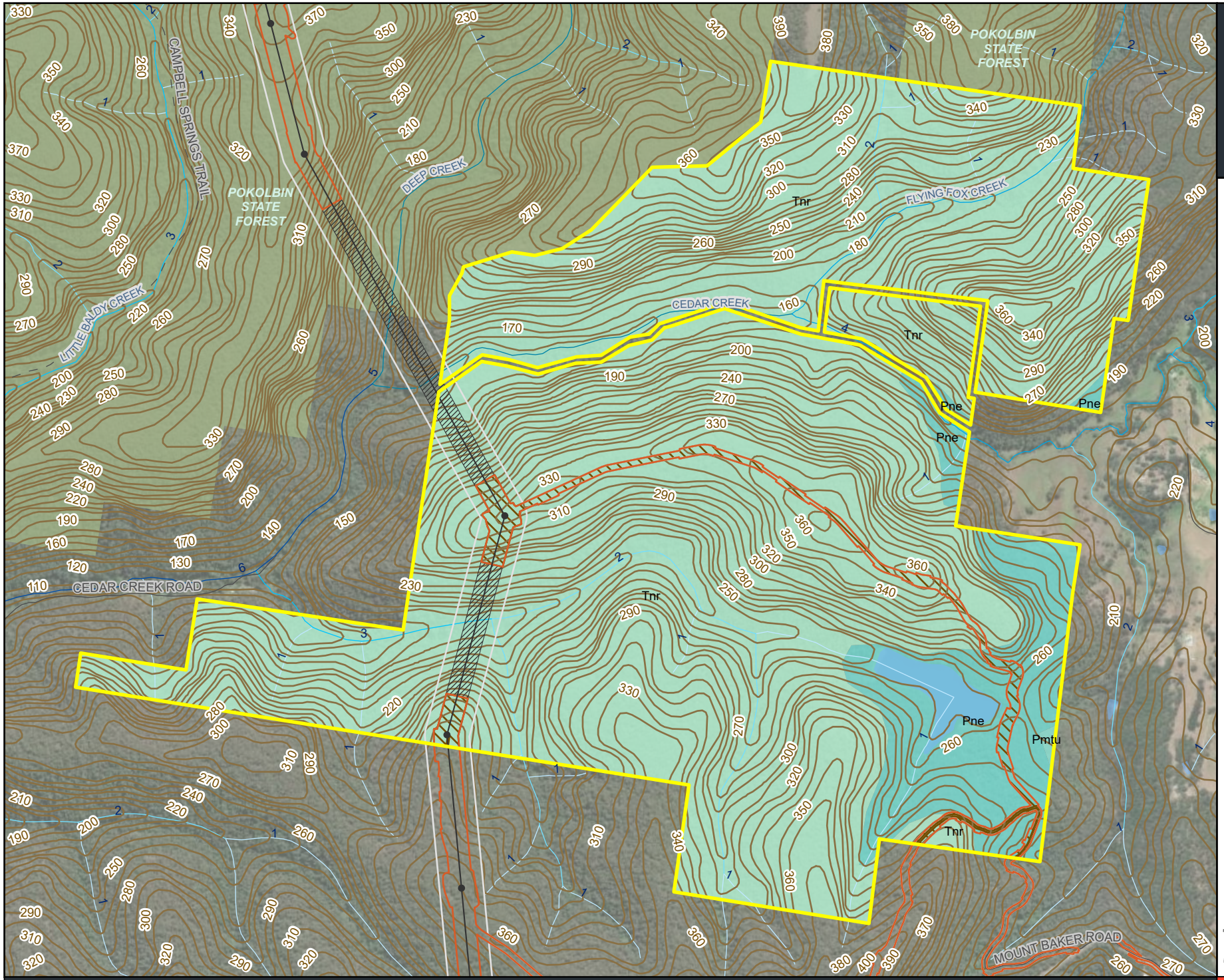

Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Aksoave Pty Limited
(No access)
Page 2 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Waterbody
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3
- 4
- 5
- 6

Geology - rock units

- Pmtu - Muree Sandstone
- Pne - Newcastle Coal Measures
- Tnr - Grose Subgroup

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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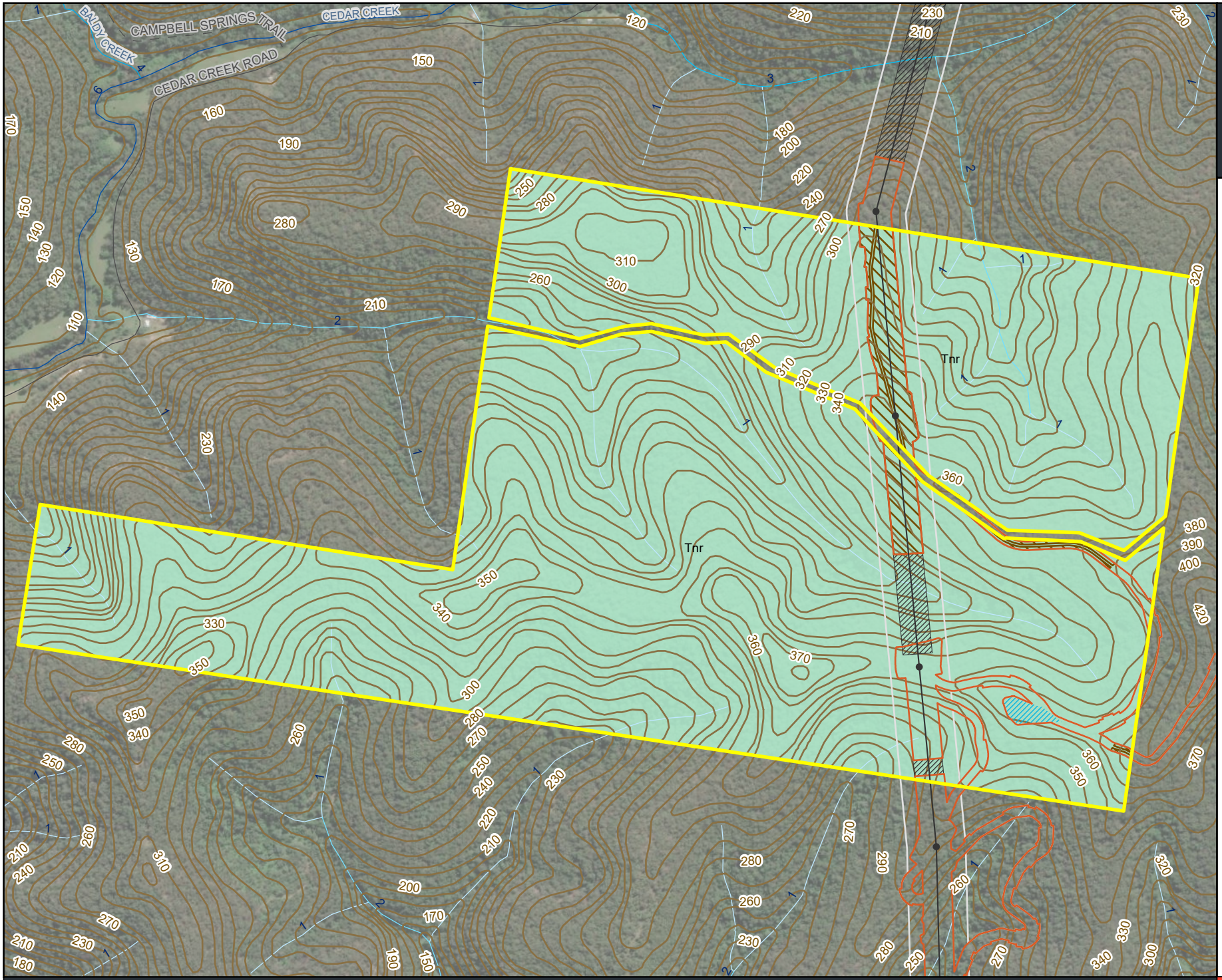


Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Ticalc Pty Ltd
(Access restricted by Aksoave property)
Page 3 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area
- Laydown area

Existing environment

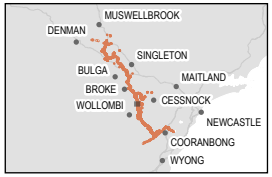
- Road
- Track
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3
- 4
- 6

Geology - rock units

- Tnr - Grose Subgroup



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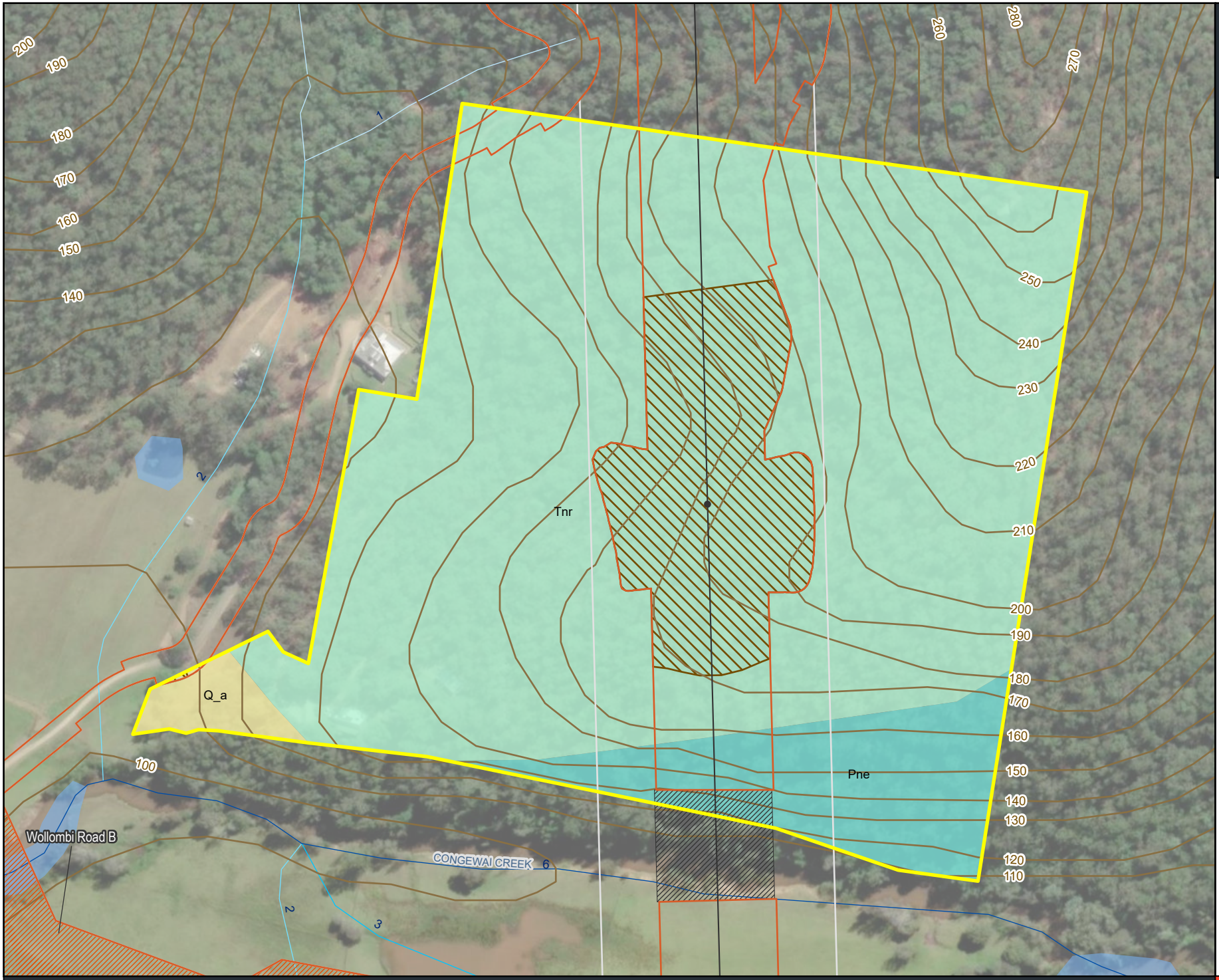

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Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Blansjaar (No access)
Page 4 of 10

Legend

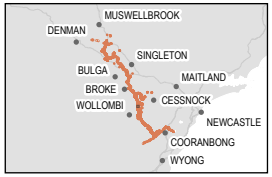
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area
- Construction support site
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3
- 6

Geology - rock units

- Pne - Newcastle Coal Measures
- Q_a - Alluvium
- Tnr - Grose Subgroup



0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Millfield Mill (No access)
Page 5 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Laydown area

Existing environment

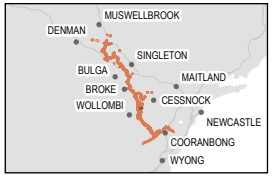
- Road
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1

Geology - rock units

- Pmtb - Branxton Formation
- Pmtbf - Fenestella Shale Member



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Metres

Coordinate system: GDA2020 MGA Zone 56

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1:3,000 Date: 29/05/2025

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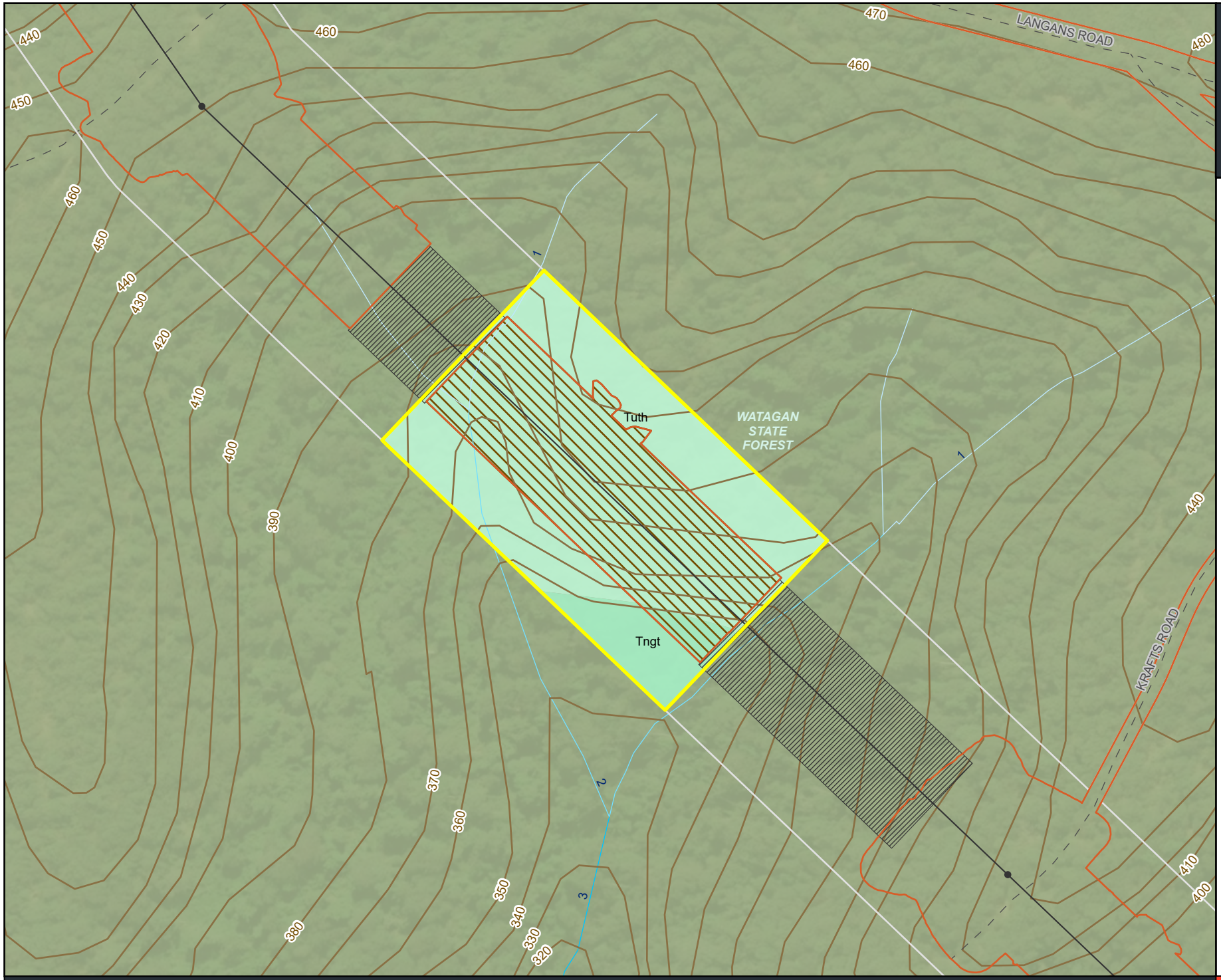

Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Watagan State Forest
(Topographic or other safety constraints)
Page 6 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Track
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3

Geology - rock units

- Tngt - Terrigal Formation
- Tuth - Hawkesbury Sandstone

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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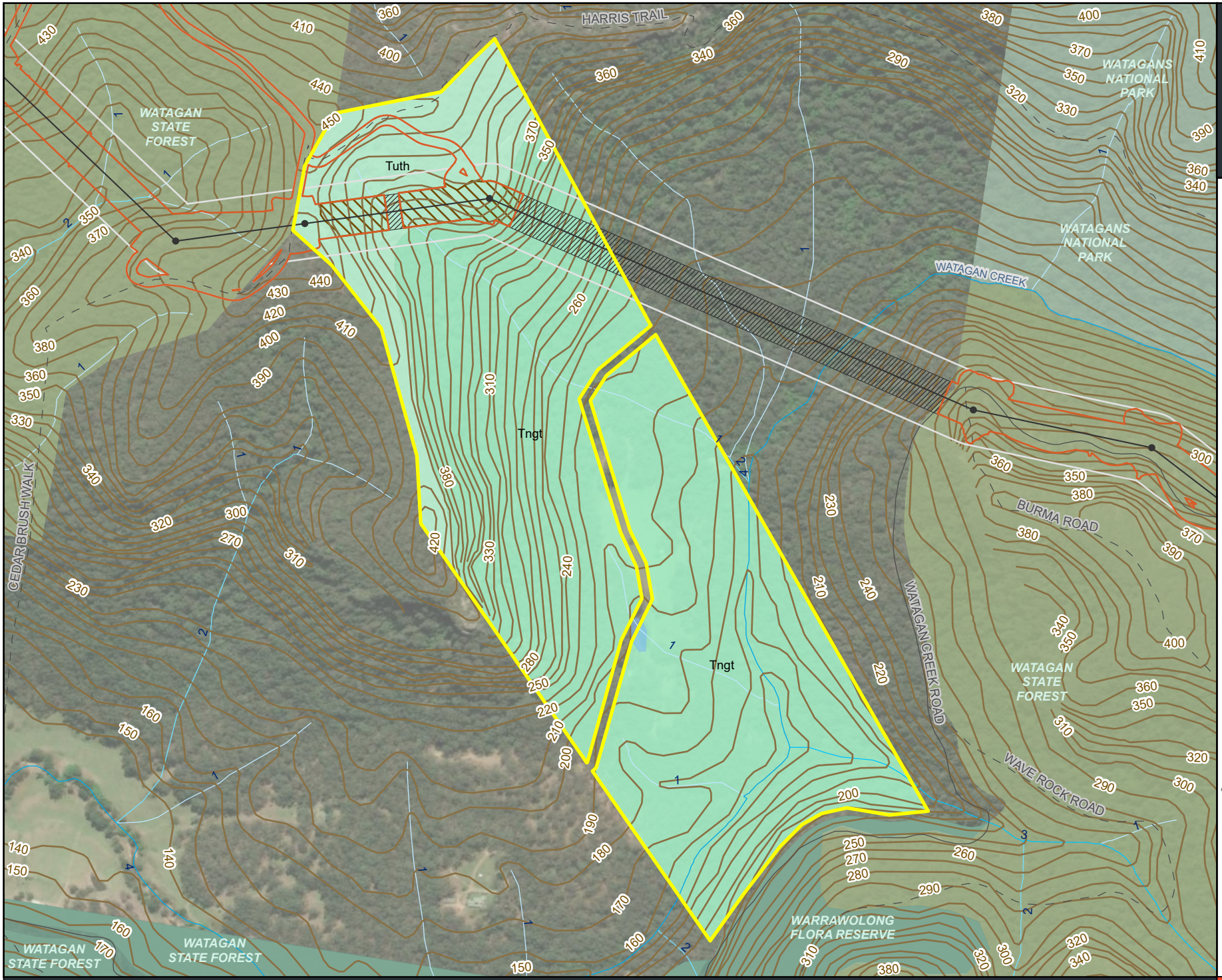

Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Dawson (No access)
Page 7 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Waterbody
- NPWS reserve
- Flora reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3
- 4

Geology - rock units

- Tngt - Terrigal Formation
- Tuth - Hawkesbury Sandstone

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:10,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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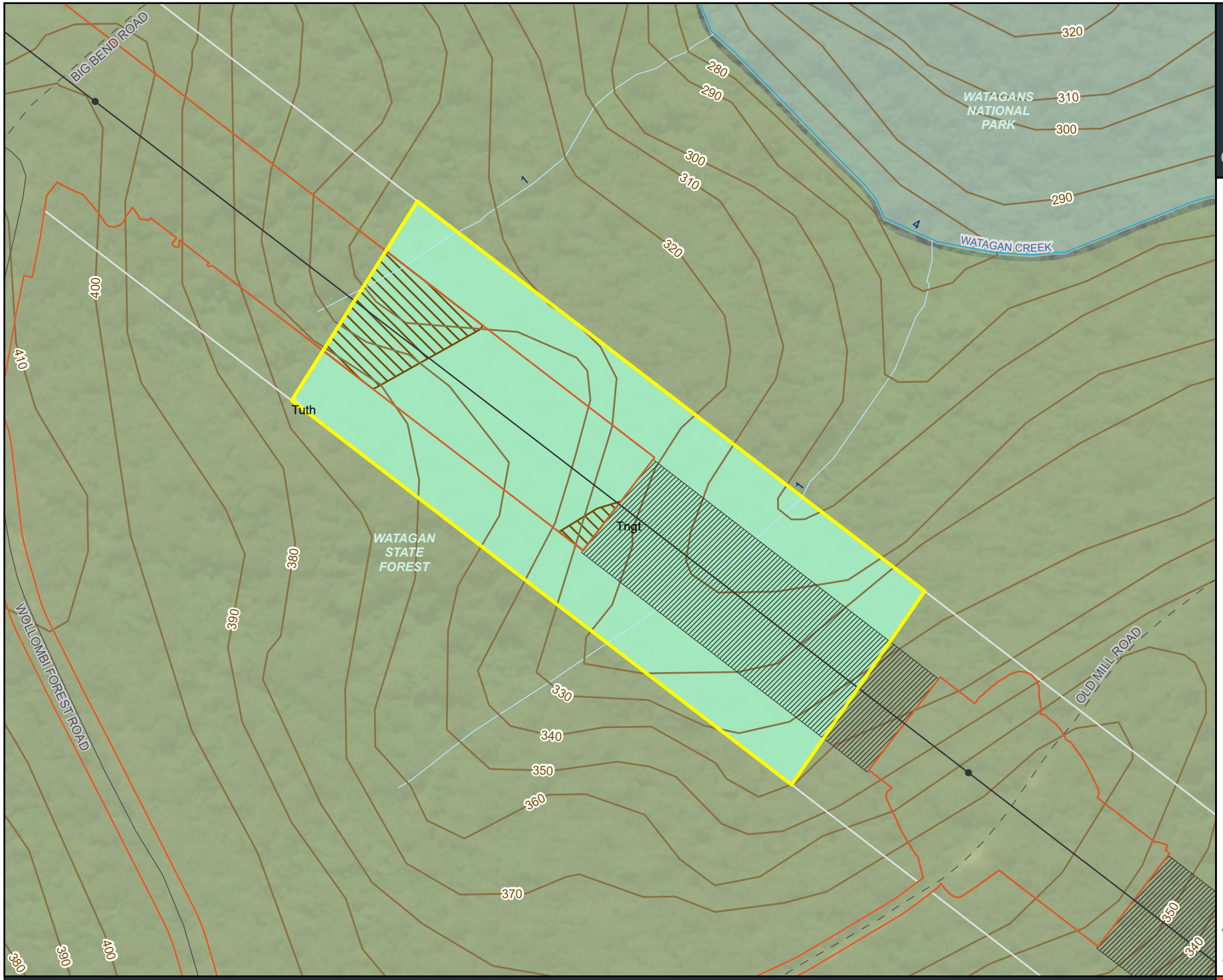

Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Watagan State Forest
(Topographic or other safety constraints)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- NPWS reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 4

Geology - rock units

- Tngt - Terrigal Formation
- Tuth - Hawkesbury Sandstone

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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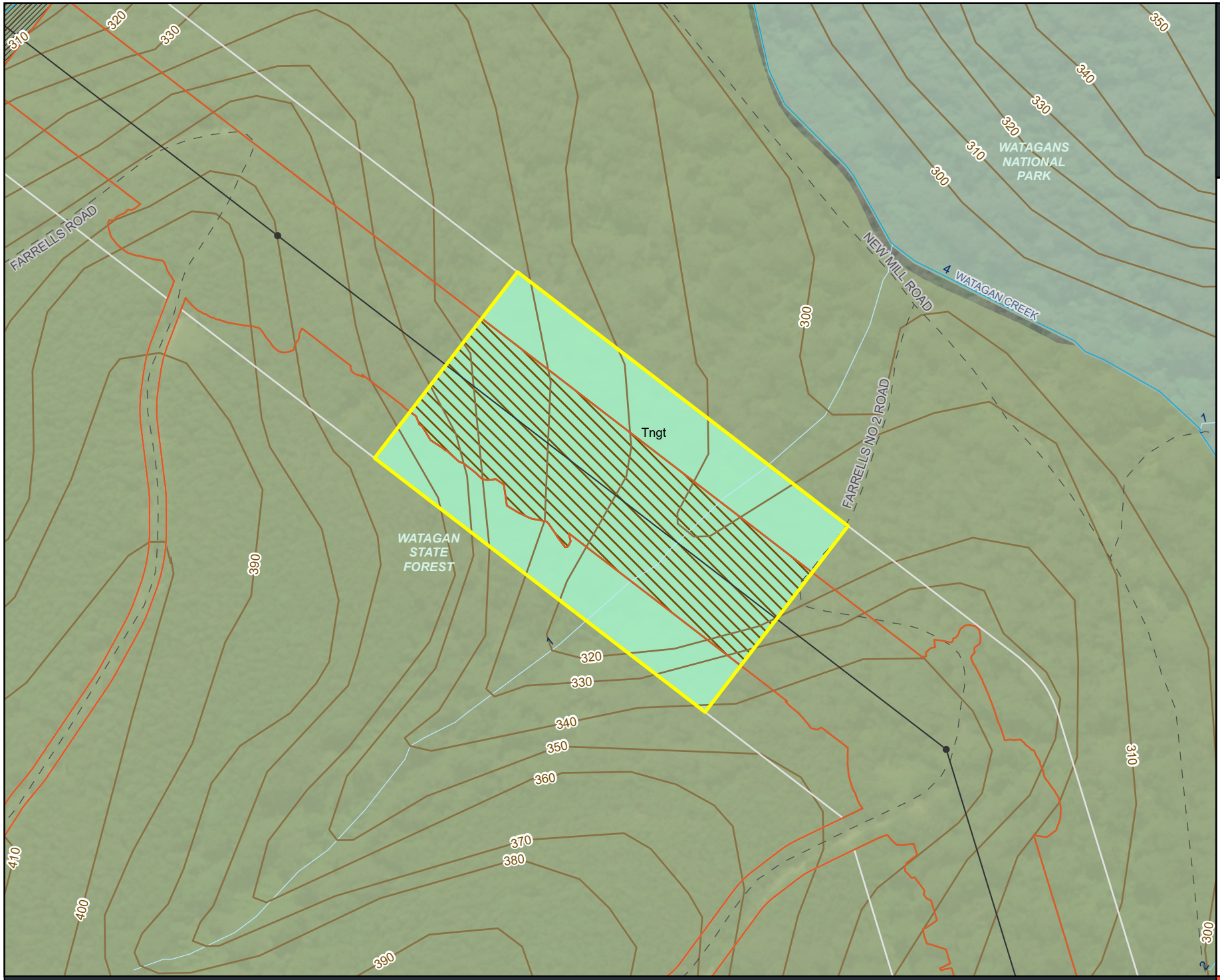

Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Watagan State Forest
(Topographic or other safety constraints)
Page 9 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Track
- NPWS reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2
- 3
- 4

Geology - rock units

- Tngt - Terrigal Formation

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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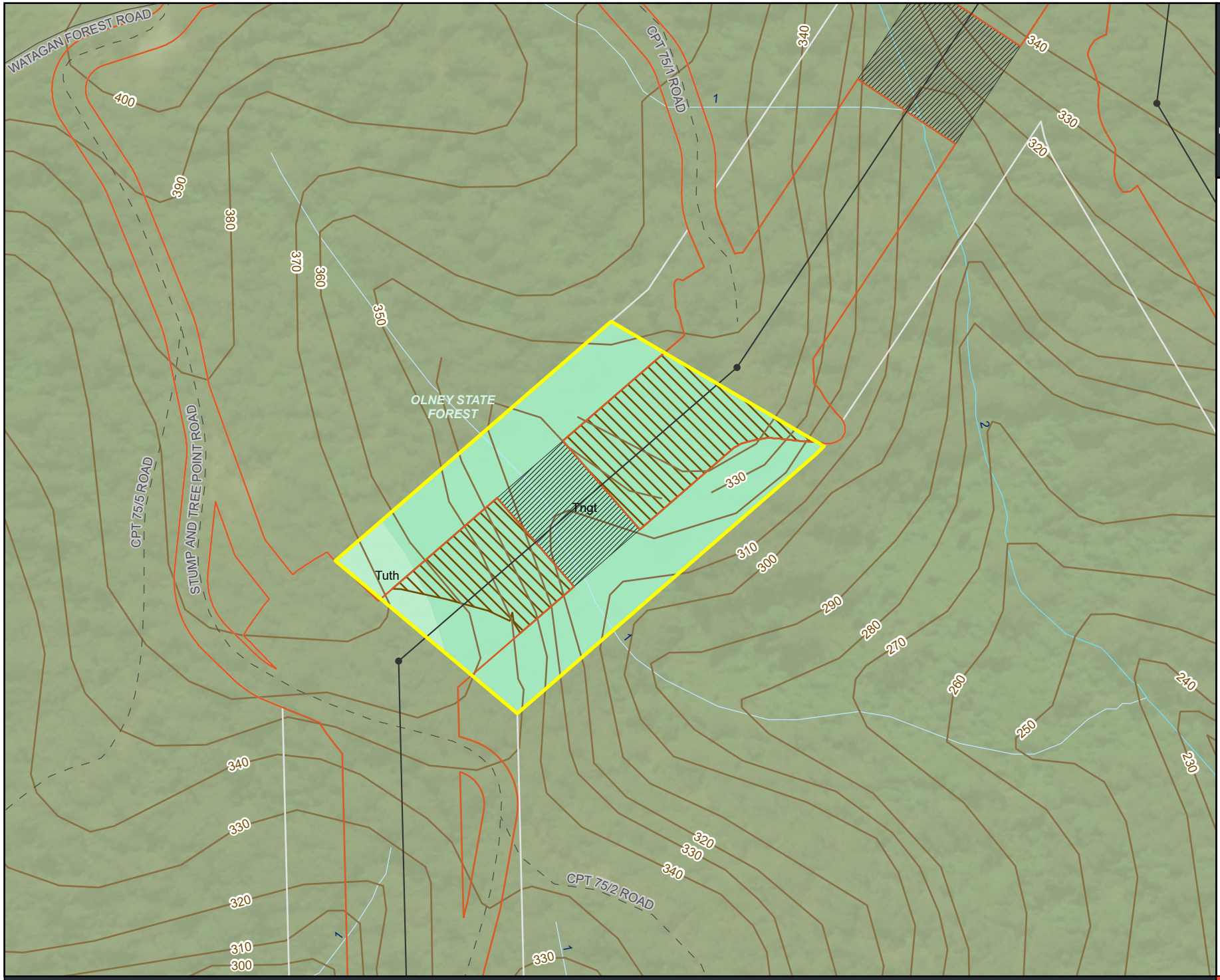

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Hunter Transmission Project

Figure 2
Geology and context features within restricted access properties - Olney State Forest
(Topographic or other safety constraints)
Page 10 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent
- 10m contour

Watercourse (Strahler stream order)

- 1
- 2

Geology - rock units

- Tngt - Terrigal Formation
- Tuth - Hawkesbury Sandstone

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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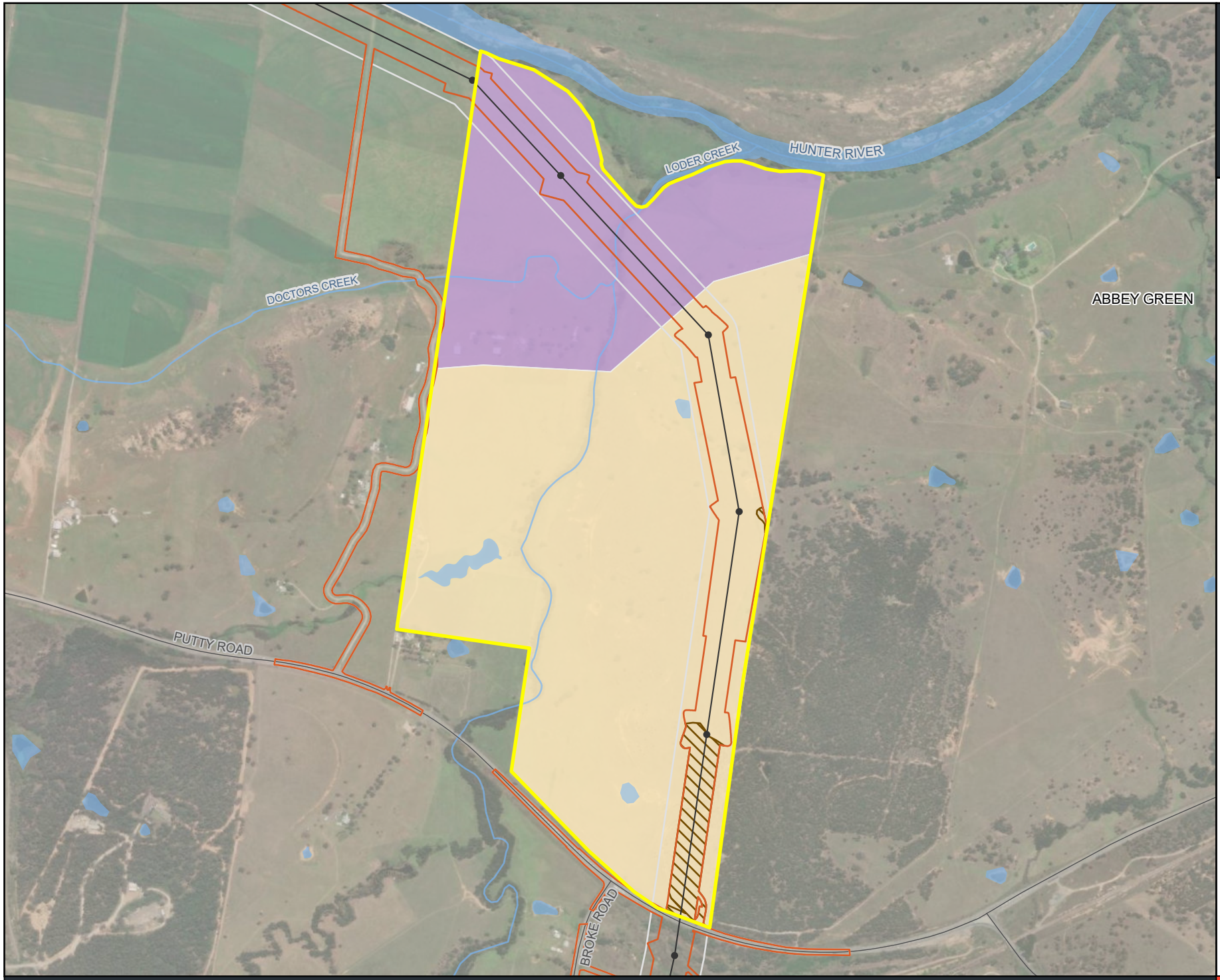

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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Bulga Mine (Restricted access)
Page 1 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line

Existing environment

- Road
- Named watercourse
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Central Hunter Alluvial Plains
- Central Hunter Foothills

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:12,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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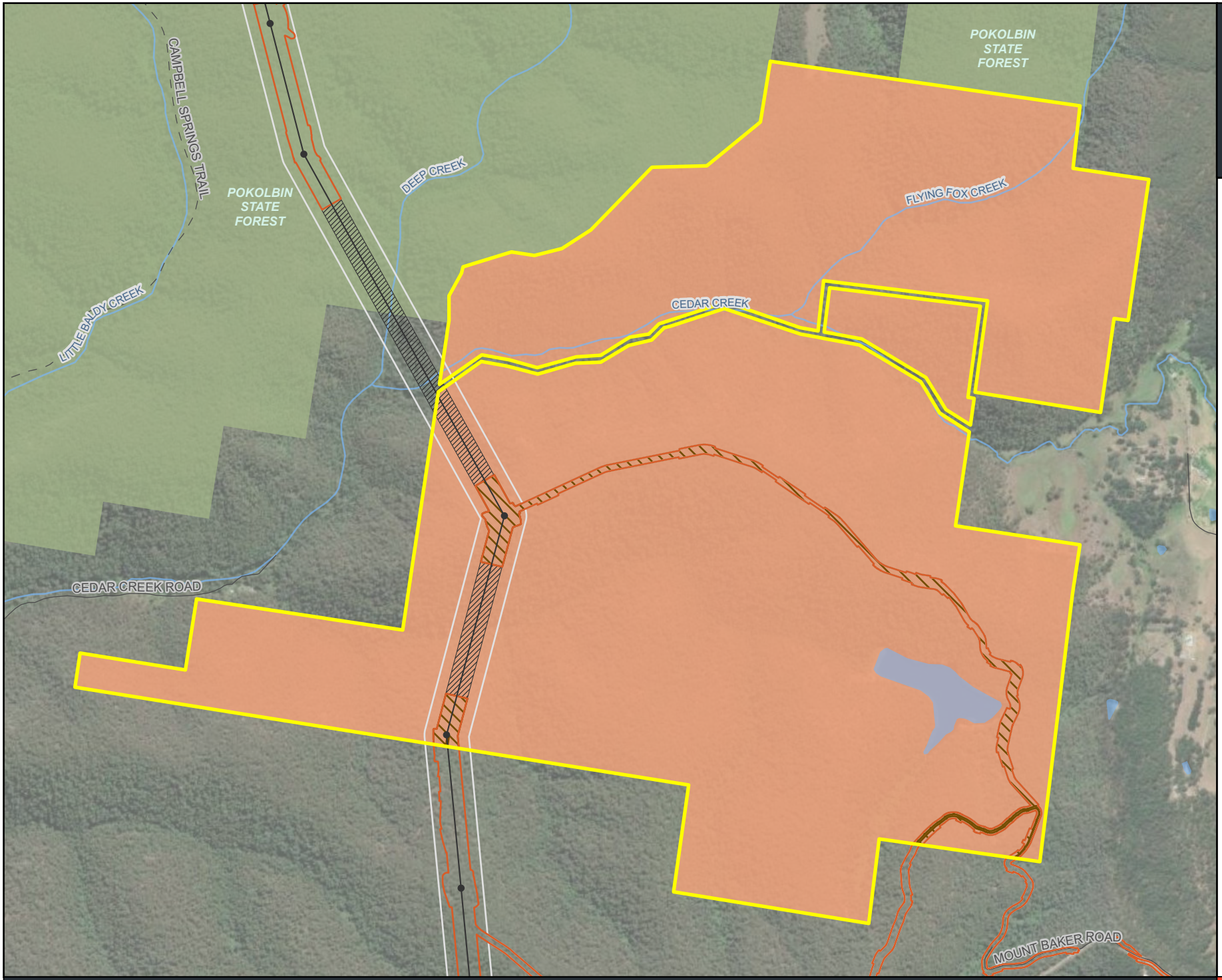

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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Aksoave Pty Limited (No access)
Page 2 of 10

Legend

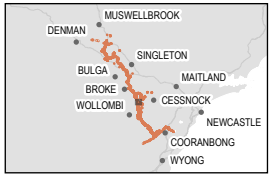
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Named watercourse
- Waterbody
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges



0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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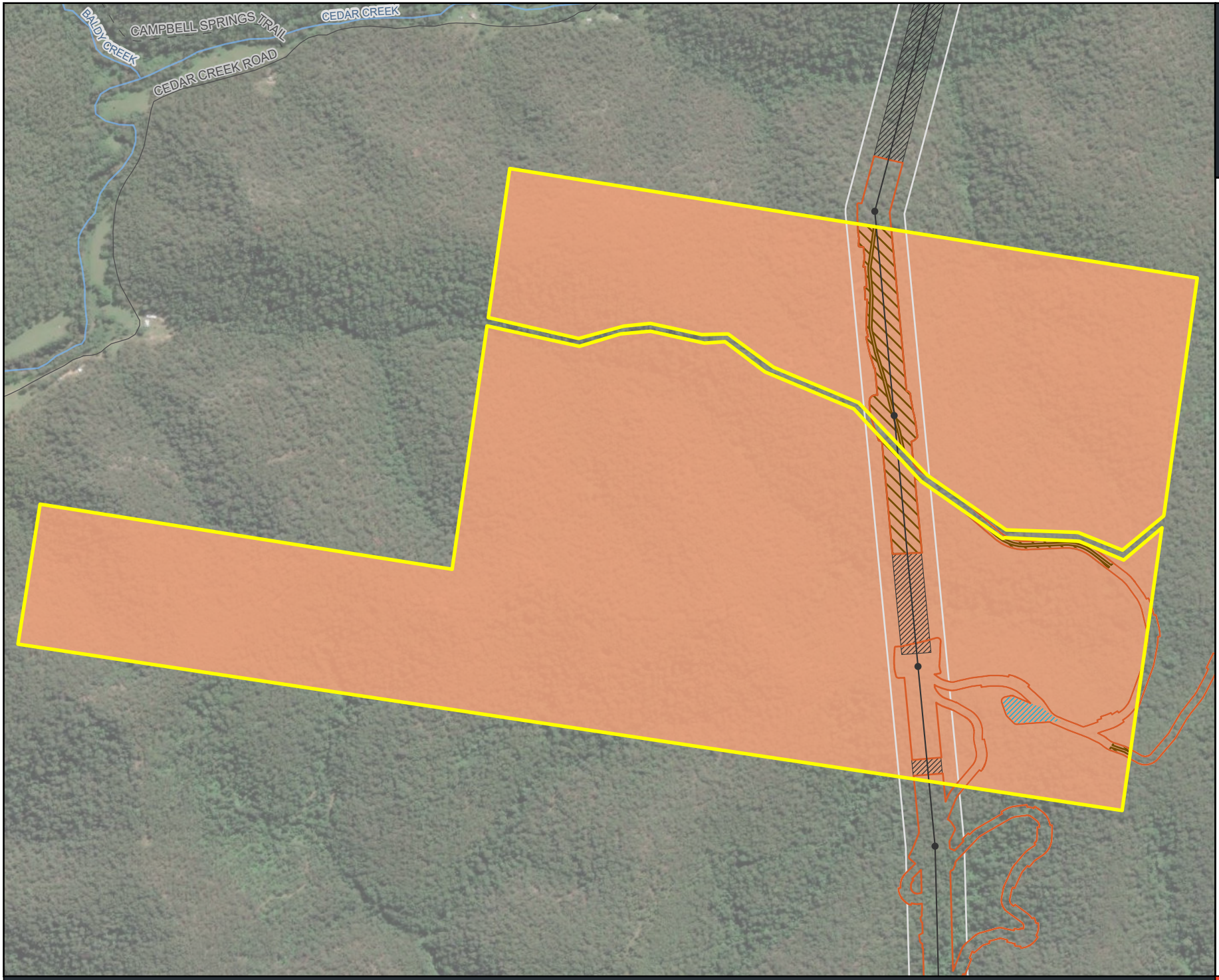


Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Ticalc Pty Ltd (Access restricted by Aksoave property)
Page 3 of 10

Legend

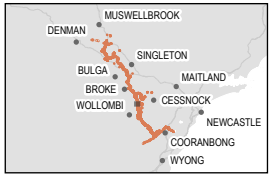
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area
- Laydown area

Existing environment

- Road
- Track
- Named watercourse
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges



0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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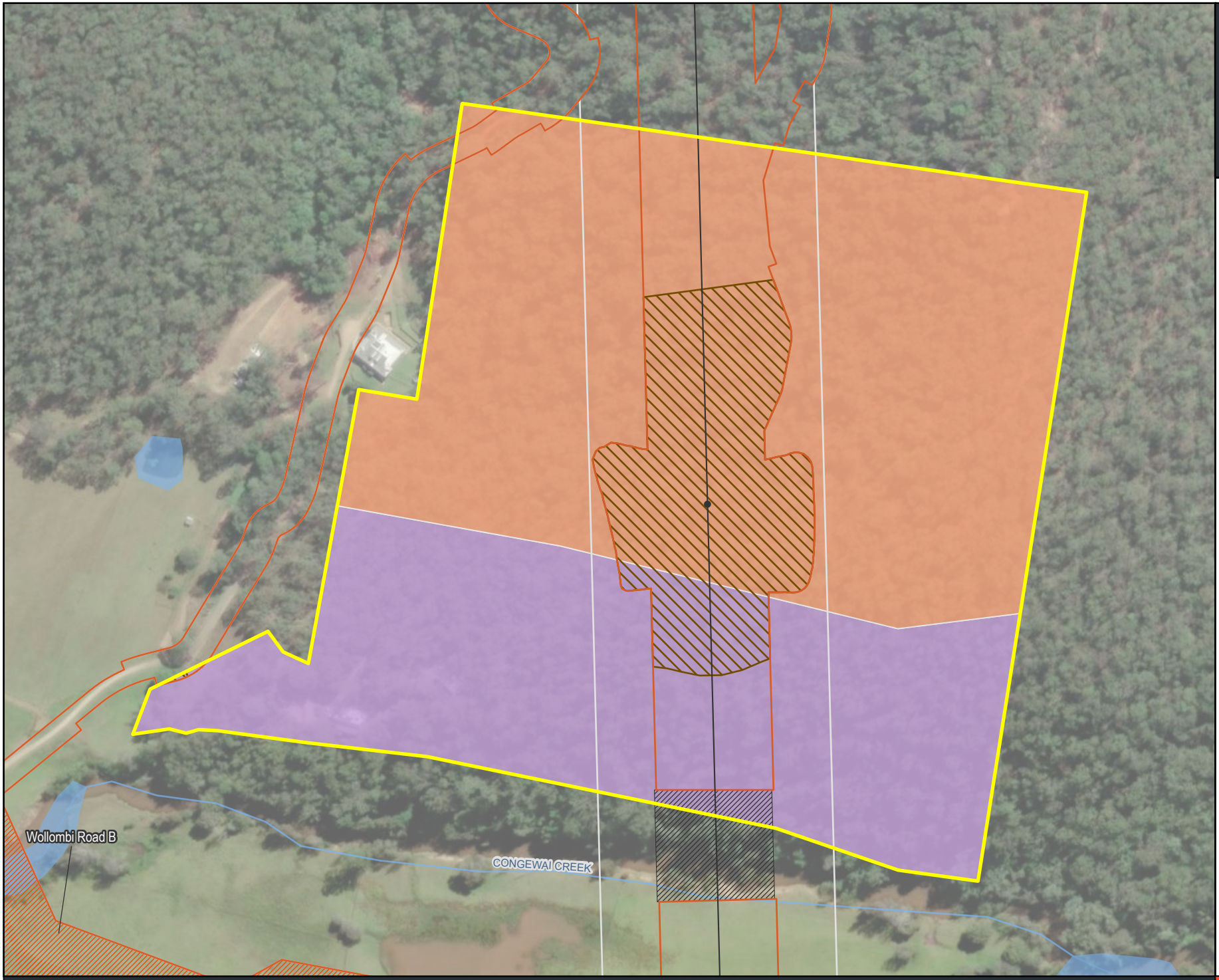


Hunter Transmission Project

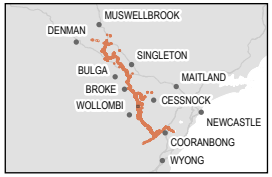
Figure 3
Mitchell landscapes within restricted access properties - Blansjaar (No access)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area
- Construction support site
- Named watercourse
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Central Hunter Alluvial Plains
- Watagan Ranges



0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Millfield Mill (No access)
Page 5 of 10

Legend

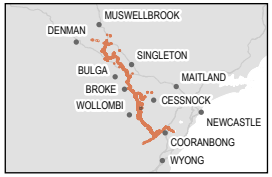
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Laydown area

Existing environment

- Road
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Central Hunter Foothills



0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Watagan State Forest (Topographic or other safety constraints)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Track
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

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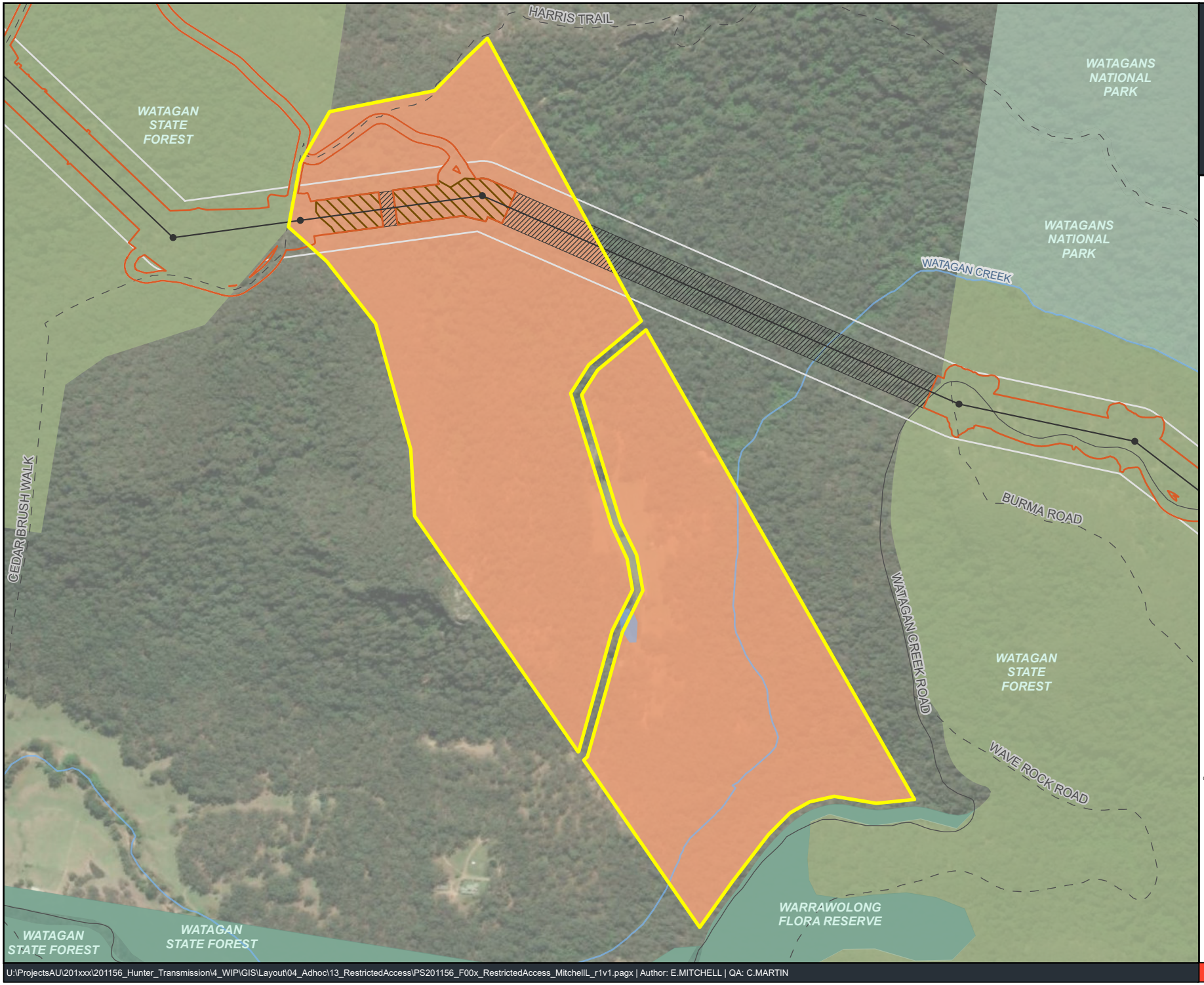

Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Dawson (No access)
Page 7 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Named watercourse
- Waterbody
- NPWS reserve
- Flora reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Watagan State Forest (Topographic or other safety constraints)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Named watercourse
- NPWS reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Watagan State Forest (Topographic or other safety constraints)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Track
- Named watercourse
- NPWS reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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Hunter Transmission Project

Figure 3
Mitchell landscapes within restricted access properties - Olney State Forest (Topographic or other safety constraints)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Mitchell landscapes

- Watagan Ranges

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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1.1.4 Assessing native vegetation, threatened ecological communities and vegetation integrity

In the absence of access and previous surveys in these restricted sites, the following information has been utilized in determining the vegetation extent and condition likely present in the restricted sites:

- NSW State Vegetation Type Map release C2.0M2.1 (accessed April 2025) (NSW DCCEEW, 2025)
- NSW BioNet Flora Survey Plots – PCT Reference Sites: full floristic plots used in the development of the quantitative Plant Community Type (PCT) classification. Currently available for eastern NSW PCTs version C2.0. (NSW Department of Planning and Environment, 2022)
- Recent plot data acquired elsewhere in the subject land
- Aerial photos provided on the ArcGIS online World Imagery map server

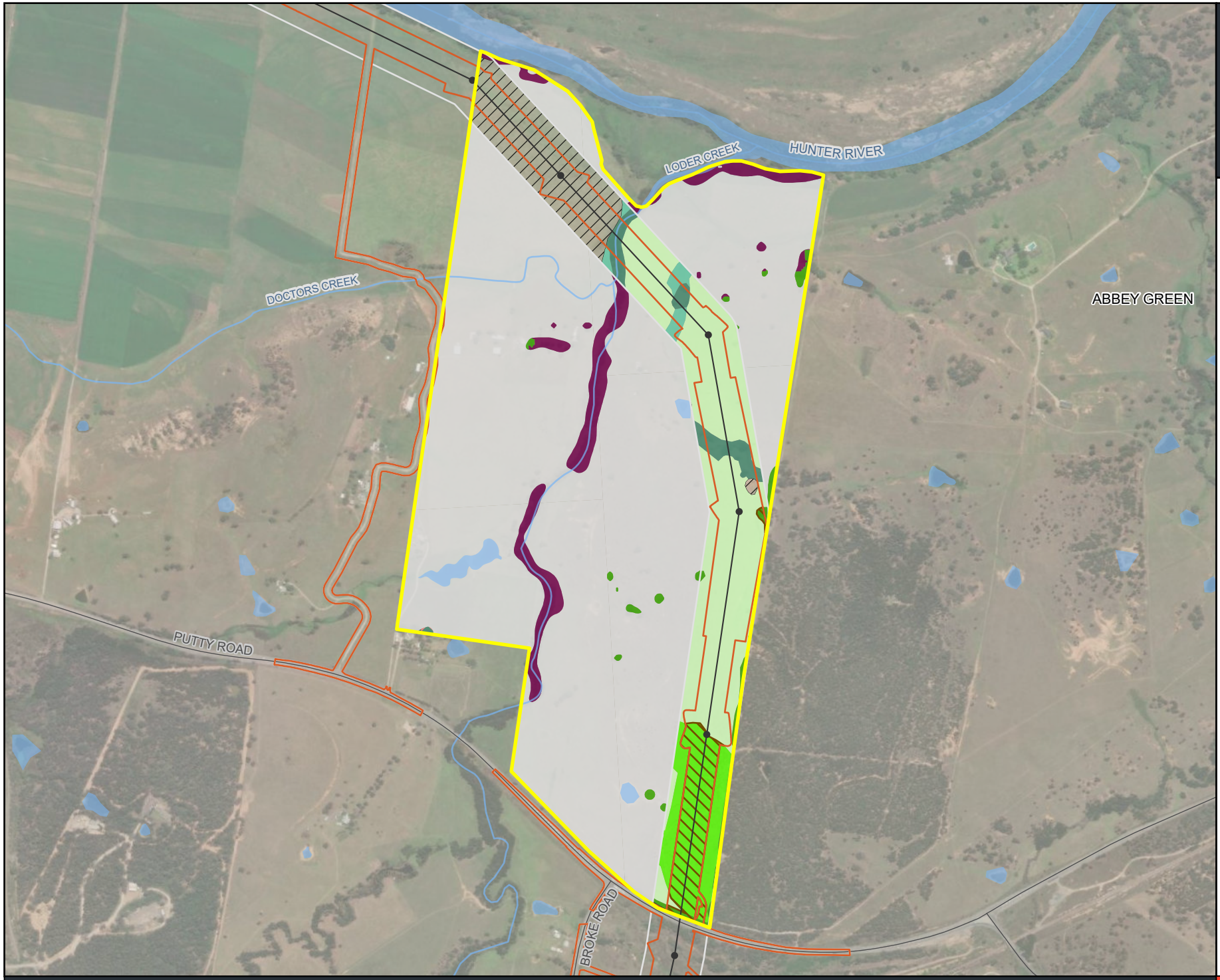
A summary of each identified PCT and condition class within the restricted access areas and corresponding extent within proposed surrogate survey areas is provided in Figure 4 and Table 5.

The surrogate survey for the project has been completed across significantly greater areas of continuous vegetation in similar or better quality condition and land use practices for all of the PCTs and condition classes.

Table 5 Plant Community Types present in restricted access properties

Property name	IBRA subregion	Plant Community Type	Condition class	Subject land within restricted access area (ha)	Area within proposed surrogate survey (ha)
Olney SF	Wyong	PCT3150 - Hunter Coast Ranges Turpentine Wet Forest	Mod-good	1.08	29.56
		PCT3230 - Central Coast Escarpment Moist Forest	Mod-good	0.20	42.23
Watagan SF	Wyong	PCT3029 - Lower North Wet Gully Palm Rainforest	Mod-good	0.40	3.82
		PCT3150 - Hunter Coast Ranges Turpentine Wet Forest	Mod-good	1.29	29.56
		PCT3242 - Lower North Ranges Turpentine Moist	Mod-good	2.14	21.68
		PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest	Mod-good	0.96	36.75
Dawson Property	Wyong	PCT0 - Not classified	-	0.22	25.48
		PCT3029 - Lower North Wet Gully Palm Rainforest	Mod-good	0.49	3.82
		PCT3242 - Lower North Ranges Turpentine Moist Forest	Mod-good	2.03	21.68
		PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest	Mod-good	1.33	36.75
Millfield Mill	Hunter	PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest	Mod-good	1.58	35.06

Property name	IBRA subregion	Plant Community Type	Condition class	Subject land within restricted access area (ha)	Area within proposed surrogate survey (ha)
Blansjaar Property	Yengo	PCT3151 - Northwest Sydney Sandstone Grey Myrtle Dry Rainforest	Mod-good	0.03	1.82
		PCT3238 - Hunter Range Colluvial Apple-Gum Forest	Mod-good	0.05	0.00
		PCT3239 - Hunter Range Sheltered Grey Gum Forest	Mod-good	1.50	85.90
		PCT3489 - Hunter Escarpment Grey Box Forest	Mod-good	0.45	5.22
		PCT3605 - Hunter Range Ironbark Forest	Mod-good	1.39	44.05
TICALC Pty Ltd	Yengo	PCT0 - Not classified	-	1.02	29.75
		PCT3239 - Hunter Range Sheltered Grey Gum Forest	Mod-good	5.98	85.90
		PCT3605 - Hunter Range Ironbark Forest	Mod-good	4.76	44.05
Aksoave Pty Ltd	Yengo	PCT0 - Not classified	-	0.41	29.75
		PCT3152 - Hunter Range Turpentine-Grey Myrtle Gully Forest	Mod-good	0.39	0.53
		PCT3239 - Hunter Range Sheltered Grey Gum Forest	Mod-good	2.87	85.90
		PCT3605 - Hunter Range Ironbark Forest	Mod-good	6.62	44.05
Bulga Mine	Hunter	Category 1 Land	-	3.68	188.05
		PCT0 - Not classified	-	0.02	48.62
		PCT3431 - Central Hunter Ironbark Grassy Woodland	Disturbed Grassland	10.35	49.61
		PCT3431 - Central Hunter Ironbark Grassy Woodland	Poor	3.17	2.03
		PCT3431 - Central Hunter Ironbark Grassy Woodland	Thinned	0.16	63.26
		PCT4015 - Central Hunter Swamp Oak Riparian Forest	Derived	0.22	3.53
		PCT4015 - Central Hunter Swamp Oak Riparian Forest	Thinned	1.08	6.53



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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Bulga Mine
(Restricted access)
Page 1 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line

Existing environment

- Road
- Named watercourse
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- Category 1 land
- PCT0 - Not classified
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Disturbed Grassland)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Poor condition)
- PCT3431 - Central Hunter Ironbark Grassy Woodland (Thinned condition)
- PCT4015 - Central Hunter Swamp Oak Riparian Forest (Derived condition)
- PCT4015 - Central Hunter Swamp Oak Riparian Forest (Thinned condition)
- PCT4089 - Namoi-Upper Hunter River Red Gum Forest (Poor condition)

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:12,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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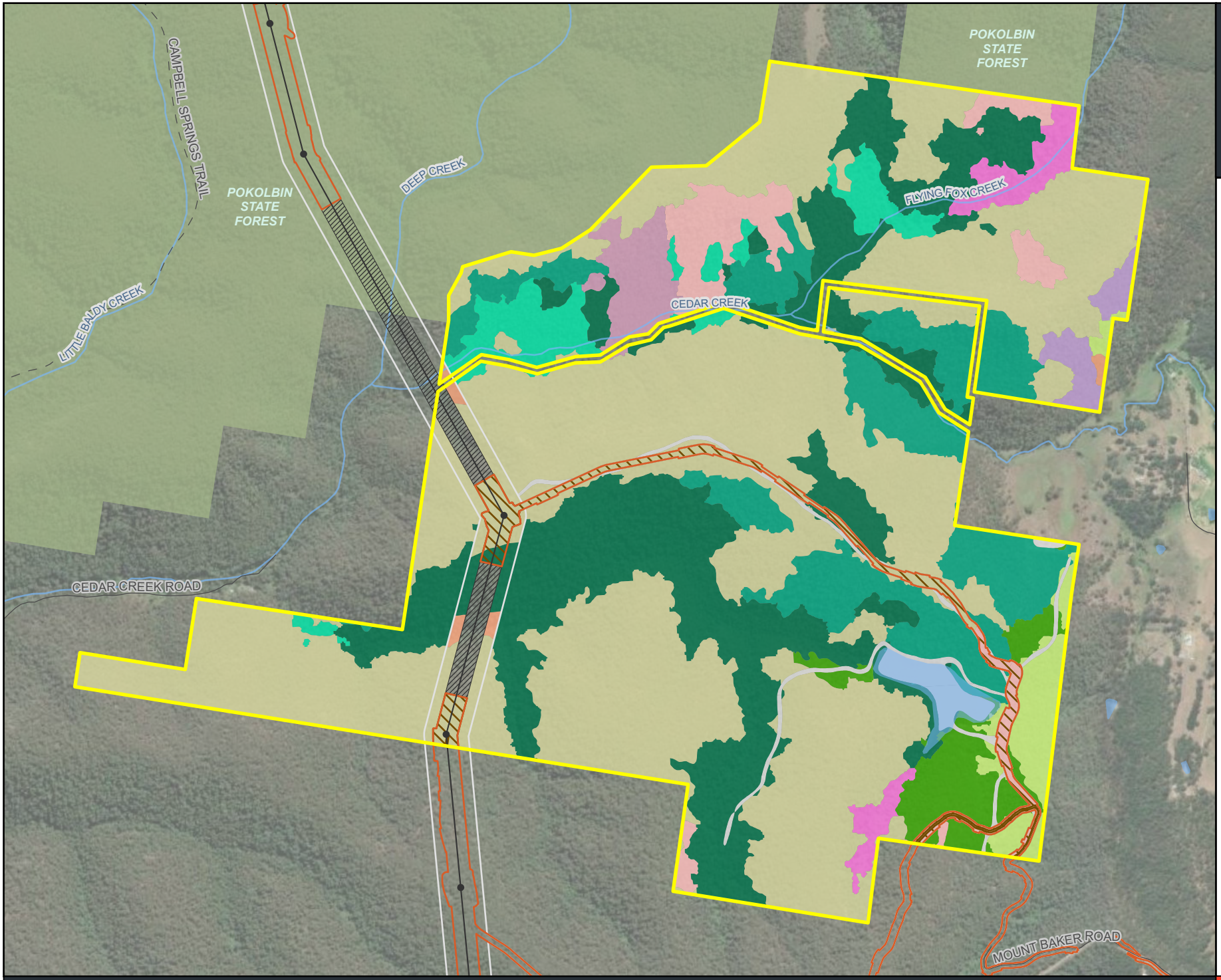

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Aksoave Pty Limited (No access)
Page 2 of 10

Legend

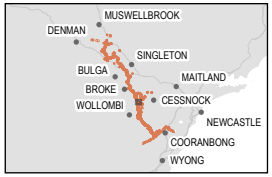
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Named watercourse
- Waterbody
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- Category 1 land
- PCT0 - Not classified
- PCT3087 - Lower North Ranges Riparian Turpentine Forest (Mod-good condition)
- PCT3152 - Hunter Range Turpentine-Grey Myrtle Gully Forest (Mod-good condition)
- PCT3239 - Hunter Range Sheltered Grey Gum Forest (Mod-good condition)
- PCT3258 - Sydney Basin Creekflat Blue Gum-Apple Forest (Mod-good condition)
- PCT3605 - Hunter Range Ironbark Forest (Mod-good condition)
- PCT3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest



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Kilometres

Coordinate system: GDA2020 MGA Zone 56

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GDA 2020 1:16,000 Date: 29/05/2025

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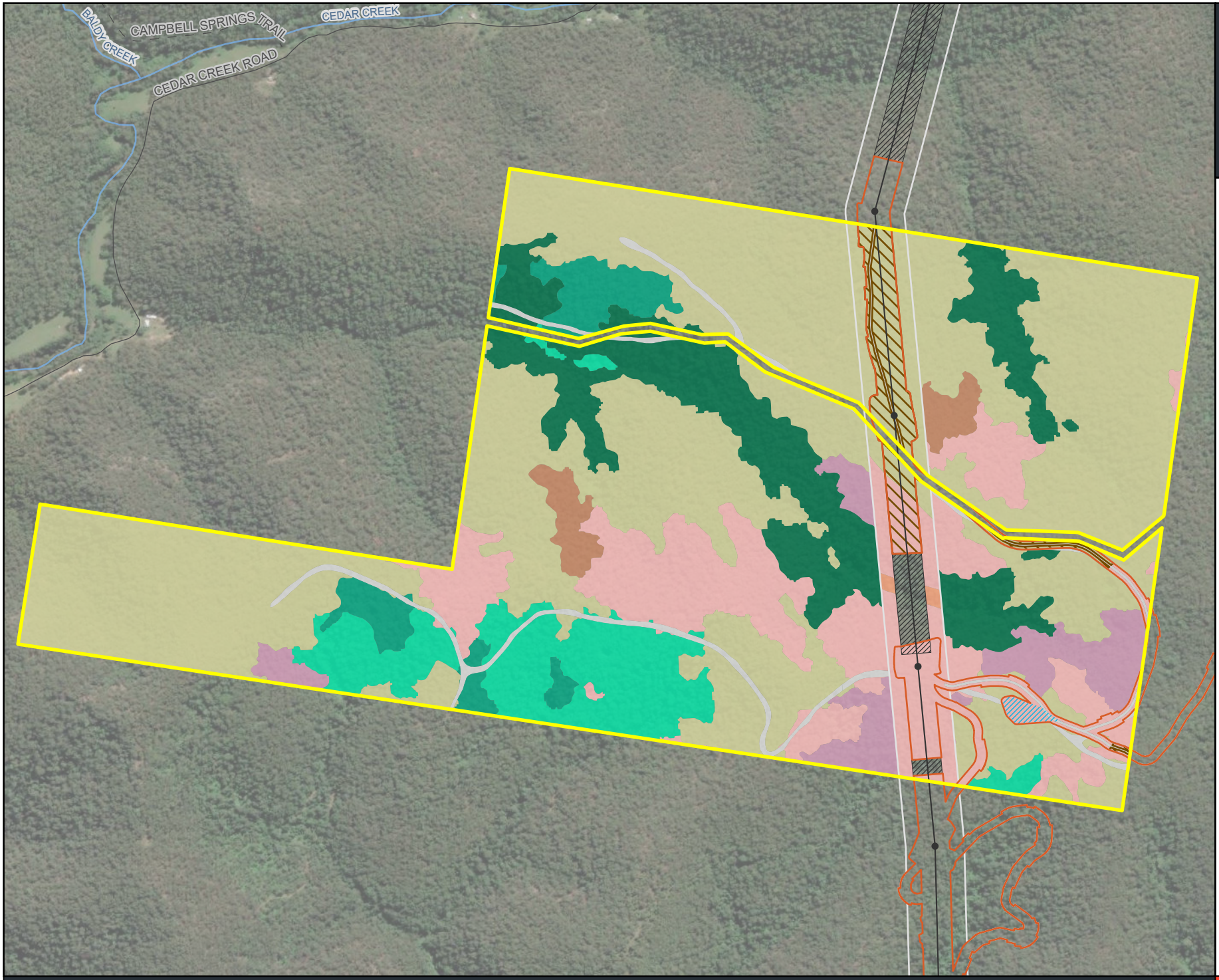

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Ticalc Pty Ltd (Access restricted by Aksoave property)
Page 3 of 10

Legend

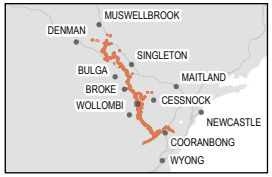
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area
- Laydown area

Existing environment

- Road
- Track
- Named watercourse
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT0 - Not classified
- PCT3087 - Lower North Ranges Riparian Turpentine Forest (Mod-good condition)
- PCT3239 - Hunter Range Sheltered Grey Gum Forest (Mod-good condition)
- PCT3605 - Hunter Range Ironbark Forest (Mod-good condition)
- PCT3620 - Sydney Hinterland Turpentine Sheltered Forest



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Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:12,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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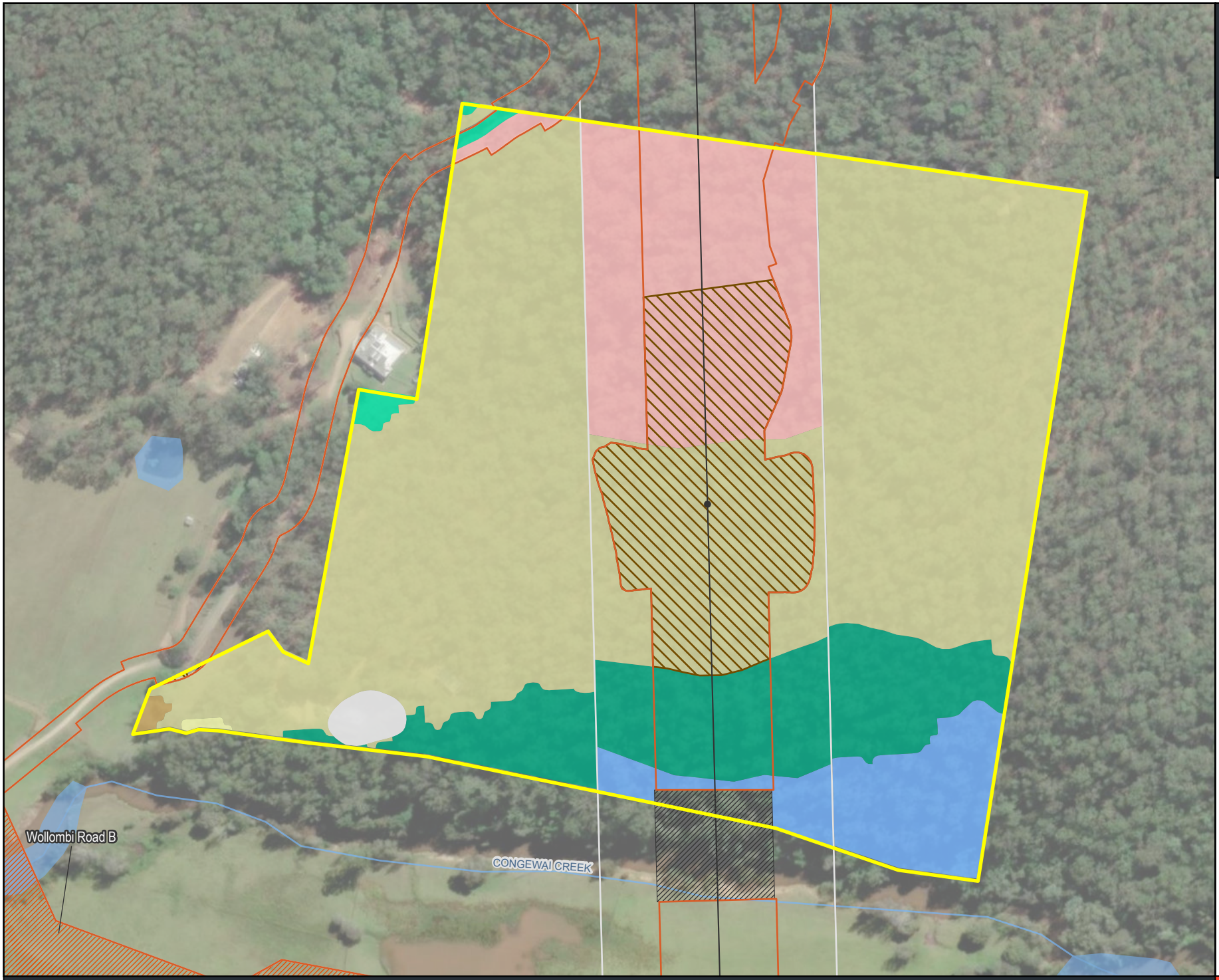


Hunter Transmission Project

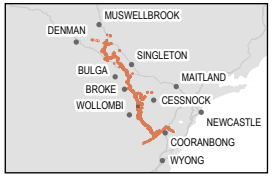
Figure 4
Vegetation within restricted access properties - Blansjaar (No access)
Page 4 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area
- Construction support site
- Named watercourse
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- Category 1 land
- PCT3151 - Northwest Sydney Sandstone Grey Myrtle Dry Rainforest (Mod-good condition)
- PCT3238 - Hunter Range Colluvial Apple-Gum Forest (Mod-good condition)
- PCT3239 - Hunter Range Sheltered Grey Gum Forest (Mod-good condition)
- PCT3489 - Hunter Escarpment Grey Box Forest (Mod-good condition)
- PCT3605 - Hunter Range Ironbark Forest (Mod-good condition)
- PCT4058 - Sydney Hinterland Red Gum Riverflat Forest
- PCT0 - Not classified



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Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
World Imagery: Maxar

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Millfield Mill (No access)
Page 5 of 10

Legend

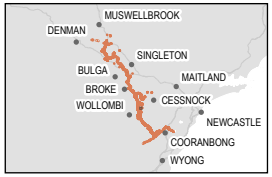
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Laydown area

Existing environment

- Road
- Waterbody
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT3444 - Lower Hunter Spotted Gum-Ironbark Forest (Mod-good condition)
- PCT3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
- PCT3634 - Quorrobolong Sand Flats Forest
- PCT0 - Not classified



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Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

GDA 2020 1:3,000 Date: 29/05/2025

Data sources: EMM, Beca, Geoscience Australia, NSW State Government, WSP
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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Watagan State Forest (Topographic or other safety constraints)
Page 6 of 10

Legend

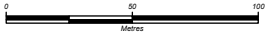
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Track
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT3242 - Lower North Ranges Turpentine Moist Forest (Mod-good condition)



Coordinate system: GDA2020 MGA Zone 56

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Dawson
(No access)
Page 7 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Named watercourse
- Waterbody
- NPWS reserve
- Flora reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT0 - Not classified
- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3242 - Lower North Ranges Turpentine Moist Forest (Mod-good condition)
- PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)
- PCT3037 - Sydney Basin Warm Temperate Rainforest
- PCT3111 - Sydney Hinterland Grey Myrtle Riparian Forest
- PCT4058 - Sydney Hinterland Red Gum Riverflat Forest

0 0.2 0.4
Kilometres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Watagan State Forest (Topographic or other safety constraints)
Page 8 of 10

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- Named watercourse
- NPWS reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT3242 - Lower North Ranges Turpentine Moist Forest (Mod-good condition)
- PCT3263 - Watagan Range Turpentine-Mahogany Grassy Forest (Mod-good condition)

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A4

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Watagan State Forest (Topographic or other safety constraints)

Legend

- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Track
- Named watercourse
- NPWS reserve
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT3029 - Lower North Wet Gully Palm Rainforest (Mod-good condition)
- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Plantation)
- PCT3242 - Lower North Ranges Turpentine Moist Forest (Mod-good condition)

0 50 100
Metres

Coordinate system: GDA2020 MGA Zone 56

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Hunter Transmission Project

Figure 4
Vegetation within restricted access properties - Olney State Forest (Topographic or other safety constraints)
Page 10 of 10

Legend

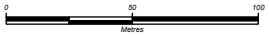
- Biodiversity study area
- Subject land
- Transmission towers
- Proposed transmission line
- Non-disturbance area

Existing environment

- Road
- Track
- State forest
- Local government area
- Property with restricted access
- Assumed flora extent

Plant Community Types

- PCT3150 - Hunter Coast Ranges Turpentine Wet Forest (Mod-good condition)
- PCT3230 - Central Coast Escarpment Moist Forest (Mod-good condition)



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1.1.5 Assessing the habitat suitability for threatened species within restricted access areas

An assessment of habitat constraints and vagrant species in the subject land, including areas of restricted access has been undertaken in Section 5.1 of the BDAR. The following species were excluded based on geographic limitation or habitat constraints:

- *Kunzea rupestris*
- *Persoonia pauciflora``*
- *Prostanthera askania*
- *Seringia denticulata* (endangered population).

Additionally vagrant species have been further assessed in Section 5.1.2 of the BDAR and removed in accordance with BAM Subsection 5.2.3.

In the absence of survey, the following habitat features were assumed present within the restricted access areas:

- Burrows
- Epiphytes
- Fallen/standing dead timber, including logs
- Hollow-bearing trees
- Rocky substrates
- Native groundcover.

1.2 Species not proposed for exclusion through surrogate survey

1.2.1 Fauna

Given the assumed presence of these habitat features and/or the recorded presence within contiguous areas of habitat no candidate fauna species are proposed for exclusion through surrogate survey effort under the guide.

1.2.2 Flora

Candidate species of flora that have been confirmed presence within the surrogate survey areas have not been excluded from the subject land with restricted access and assumed presence. A summary of these species is provided in Table 6 below.

Table 6 Candidate flora species assumed to be presence within the restricted access areas

Species	BC Act	EPBC Act	SAII	Reason for not applying the guide	Assumed habitat within restricted access area (ha)
Cymbidium canaliculatum – endangered population	EP	-	No	Recorded during survey within the Hunter IBRA subregion.	13.69 ha in the Hunter
Eucalyptus fracta	E	-	Yes	Recorded during survey within the Yengo IBRA subregion.	13.77 ha in the Yengo
Melaleuca groveana	V	-	No	Recorded during survey within the Yengo IBRA subregion.	16.37 ha in the Yengo
Prostanthera cineolifera	V	V	No	Recorded during survey within the Yengo and Hunter IBRA subregion.	16.37 ha in the Yengo 4.00 ha in the Hunter
Rhodamnia rubescens	CE	CE	Yes	Recorded during survey within the Wyong, Yengo and Hunter IBRA subregion.	9.93 ha in the Wyong 3.44 ha in the Yengo 2.42 ha in the Hunter

Species	BC Act	EPBC Act	SAII	Reason for not applying the guide	Assumed habitat within restricted access area (ha)
Rhodomyrtus psidioides	CE	CE	Yes	Recorded during survey within the Wyong IBRA subregion.	7.44 ha in the Wyong 0.39 ha in the Yengo
Senna acclinis	E	-	No	Recorded during survey within the Yengo IBRA subregion.	7.44 ha in the Wyong

1.3 Species proposed for exclusion through surrogate survey

1.3.1 Flora

A total of 23 candidate flora species are proposed to be excluded from presence within restricted areas of the subject land based on targeted survey within the surrogate areas (refer to Table 7).

Table 7 Candidate flora species proposed for exclusion under the guide

Species	BC Act	EPBC Act	SAII	Assumed habitat within restricted access area (ha)
Acacia pendula – endangered population	EP	-	Yes	13.69
Asperula asthenes	V	V	No	4.17
Callistemon linearifolius	V	-	No	1.78
Corybas dowlingii	E	-	No	2.37
Cynanchum elegans	E	E	No	4.77
Dillwynia tenuifolia	V	-	No	13.32
Eucalyptus pumila	V	V	Yes	3.34
Grammitis stenophylla	E	-	No	32.87
Grevillea parviflora subsp. parviflora	V	V	No	20.76
Leionema lamprophyllum subsp. fractum	CE	CE	Yes	10.48
Melaleuca biconvexa	V	V	No	1.58
Olearia cordata	V	V	No	1.43
Ozothamnus tesselatus	V	V	No	7.44
Persoonia hirsuta	E	E	Yes	16.81
Pomaderris queenslandica	E	-	No	13.69
Prasophyllum petilum	E	E	No	13.38
Prasophyllum sp. Wybong	-	CE	No	13.69
Pterostylis chaetophora	V	-	No	4.92
Rutidosis heterogama	V	V	No	4.92
Syzygium paniculatum	V	V	No	4.92

Species	BC Act	EPBC Act	SAII	Assumed habitat within restricted access area (ha)
Tetratheca juncea	V	V	No	14.90
Velleia perfoliata	V	V	No	6.55
Zieria involucrata	E	V	No	4.17

1.4 Proposed use of surrogate survey information

Extensive targeted candidate threatened flora surveys have been undertaken throughout the accessible areas of the project in like for like PCTs and condition classes to the assumed habitats associated with species within these restricted access areas.

Field survey techniques for targeted seasonal surveys are presented within Section 2.3 of the BDAR and were in general accordance with *Surveying threatened plants and their habitats: NSW guide for the Biodiversity Assessment Method* (DPIE 2020). These include both:

- two-phase grid-based systematic survey
- parallel field traverses of microhabitats

The completed targeted surveys in similar condition PCTs areas across the subject land, including areas directly adjacent and contiguous with the restricted areas are proposed as adequate surrogate survey effort to exclude areas of assumed habitat.

A summary of the surrogate survey area for each candidate species, in each IBRA subregion is provided in Tables 8–10. Survey areas represented are restricted to surveys within like for like PCTs in corresponding species seasonal requirements. For many species additional areas of associated PCTs not recorded within the restricted access areas have also been subject to survey.

The surrogate surveys demonstrate significant representative coverage of each species habitat within the subject land, with all species having greater than 75% (with most exceeding 90%) of the representative PCT and condition classes surveyed within each IBRA subregion.

Table 8 Assumed flora species in restricted sites (Wyong IBRA subregion)

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Asperula asthenes	3242	Mod-good	**4.17**	**18.07**	**81.25**
Callistemon linearifolius	3230	Mod-good	**0.20**	**37.87**	**99.47**
Corybas dowlingii	3150	Mod-good	**2.37**	**15.17**	**86.49**
Cynanchum elegans	3029	Mod-good	**0.89**	**3.01**	**77.18**
Grammitis stenophylla	3029	Mod-good	0.89	3.01	77.18
	3150	Mod-good	2.37	27.77	92.14
	3242	Mod-good	4.17	18.07	81.25
	TOTAL		**7.43**	**48.85**	**86.80**

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Melaleuca biconvexa	3029	Mod-good	0.89	3.01	77.18
	3150	Mod-good	2.37	27.77	92.14
	3242	Mod-good	4.17	18.07	81.25
	TOTAL		**7.43**	**48.85**	**86.80**
Syzygium paniculatum	3150	Mod-good	2.37	27.77	92.14
	3242	Mod-good	4.17	18.07	81.25
	TOTAL		**6.54**	**45.84**	**87.51**
Tetratheca juncea	3242	Mod-good	4.17	16.14	79.47

Table 9 Assumed flora species in restricted sites (Yengo IBRA subregion)

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Cynanchum elegans	3152	Mod-good	0.39	0.46	54.12
	3239	Mod-good	3.05	89.68	96.71
	3489	Mod-good	0.45	4.94	91.65
	TOTAL		**3.89**	**95.08**	**96.07**
Dillwynia tenuifolia	3605	Mod-good	13.32	41.67	75.78
Eucalyptus glaucina	3152	Mod-good	0.39	85.20	85.20
	3239	Mod-good	3.05	96.15	96.15
	3605	Mod-good	13.32	95.19	95.19
	TOTAL		**16.76**	**131.81**	**88.72**
Eucalyptus pumila	3152	Mod-good	0.39	85.20	85.20
	3239	Mod-good	3.05	96.15	96.15
	3605	Mod-good	13.32	95.19	95.19
	TOTAL		**16.76**	**131.81**	**88.72**
Grammitis stenophylla	3239	Mod-good	**3.05**	**89.68**	**96.15**
Leionema lamprophyllum subsp. fractum	3605	Mod-good	**1.43**	**41.67**	**95.19**

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Olearia cordata	3152	Mod-good	0.39	0.46	85.20
	3238	Mod-good	0.05	0	95.63
	3239	Mod-good	3.05	89.68	96.15
	3605	Mod-good	13.32	41.67	95.19
	TOTAL		**16.81**	**131.81**	**88.69**
Persoonia hirsuta	3238	Mod-good	0.05	0	95.63
	3605	Mod-good	13.32	41.67	95.19
	TOTAL		**13.37**	**41.67**	**75.71**
Rutidosis heterogama	3605	Mod-good	**13.32**	**41.67**	**95.19**
Velleia perfoliata	3152	Mod-good	0.39	0.09	85.20
	3239	Mod-good	3.05	88.52	96.15
	3605	Mod-good	13.32	31.16	95.19
	TOTAL		**16.76**	**119.77**	**87.72**
Zieria involucrata	3152	Mod-good	0.39	0.46	85.20
	3238	Mod-good	0.05	0	95.63
	3239	Mod-good	3.05	89.68	96.15
	3605	Mod-good	13.32	41.67	95.19
	TOTAL		**16.81**	**131.81**	**88.69**

Table 10 Assumed flora species in restricted sites (Hunter IBRA subregion)

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Acacia pendula – endangered population	3431	Disturbed Grassland	10.35	25.72	71.31
	3431	Poor	3.17	17.30	84.51
	3431	Thinned	0.16	28.31	99.44
	TOTAL		**13.68**	**71.33**	**83.90**
Callistemon linearifolius	3444	Mod-good	**1.58**	**31.07**	**95.16**

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Diuris tricolor	3431	Poor	3.17	1.68	34.64
	3431	Thinned	0.16	42.59	99.63
	TOTAL		**4.91**	**75.34**	**93.88**
Eucalyptus glaucina	3239	Mod-good	2.42	-	-
	3431	Disturbed Grassland	10.35	39.70	79.32
	3431	Poor	3.17	1.72	35.17
	3431	Thinned	0.16	55.12	99.71
	TOTAL		**16.1**	**96.54**	**85.71**
Eucalyptus pumila	3239	Mod-good	2.42	-	-
	3444	Mod-good	1.58	31.07	
	TOTAL		**4**	**31.07**	**88.59**
Grevillea parviflora subsp. parviflora	3444	Mod-good	**1.58**	**30.40**	**95.06**
Ozothamnus tesselatus	3431	Disturbed Grassland	10.35	36.21	77.77
	3431	Poor	3.17	1.68	34.64
	3431	Thinned	0.16	42.59	99.63
	TOTAL		**13.68**	**80.48**	**85.47**
Pomaderris queenslandica	3431	Disturbed Grassland	10.35	39.70	79.32
	3431	Poor	3.17	1.72	35.17
	3431	Thinned	0.16	55.12	99.71
	TOTAL		**13.68**	**96.54**	**87.59**
Prasophyllum petilum	3431	Poor	3.17	1.68	34.64
	3431	Thinned	0.16	42.59	99.63
	3444	Mod-good	1.58	30.40	95.06
	TOTAL		**4.91**	**74.67**	**93.83**

Species	PCT	Condition	Assumed habitat within restricted area (ha)	Assumed like for like habitat within surrogate survey (ha)	Total percentage of habitat within surrogate areas subject to survey (%)
Prasophyllum sp. Wybong	3431	Poor	3.17	1.68	34.64
	3431	Thinned	0.16	42.59	99.63
	3444	Mod-good	1.58	30.40	95.06
	TOTAL		**4.91**	**74.67**	**93.83**
Pterostylis chaetohora	3431	Poor	3.17	1.68	34.64
	3431	Thinned	0.16	42.59	99.63
	3444	Mod-good	1.58	30.40	95.06
	TOTAL		**4.91**	**74.67**	**93.83**
Rutidosis heterogama	3444	Mod-good	**1.58**	**31.07**	**95.16**

1.5 Conclusion

The projects assessment of impacts to candidate threatened flora within the BDAR and BAMC has adopted the recently released guide for assessing areas of restricted access in accordance with the BAM.

Six restricted access areas were identified and described through available desktop resources to inform the potential assumed presence of candidate flora and fauna species.

Given the habitat requirements for a number of candidate fauna species and the recorded presence in adjoining and contiguous areas of habitat, all candidate fauna with associated habitats within the restricted access areas were assumed present.

A total of seven candidate flora species recorded within the subject land through targeted survey were also assumed presence within the restricted access areas.

23 candidate flora species with habitat within both the restricted access areas and adjoining contiguous areas of the subject land were assessed and excluded from the assessment through surrogate survey in accordance with the BAM.

The surrogate survey areas represent between 75% (with most exceeding 90%) of the representative PCT and condition classes surveyed within each IBRA subregion.

Attachment A EnergyCo approval for the use of the recently released *Remote assessment of biodiversity values: Biodiversity Assessment Method guide* (DCCEEW, 2025)

EnergyCo

Ref: DOC 25/359969

8 May 2025

Dr Louisa Mamouney
Executive Director,
Planning, Offsets, Ecosystems and Threatened Species Division

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Re: Request to use the remote assessment of biodiversity values guide for inaccessible land for the Hunter Transmission Project (HTP)

Dear Louisa,

I refer to our recent discussions on the development of the Hunter Transmission Project.

I would like to request the use of the *Remote assessment of biodiversity values guide* (DCCEEW, 2025) (the Guide) to exclude species in inaccessible areas of the proposed transmission line alignment that were not present in surveyed areas.

The areas proposed for application of the Guide include two private properties with no land access agreements in place, minor realignment changes that occurred after seasonal surveys and small areas where the topography was deemed to represent an unacceptable safety risk to access (such as cliff lines).

We consider the HTP meets the requirements for the application of the guide as a Critical State Significant Infrastructure project. We would like to work with your team to develop and agree the process to undertake the assessment. Subject to the time required, the outcome may not be included until the revised BDAR at the response to submissions stage.

Thank you for you and your team's ongoing support and collaboration with EnergyCo to deliver the HTP. Please contact Robin Ward to progress this matter, or for more information at robin.ward@planning.nsw.gov.au.

Sincerely,

Thomas Watt
Director, Planning and Policy
Energy Corporation of NSW

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