TECHNICAL REPORT

01

Biodiversity development assessment report

(Part 2 of 3)

NARROMINE TO NARRABRI ENVIRONMENTAL IMPACT STATEMENT

TECHNICAL REPORT

01

Biodiversity development assessment report

Appendix A Minimum information requirements for the Biodiversity Development Assessment Report

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

Table A1 BDAR requirements

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
Introduction	Chapters 2 and 3	*Information* Introduction to the biodiversity assessment including:	Section 1
		• brief description of the proposal	Section 1.1
		• identification of subject land boundary, including: - operational footprint - construction footprint indicating clearing associated with temporary construction facilities and infrastructure	Section 1.2 Appendix G
		• general description of the subject land	Section 1.2.1
		• sources of information used in the assessment, including reports and spatial data	Section 3.2 Section 15
		Maps and Tables (in document)	
		• Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1.1 Figure 1.2 Figure 4.1 Appendix G
Landscape context	Sections 3.1 and 3.2, Appendix E	Identification of landscape features at the development site, including:	Section 4
		• general description of subject land topographic and hydrological setting, geology and soils	Section 4
		• percent native vegetation cover in the assessment area (as described in BAM Section 3.2)	Section 4.5
		• IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	Section 4.4 Section 4.5
		• rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	Appendix G
		• wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	Section 4.4.3 Section 7.4
		• connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	Section 4.4.4 Figure 4.1

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.)	Section 4.4.5
		• areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	Section 4.4.6
		• any additional landscape features identified in any SEARs for the proposal	Section 4.4
		• NSW (Mitchell) landscape on which the subject land occurs	Section 4.4.2
		Maps and Tables (in document)	
		• Site Map – Boundary of subject land – Cadastre of subject land – Landscape features identified in BAM Subsection 3.1.3	Figure 1.1 Figure 1.2
		• Location Map – Digital aerial photography at 1:1,000 scale or finer – Boundary of subject land – Assessment area, (ie the subject land and either 1500 metre buffer area or 500 metre buffer for linear development – Landscape features identified in BAM Subsection 3.1.3 – Additional detail (eg local government area boundaries) relevant at this scale	Figure 4.1 Appendix G
		• Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location map include: – IBRA bioregions and subregions – rivers, streams and estuaries – wetlands and important wetlands – connectivity of different areas of habitat – karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features – areas of outstanding biodiversity value occurring on the subject land and assessment area – any additional landscape features identified in any SEARs for the proposal – NSW (Mitchell) landscape on which the subject land occurs.	Figure 4.1 Figure 4.2

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		Data (to be supplied)	
		• All report maps as separate jpeg files • Individual digital shapefiles of: – subject land boundary – assessment area (i.e. subject land and 1500 metre buffer area) boundary – cadastral boundary of subject land – areas of native vegetation cover – landscape features.	All shapefiles are provided separately to BCS
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 3.4.1 Section 5.1 Appendix B
		• Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	Section 5.4 Appendix B
		• 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 3.4.1 Section 3.4.2 Section 5 Appendix G
		• Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	Section 3 Appendix D Appendix E
		• 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)	Appendix E
		For each PCT within the subject land, describe:	
		• vegetation class	Table 5.1 Appendix B Appendix G

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• extent (ha) within subject land	Table 5.1 Appendix B Appendix G
		• plant species relied upon for identification of the PCT and relative abundance of each species	Appendix B Appendix E Appendix L
		• evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	Appendix B Appendix E Appendix L
		• if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	Table 5.1 Appendix B Appendix G
		• if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	Appendix B Appendix H
		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 5.2.1 Appendix G
		• assessment of patch size (as described in BAM Subsection 4.3.2)	Figure 4.1 Section 4.5.2 Table 5.2
		• use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	Section 3.4.3 Appendix L
		• survey effort (ie number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	Section 3.4
		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	Section 3.4
		• identify published sources of local benchmark data (if benchmarks obtained from published sources)	Section 3.4

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	Section 3.4
		• provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	Section 3.4
		• provide written confirmation from the decision-maker that they support the use of local benchmark data	Appendix E
		Maps and Tables (in document)	
		• Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of 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)	Appendix G Figure 4.1
		• Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Appendix G
		• Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Appendix G
		• Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCTs boundaries	Figure 3.2 Appendix G
		• Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 5.1
		• 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 4.1 Section 4.5.2
		• 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	Table 13.1 Appendix L
		Data (to be supplied)	
		• All report maps as separate jpeg files	Provided separately to BCS
		• Plot field data (MS Excel format) • Plot field data sheets	Appendix L

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• Digital shape files of: – PCT boundaries within subject land – TEC boundaries within subject land – vegetation zone boundaries within subject land – floristic vegetation survey and vegetation integrity plot locations	Provided separately to BCS
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.))	Table 6.4 Appendix C
		• 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)	Table 6.5
		• justification for addition of any ecosystem credit species to the list	NA
		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)	Table 6.1 Table 6.6 Appendix I
		• 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)	Table 6.1 Table 6.6 Table 6.7 Appendix I
		• 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)	Appendix I
		• justification for addition of any species credit species to the list	Appendix I
		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.))	Table 6.1 Table 6.6 Appendix I

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• 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.))	NA
		• species for which targeted surveys are to be completed to determine species presence (Subsection 5.2.4(2.b.))	Appendix I
		• species for which an expert report is to be used to determine species presence (Subsection 5.2.4(2.c.))	Appendix N
		Present the outcomes of species credit species assessments from:	
		• threatened species survey (as described in BAM Section 5.2.4)	Appendix I
		• expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Section 5.2.4 and 5.3, Box 3)	Appendix N
		Where survey has been undertaken include detailed information on:	
		• survey method and effort, (as described in BAM Section 5.3) • justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the Department's taxa-specific survey guides or where no relevant guideline has been published • 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 • survey personnel and relevant experience • describe any limitations to surveys and how these were addressed/overcome	Section 3.4 Section 3.5 Section 3.6 Appendix D Appendix I
		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	Section 3.5.4 Appendix N
		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 • provide written confirmation from the decision-maker that they support the use of local data	Not applicable

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		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	Appendix I
		• 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) – 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	Appendix I
		• 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.)) – the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken – the polygon includes all individuals located on the subject land with a buffer of 30 metres around the individuals or groups of individuals on the subject land	Appendix I
		• Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	Appendix K
		Maps and Tables (in document)	
		• Table showing ecosystem credit species in accordance with BAM Section 5.1.1, and identifying: – the ecosystem credit species removed from the list – the sensitivity to gain class of each species	Appendix I
		• Table detailing species credit species in accordance with BAM section 5.2 and identifying: – the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or micro habitat features are not present – the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Appendix I
		• 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)	Appendix I

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• 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 6.1 Appendix I
		Data (to be supplied)	
		• Digital shape files of suitable habitat identified for survey for each candidate species credit species • Survey locations including GPS coordinates of any plots, transects, grids • Digital shape files of each species polygon including GPS coordinates of located individuals • Species polygon map in jpeg format • Expert reports and any supporting data used to support conclusions of the expert report • Field data sheets detailing survey information including prevailing conditions, date, time, equipment used, etc	Provided separately to BCS
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) • water bodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4) • 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) • where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	Section 8
		• Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	Section 8
		• Describe the importance of habitat features to the species including, where relevant, impacts on life-cycle or movement patterns (e.g. Subsection 6.1.3)	Section 8

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• Where the proposed development is for a wind farm: – identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5) – provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.) – 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
		Maps and Table (in document)	
		• Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.) • 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)	Figure 4.2
		Data (to be supplied)	
		• Digital shape files of prescribed impact feature locations • Prescribed impact features map in jpeg format	All shapefiles are provided separately to BCS
Avoid and minimise impacts	Chapter 7	*Information* Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative: • modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology • routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route • alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location • alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	Section 9.1 Section 9.2 Section 12.2
		• Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	Section 9.1

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Section 7.2.1(3.))	Section 9.1
		Maps and Table (in document)	
		• Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 12.1 Table 12.2 Table 12.3
		• Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	Figure 1.3 Appendix G
		• Maps demonstrating indirect impact zones where applicable	Not applicable
		Data (to be supplied)	
		• Digital shape files of: – alternative and final proposal footprint – direct and indirect impact zones • Maps in jpeg format	Final proposal and direct impact zones provided separately to BCS as shapefiles
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 10.1 Table 10.2 Table 10.3 Table 10.4
		• Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2): – description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal – documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications – reporting any limitations or assumptions, etc. made during the assessment – identification of the threatened entities and their habitat likely to be affected	Section 9.3.2

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		• Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including: – assessment of the nature, extent and duration of impacts on the habitat of threatened species or ecological communities associated with: – karst, caves, crevices, cliffs, rocks and other features of geological significance – human-made structures – non-native vegetation – connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range – movement of threatened species that maintains their life cycle – water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities	Section 10.2
		• assessment of the impacts of wind turbine strikes on protected animals	Not applicable
		• assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Section 10.2.3 Appendix J
		Maps and Tables (in document)	
		• Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 13.2
Mitigation and management of impacts	Chapter 8, Section 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 – document any adaptive management strategy proposed	Section 12
		• 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 12
		• Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	Section 12.1 Appendix J

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		Maps and Tables (in document) • Table of measures to be implemented to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	Table 12.1 Table 12.2 Table 12.3
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 – addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land – 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 10.1
		• Identification of impacts requiring offset in accordance with BAM Section 9.2	Section 13 Appendix H Appendix K
		• Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	Section 3.4.1 Section 6.1 Appendix K Appendix I
		• Identification of areas not requiring assessment in accordance with BAM Section 9.3	
		Maps and Tables (in document)	
		• Map showing the extent of TECs at risk of an SAII within the subject land • Map showing location of threatened species at risk of an SAII within the subject land • Map showing location of: – impacts requiring offset – impacts not requiring offset – areas not requiring assessment	Figure 5.1 Appendix G Appendix I

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
		Data (to be supplied)	
		• Digital shape files of: – extent of TECs at risk of an SAII within the subject land – location of threatened species at risk of an SAII within the subject land – boundary of impacts requiring offset – boundary of impacts not requiring offset – boundary of areas not requiring assessment • Maps in jpeg format	All shapefiles are provided separately to BCS
Impact summary	Chapter 10	*Information*	
		• Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including: – future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) – change in vegetation integrity score (BAM Subsection 8.1.1) – number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 9) – number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	Table 13.1 Table 13.2 Table 13.3 Table 13.4 Table 13.5 Table 13.6
		Maps and Tables (in document)	
		• Table of PCTs requiring offset and the number of ecosystem credits required	Table 13.1 Table 13.2
		• Table of threatened species requiring offset and the number of species credits required	Table 13.5 Table 13.6 Appendix K
		Data (to be supplied)	
		• Submitted proposal in the BAM Calculator	Appendix K

Report section	BAM ref.	Information and map requirements	BDAR location (section/figure)
Biodiversity credit report	Chapter 10	*Information* • Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	Appendix K
		Maps and Tables (in document) • Table of credit class and matching credit profile	Appendix K
		Data (to be supplied) • BAM credit report in pdf format	Appendix K
Biodiversity certification offsets and strategy (biodiversity certification only)	Chapter 12 and Appendix J	*Information*	
		• Land-based conservation measures including (strategic biodiversity certification only): – identification of parcels subject to land-based conservation measures – identification of land-based conservation measures proposed for each parcel – supporting information to demonstrate suitability of land-based conservation measures (Appendix J) – credit score of land-based conservation measures (Appendix J)	Not applicable
		• Biodiversity certification strategy including: – land proposed for biodiversity certification – land proposed for biodiversity conservation – proposed conservation measures – legal mechanisms for securing delivery of proposed conservation measures – parties to the biodiversity certification and responsibilities, noting where biodiversity certification agreements are proposed – timing for delivery of conservation measures – funding sources for delivery of conservation measures – framework for monitoring, reporting or auditing implementation of conservation measures	Not applicable

TECHNICAL REPORT

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Biodiversity development assessment report

Appendix B Detailed PCT profiles and fauna habitat descriptions

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

PCT descriptions

Table B1 PCT27

PCT 27 – Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion	
Vegetation formation	Semi-arid Woodlands (Grassy sub-formation)
Vegetation class	Riverine Plain Woodlands
PCT ID	27
PCT % cleared	86%
Plots sampled	T2-SP2, BN2
Area of impact	Castlereagh-Barwon subregion 3.4 hectares Pilliga subregion 1.5 hectares
Floristic description	This community consists of mid-high and low woodland to open woodland to about 10 metres high dominated by *Acacia pendula* (Weeping Myall) often with *Casuarina cristata* (Belah) and *Capparis mitchellii* (Wild Orange). *Eucalyptus populnea subsp. bimbil* (Poplar Box), *Alectryon oleifolius* (Western Rosewood), *Atalaya hemiglauca* (Whitewood) and *Eucalyptus largiflorens* (Black Box). Shrubs are sparse and include *Geijera parviflora* (Wilga), *Rhagodia spinescens, Capparis lasiantha, Acacia oswaldii, Acacia salicina, Myoporum montanum, Pimelea neo-anglica*, *Maireana aphylla, Atriplex stipitata, Leiocarpa panaetioides and Enchylaena tomentosa.* Many species of copperburrs may be present including *Sclerolaena brachyptera, Sclerolaena muricata var. muricata, Sclerolaena stelligera,* The ground cover is mid-dense to sparse. Common grass and forb species include *Einadia nutans subsp. nutans, Leiocarpa tomentosa, Marsilea hirsuta, Solanum esuriale, Daucus glochidiatus, Goodenia fascicularis, Oxalis perennans, Eryngium paludosum* and *Craspedia variabilis*. The most common grass species are *Monachather paradoxus, Chloris truncata, Enteropogon acicularis, Astrebla lappacea, Astrebla pectinata, Walwhalleya proluta, Dichanthium sericeum subsp. sericeum, Sporobolus caroli, Austrodanthonia setacea* and *Aristida leptopoda*.
Justification for PCT selection	The PCT was dominated by Weeping Myall on rich loam soils on flat plains north west of Gilgandra, consistent with the soil types and landscape position identified for the PCT in the BioNet database. Multiple small shrub and ground cover species consistent with the attributes described for this PCT in the BioNet Vegetation Classification database occurred in the plot, including *Sclerolaena muricata*, *Enchylaena tomentosa and Sporobolus caroli*. Other potential candidate PCTs for this community, dominated by the key tree species identified in the plots surveyed (Weeping Myall), including PCT 26, do not commonly occur in the Darling Riverine Plains and Brigalow Belt South Bioregions where this community is found.
Conservation significance	The woodland occurrences of this community within the study area are consistent with the final determination for the EEC *Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion* (BC Act). The woodland occurrences are also consistent with the EEC *Weeping Myall Woodlands* (EPBC Act).

PCT 27 – Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion	
Photograph	 Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Table B2 PCT 35

PCT 35 – Brigalow – Belah open forest/woodland on alluvial plains often gilgaied clay from Pilliga Scrub to Goondiwindi Brigalow Belt South bioregion	
Vegetation formation	Semi-arid Woodlands (grassy sub-formation)
Vegetation class	Brigalow Clay Plain Woodlands
PCT ID	35
PCT % cleared	90%
Plots sampled	T1-P5, 35BchDNG1, 35BchDNG2, 35BchDNG3
Area of impact	Pilliga Outwash subregion 7.3 hectares
Floristic description	This community is a low open woodland dominated by *Acacia harpophylla* (Brigalow) with a sparse understorey characterised by low abundances of saltbush species and native grasses. The canopy layer includes occasional occurrences of *Eucalyptus populnea* (Poplar Box) and *E. pilligaensis* (Pilliga Box). The low shrub layer is characterised by *Enchylaena tomentosa* (Ruby Saltbush), *Einadia hastata* (Berry Saltbush) and *Maireana enchylaenoides* (Wingless Bluebush). The dominant ground layer species included *Paspalidium caespitosum* (Brigalow Grass), *Enteropogon acicularis, Eragrostis brownii* (Brown's Lovegrass) and *Brunoniella australis* (Blue Trumpet).

PCT 35 – Brigalow – Belah open forest/woodland on alluvial plains often gilgaied clay from Pilliga Scrub to Goondiwindi Brigalow Belt South bioregion	
Justification for PCT selection	The PCT within the study area is consistent with the attributes described for this PCT in the BioNet Vegetation Classification database. Although the ground layer was degraded and heavily impacted by drought and livestock grazing, the upper stratum was dominated by Brigalow and occurred on alluvial plains. In addition, cleared area of gilgaied lands were observed adjacent to the proposal site in agricultural land, characteristics described for this PCT in the BioNet database. Species that occurred in the plots surveyed, that are consistent with the PCT description include *Eucalyptus pilligaensis, Geijera parviflora and Apophyllum anomalum*, which are known to occur as associated species in the canopy and shrub layers, with groundcover species including *Einadia nutans*, *Maireana enchylaenoides* and *Einadia hastata*. Other potential candidate PCTs for this community, dominated by the key tree species identified in the plots surveyed (Brigalow), including PCTs 29 and 31, do not commonly occur in the Brigalow Belt South Bioregion where this community is found.
Conservation significance	Woodland occurrences of this community within the study area are consistent with the final determination for the EEC *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains* (BC Act). The woodland occurrences are also consistent with the EEC *Brigalow (Acacia harpophylla dominant and co-dominant)* (EPBC Act).
Photograph	 Brigalow-Belah open forest/woodland on alluvial plains often gilgaied clay from Pilliga Scrub to Goondiwindi Brigalow Belt South Bioregion

Table B3 PCT 36

PCT 36 – River Red Gum tall to very tall open forest/woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains bioregion.	
Vegetation formation	Forested Wetlands
Vegetation class	Inland Riverine Forests
PCT ID	36
PCT % cleared	53%
Plots sampled	T2-P30, T2-P32, T1-P25
Area of impact	Pilliga subregion 3.0 hectares Bogan-Macquarie subregion 2.5 hectares
Floristic description	This community consists of very tall or tall open forest or woodland up to 30 metres high lining major watercourses dominated by *Eucalyptus camaldulensis subsp. camaldulensis* (River Red Gum). A sparse shrub layer may be present and can include *Acacia salicina* (Cooba), *Acacia stenophylla* (River Cooba) and *Muehlenbeckia florulenta* (Lignum). The ground layer was very sparse at the time of survey but the dominant species included *Austrostipa ramosissima*, *Cynodon dactylon* (Couch) and *Paspalidium jubiflorum* (Warrego Summer Grass). Rush species included *Juncus spp,* whilst ferns included *Marsilea drummondii* (Nardoo) was present on poorly drained sites. Other ground covers include *Rumex brownii, Boerhavia dominii, Alternanthera denticulata* and *Lobelia concolor*.
Justification for PCT selection	The flora species found within this PCT are consistent with the attributes described for this PCT in the BioNet Vegetation Classification database. The upper stratum on the banks of major creeks was dominated by River Red Gum in the southern end of the proposal site near Narromine and Burroway, which fits the distribution information for this PCT, which is mainly found in the Darling Riverine Plains Bioregion and extending into the adjoining bioregions. Associated species described for this PCT within the BioNet database that were identified across all stratum layers and growth forms within plots surveyed, include *Eucalyptus populnea, Sclerolaena birchii, Einadia nutans, Glycine tabacina, Alternanthera denticulata, Paspalidium constrictum* and *Carex inversa*. Other potential candidate PCTs for this community, dominated by the key tree species identified in the plots surveyed (River Red Gum) are generally more commonly distributed across other bioregions with PCT 78, whose distribution overlaps, not containing associated species that fit the community as closely as PCT 36.
Conservation significance	Not listed as a threatened ecological community under the BC Act or EPBC Act.

PCT 36 – River Red Gum tall to very tall open forest/woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains bioregion.	
Photograph	 River Red Gum tall to very tall open forest/ woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion.

Table B4 PCT 49

PCT 49 – Partly derived Windmill Grass – Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion	
Vegetation formation	Grasslands
Vegetation class	Semi-arid Floodplain Grasslands
PCT ID	49
PCT % cleared	50%
Plots sampled	49Bch, T1-MP-38, T2-MP24, T2-P18, Plot 14, Plot 20, Plot 11, AN1, AN2, AN3, WP1, WP2, WP3, T1-P22, BN3, BN4, BN5, BN6
Area of impact	Northern Basalts subregion 7.1 hectares Pilliga subregion 82.0 hectares Bogan-Macquarie subregion 11.7 hectares Pilliga Outwash subregion 91.4 hectares Castlereagh-Barwon subregion 104.7 hectares
Floristic description	This community is a tussock grassland dominated by *Chloris truncata* (Windmill Grass), *Enteropogon acicularis* (Curly Windmill Grass) and *Austrostipa scabra subsp. scabra* (Corkscrew grass) as well as *Convolvulus spp.* Scattered small shrubs include *Sclerolaena muricata* (Black Roly Poly), *Sclerolaena birchii* (Galvanized Burr), *Atriplex leptocarpa, Atriplex muelleri, Vachellia (Acacia) farnesiana, Sida trichopoda, Acacia stenophylla* (River Cooba) and *Geijera parviflora* (Wilga) and *Solanum esuriale*. Scattered trees include *Eucalyptus populnea subsp. bimbil* (Poplar Box) and *Eucalyptus coolabah* (Coolabah).

PCT 49 – Partly derived Windmill Grass – Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion	
Justification for PCT selection	Areas of this PCT are located within grasslands dominated by *Chloris* species. Although the occurrence of this PCT within the study area is highly degraded and exhibits low native species diversity, it is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). Additional plots completed in June 2020 exhibited a high species diversity of native herbs and forbs and dominance by Windmill Grass. Associated species described for this PCT within the BioNet database that were identified across different growth forms during plot surveys include *Sclerolaena birchii, Dactyloctenium radulans, Sida corrugata* and *Solanum esuriale*. This community is found on slight rises of the floodplains of the rivers in the bioregions in which it is found, on alluvial clays and brown soils, as described in the BioNet database. Other potential candidate PCTs for this community, dominated by the key diagnostic species identified in the plots surveyed (Windmill Grass) are more commonly associated with other bioregions, including the Riverina Bioregion.
Conservation significance	Not listed as a threatened ecological community under the BC Act or EPBC Act.
Photograph	 Partly derived Windmill Grass – Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion.

Table B5 PCT 55

PCT 55 – Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	
Vegetation formation	Semi-arid Woodlands (grassy sub-formation)
Vegetation class	North-west Floodplain Woodlands
PCT ID	55
PCT % cleared	83%
Plots sampled	Plot12, WP6, WP6A
Area of impact	Northern Basalts subregion 0.7 hectares Liverpool Plains bioregion 0.2 hectares Pilliga subregion 3.1 hectares
Floristic description	This community is a tall woodland dominated by *Casuarina cristata* (Belah) and *Eucalyptus pilligaensis* (Pilliga Box) with a sparse understorey characterised by low abundances of saltbush species and native grasses. Whilst shrub and ground layers were sparse during the survey, species generally include *Sclerolaena muricata* (Black Rolypoly), *Solanum esuriale* (Quena), *Sclerolaena birchii* (Galvanised Burr), *Sclerolaena divaricata* (Tangled Copperburr), *Salsola australis* and *Alectryon diversifolius* (Scrub Boonaree). The groundcover is characterised by low covers of native grasses and forbs, including *Chloris truncata* (Windmill Grass), *Panicum effusum* (Hairy Panic), *Maireana enchylaenoides* (Wingless Bluebush) and *Dichondra repens* (Kidney Weed).
Justification for PCT selection	The occurrence of this PCT within the proposal site is restricted. In the proposal site it is highly degraded and exhibits low native species diversity, but it is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database, including having a canopy dominated by Belah and located on brown and grey clay soils on flat to undulating terrain. Associated species described for this PCT within the BioNet database that were identified across different growth forms during plot surveys include *Geijera parviflora, Sclerolaena birchii, Enteropogon acicularis* and *Abutilon oxycarpum*. Other potential candidate PCTs for this community, dominated by the key tree species identified in the plots surveyed (Belah), including PCTs 35 and 56, include other characteristic tree species such as Brigalow and Poplar Box, that are not present in this community, with species being more consistent with PCT 55.
Conservation significance	Not listed as a threatened ecological community under the BC Act or EPBC Act.

PCT 55 – Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	
Photograph	 Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions

Table B6 PCT 56

PCT 56 – Poplar Box - Belah woodland on clay - loam soils on alluvial plains of north-central NSW	
Vegetation formation	Grassy Woodland
Vegetation class	Floodplain Transition Woodlands
PCT ID	56
PCT % cleared	80%
Plots sampled	T1-P13, T2-P21, S1, S2, WP5, 56Bench, 56BchDNG
Area of impact	Pilliga subregion 6.2 hectares Bogan-Macquarie subregion 0.5 hectares Castlereagh-Barwon subregion 28.6 hectares
Floristic description	Tall to mid-high woodland dominated by *Eucalyptus populnea subsp. bimbil* (Poplar Box) and *Casuarina cristata* (Belah) commonly with the small tree *Alectryon oleifolius* (Western Rosewood). Tall shrubs are sparse and include *Geijera parviflora* (Wilga), *Apophyllum anomalum* (Warrior Bush), *Capparis* sp., *Citrus glauca* and *Rhagodia spinescens* (Thorny Rhagodia). Low shrubs include *Sclerolaena birchii* (Galvanized Burr), *Sclerolaena muricata* (Black Roly Poly), other copperburrs, *Maireana coronata*, *Maireana decalvans* and *Enchylaena tomentosa*. The ground cover is sparse during dry times, such as the survey period, but mid-dense after rain. Species include grasses such as *Chloris truncata, Enteropogon acicularis* and *Austrostipa scabra* subsp. *scabra*. Forb species include *Einadia nutans* subsp. *nutans*, *Oxalis chnoodes*, *Bulbine alata, Erodium crinitum, Wahlenbergia fluminalis* and *Brachyscome heterodonta*.

PCT 56 – Poplar Box - Belah woodland on clay - loam soils on alluvial plains of north-central NSW	
Justification for PCT selection	The woodland occurrence of this PCT within the proposal site is consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT occurs as scattered patches throughout the central section of the proposal site always on flat alluvial plains. It has been heavily impacted by agriculture and is generally grazed and consists mostly of a scattered upper stratum of Belah and lesser amounts of Poplar Box, with *Eucalyptus microcarpa* and *Alectryon oleifolius* also occurring. Associated species described for this PCT within the BioNet database that were identified across all growth forms within plots surveyed, include *Sclerolaena muricata, Abutilon oxycarpum* and *Enteropogon acicularis*. Due to the dominant key diagnostic species within the community, this PCT is the best fit for the community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Poplar Box- Belah woodland on clay-loam soils on alluvial plains of north-central NSW.

* Benchmark data used

Table B7 PCT 78

PCT 78 – River Red Gum riparian tall woodland/open forest wetland in the Nandewar Bioregion and Brigalow Belt South bioregion.	
Vegetation formation	Forested Wetlands
Vegetation class	Inland Riverine Forests
PCT ID	78
PCT % cleared	60%
Plots sampled	T1-P8, T1-P9 T2-P1, T2-P15, T2-P14, 78Bench1, 78BenchDNG
Area of impact	Pilliga subregion 6.4 hectares Pilliga Outwash subregion 12.1 hectares Liverpool Plains subregion 1.4 hectares Castlereagh-Barwon subregion 8.7 hectares
Floristic description	This community is comprised of tall open forest or woodland to 30 metres high composed of *Eucalyptus camaldulensis* (River Red Gum) often with *Angophora floribunda* (Rough-barked Apple), *Eucalyptus melliodora* (Yellow Box) or *Casuarina cunninghamiana* (River Oak). *Eucalyptus blakelyi* (Blakely's Red Gum) may intergrade with River Red Gum. The shrub layer was sparse but may contain thickets of wattles such as *Acacia deanei, Leptospermum polygalifolium, Leptospermum brachyandrum, Notelaea microcarpa var. microcarpa, Swainsona galegifolia, Nyssanthes erecta* and *Maireana microphylla.* Ground cover is often dense and is composed of a mixture of forbs, graminoids and sedges. Forbs include and *Alternanthera denticulata, Commelina cyanea* and *Einadia hastata.* Graminoids include *Lomandra longifolia, Lomandra multiflora* and the grasses *Austrostipa verticillata, Cynodon dactylon, Aristida vagans* and *Themeda triandra*. Sedges include *Cyperus gracilis, Cyperus gymnocaulos, Carex incomitata* and *Carex appressa.* Weeds are often abundant and include *Lycium ferrosissimum* (African Boxthorn), *Salix babylonica* (Willow), *and Schinus areira* (Pepper Tree).
Justification for PCT selection	The occurrence of this PCT within the proposal site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT is dominated by River Red Gum along the immediate riparian banks of the major rivers, including the Macquarie and Castlereagh Rivers. The occurrences of this PCT in the proposal site are generally weedy due to their location in publicly accessible areas and they have a number of high threat weeds recorded that are associated with this PCT. It grades quickly into other dryland communities including PCT 88 and PCT 248 which generally contain box species as per the classification for this PCT. Associated species described for this PCT within the BioNet database that were identified across different growth forms within plots surveyed, include *Austrostipa ramosissima, Aristida vagans* and *Boerhavia dominii*. Other potential candidate PCTs for this community, dominated by the key tree species identified in the plots surveyed (River Red Gum) are generally more commonly distributed across other bioregions with PCT 36, whose distribution overlaps, not containing associated species that fit the community as closely as PCT 78
Conservation significance	Not listed as a threatened ecological community under the BC Act or EPBC Act.

PCT 78 – River Red Gum riparian tall woodland/open forest wetland in the Nandewar Bioregion and Brigalow Belt South bioregion.	
Photograph	  River Red Gum riparian tall woodland/ open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion.

Table B8 PCT 81

PCT 81 – Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	
Vegetation formation	Grassy Woodlands
Vegetation class	Floodplain Transition Woodland
PCT ID	81
PCT % cleared	78
Plots sampled	T2-P37
Area of impact	Bogan – Macquarie Subregion 0.9 hectares
Floristic description	A tall (up to 20 metres high) *Eucalyptus microcarpa* (Western Grey Box) dominated woodland, often containing scattered *Callitris glaucophylla* (White Cypress Pine), *Allocasuarina leuhmannii* (Bulloak) and *Brachychiton populneus* (Kurrajongs). Other trees such as *Callitris endlicheri (*Black Cypress Pine), *Eucalyptus melliodora (*Yellow Box), *Eucalyptus crebra* (Narrow-leaved Ironbark), and *Angophora floribunda* (Rough-barked Apple) may also occur. Typically this community contains a sparse shrub layer comprised of *Maireana microphylla, Cassinia sp,* and with wattle species such as *Acacia hakeoides*, *Acacia decora* and *Acacia deanii.* The ground-layer is mid-dense and dominated by grass and forb species.
Justification for PCT selection	The occurrence of this PCT within the proposal site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). While the plot data captured Fuzzy Box (*Eucalyptus conica)* within the narrow road reserve, Grey Box (*Eucalyptus macrocarpa)* was dominant and widespread throughout the patch extending into adjacent farmland. Other canopy species including *Callitris glaucophylla* and *Eucalyptus populneus* were recorded in the road reserve. The PCT was dominated by native species, including *Chloris truncate. Eremophila debilis and Carex inversa.* It occurred on flats in the proposal site in most soil types except sand. Given the dominance of Grey Box in the surrounding area, no other PCTs were consistent with the dominant canopy species and other attributes recorded for this community.
Conservation significance	The one occurrence of this community within the roadside east of Narromine is commensurate with Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (BC Act and Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act).

PCT 81 – Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	
Photograph	 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion

Table B9 PCT 88

PCT 88 – Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Pilliga Outwash Dry Sclerophyll Forests
PCT ID	88
PCT % cleared	38%
Plots sampled	T2-P26, T1-P10, T1-P12, T1-P16, T1-P17, T1-P20, T1-P21, T2-P22, T2-P25, T2-P31, T2-P34, T1-MP4, T1-MP24, T2-MP13, T1-P6, 88BenchDNG, T2-MP13, T1-MP24, T2-P16, 88BchDNG1, 88BchDNG2, 88BchDNG3, 88BchDNG4
Area of impact	Pilliga subregion 249.3 hectares Bogan-Macquarie subregion 17.4 hectares Pilliga Outwash subregion 105.9 hectares Castlereagh-Barwon subregion 15.7 hectares
Floristic description	This community is a tall woodland or open forest dominated by *Eucalyptus pilligaensis* (Pilliga Box) with *Callitris glaucophylla* (White Cypress Pine) and *Allocasuarina luehmannii* (Buloke). Shrub species include *Geijera parviflora* (Wilga), *Acacia deanei, Acacia hakeoides* and *Dodonaea viscosa*. The ground cover is sparse and includes the chenopods Enchylaena tomentosa, *Einadia nutans, Aristida ramosa, Austrostipa scabra subsp. scabra*, *Enteropogon acicularis*, *Digitaria brownii* and *Eragrostis lacunaria.* The sedges *Cyperus fulvus* or Cyperus gracilis may be present. Forbs species include *Calotis cuneifolia* and *Calotis lappulacea*.

PCT 88 – Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South bioregion	
Justification for PCT selection	The floristic composition found throughout the survey is highly consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT is common and widespread through the north, central and southern sections of the proposal site. It is dominated by Pilliga Box and other canopy species, including *Callitris glaucophylla* and *Allocasuarina luehmannii* that vary in their dominance depending on the patch. The PCT was dominated by native species, including *Lomandra filiformis, Aristida ramosa* and *Calotis lappulacea,* but cover of species was not high mostly due to a cover of leaf litter and shrub species as well as regrowth upper stratum species (particularly in the Pilliga). It occurred on flat and plains across the proposal site in most soil types except sand, sandstone and alluvial clays. No other PCTs were consistent with the dominant canopy species and other attributes recorded for this community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Pilliga Box- White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion

* Benchmark data used

Table B10 PCT 141

PCT 141 – Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Pilliga Outwash Dry Sclerophyll Forests
PCT ID	141
PCT % cleared	11%
Plots sampled	T1-MP11, T1-MP13, T1-MP14, T1-MP19
Area of impact	Pilliga subregion 28.2 hectares Pilliga Outwash subregion 1.7 hectares
Floristic description	Tall to very tall shrubland to closed shrubland to over three metres high dominated by the tall shrub *Melaleuca uncinata* (Broombush). Other shrubs include *Calytrix tetragona, Westringia cheelii, Acacia triptera, Melaleuca erubescens, Acacia murrayana* and *Micromyrtus ciliata*. Ground cover was sparse due to dry conditions, however species included *Aristida jerichoensis var. jerichoensis, Lomandra leucocephala* and *Cheilanthes sieberi*. Canopy species which were also sparse included *Callitris glaucophylla* and *Eucalyptus crebra*.
Justification for PCT selection	The floristic composition found throughout the survey is highly consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT occurred only in the Pilliga and was dominated by shrub species, including Broombush and *Acacia triptera*, consistent with the classification of this PCT. It occurred on flat plains sometimes in sandy areas grading into woodlands. Other potential candidate PCTs for this community, dominated by the key diagnostic species identified in the plots surveyed (Broombush) are not specifically associated with the Pilliga region where this community is found.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Broombush-wattle very tall shrubland of the Pilliga to Goonoo regions. Brigalow Belt South Bioregion.

Table B11 PCT 145

PCT 145 – Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains bioregion	
Vegetation formation	Semi-arid Woodlands (Shrubby sub-formation)
Vegetation class	Western Peneplain Woodland
PCT ID	145
PCT % cleared	75%
Plots sampled	T1SP1, T2-SP4, T1SP2, T1BP5, S1
Area of impact	Pilliga subregion 46.5 hectares Pilliga Outwash subregion 5.8 hectares Castlereagh-Barwon subregion 15.1 hectares
Floristic description	Low open woodland or open shrubland to about eight metres high, dominated by the small trees *Alectryon oleifolius* (Western Rosewood), *Geijera parviflora* Wilga (Wilga), *Casuarina cristata* Belah (Belah), *Atalaya hemiglauca* Whitewood (Whitewood) and *Capparis mitchellii* Orange Bush (Orange Bush). Eucalypts such as *Eucalyptus populnea* Poplar Box (Poplar Box) and *Eucalyptus pilligaensis* Pilliga Box (Pilliga Box) also occur. Shrubs include *Rhagodia spinescens*, *Senna* form taxon *filifolia* (Punty Bush), *Apophyllum anomalum* Warrior Bush (Warrior Bush) and *Eremophila mitchellii* Budda (Budda). Small shrubs and grasses dominate the ground cover. The main small shrubs are *Sclerolaena* spp. copperburrs (copperburrs) and *Maireana* sp bluebushes (bluebushes). Grasses include *Enteropogon acicularis, Chloris truncata, Dichanthium sericeum* subsp., *Enneapogon gracilis* and forbs of *Portulaca oleracea*, *Ptilotus semilanatus*, *Tetragonia tetragonioides* and *Sida corrugata*.
Justification for PCT selection	The floristic composition found throughout the survey is highly consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT occurred on the edges of sloping hills and rocky outcrops grading onto the lower slopes where it occurred as an open woodland. Western Rosewood and Wilga were the most dominant canopy trees on the lower slopes of the proposal site. Grading to the higher slopes Wild Orange and other shrub species occurred, which are outside the proposal site but is still consistent with the PCT classification. The location of this community is consistent with the BioNet database distribution, with this PCT being the most consistent with the attributes and diagnostic species described.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.

PCT 145 – Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains bioregion	
Photograph	 Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains bioregion

Table B12 PCT 148

PCT 148 – Dirty Gum - Buloke - White Cypress Pine - Ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Pilliga Outwash Dry Sclerophyll Forests
PCT ID	148
PCT % cleared	50%
Plots sampled	T2-P6, T2-P13, BN8, BN9, AN7, T2-P3, T2-P4, T1-P6, 148BchDNG1, 148BchDNG2
Area of impact	Pilliga Outwash subregion 134.4 hectares
Floristic description	This community is a tall to very tall woodland to open woodland dominated by *Eucalyptus chloroclada* (Dirty Gum) and *Allocasuarina luehmannii* (Buloke) often with *Callitris glaucophylla* (White Cypress Pine). Depending on grazing or fire history the understorey can be grassy or shrubby. Within this PCT the shrub layer was highly disturbed, therefore non-existent. Common shrubs described within the PCT include *Acacia deanei, Acacia spectabilis, Acacia sertiformis, Acacia ixiophylla, Dodonaea spp., Geijera parviflora* (Wilga), *Myoporum montanum* (Boobialla), *Brachyloma daphnoides, Xanthorrhoea glauca subsp. angustifolia, Daviesia ulicifola* subsp. *pilligensis* and *Pimelea linifolia*. The ground cover may be very sparse or near to bare. Groundcover species included *Aristida ramosa, Digitaria brownii, Panicum effusum* and *Wahlenbergia gracilis.*

PCT 148 – Dirty Gum - Buloke - White Cypress Pine - Ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South bioregion	
Justification for PCT selection	Although a very sparse shrub and ground layer was present, the community is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT occurred mostly as scattered patches in the north of the proposal site and is dominated by Dirty Gum and White Cypress Pine. The groundcover layer was severely impacted by drought conditions and had a very low percent cover and low diversity of native species. However, the species observed in the ground layer were consistent with the PCT and there was high litter cover. It also occurred on sandy loam soils within the Pilliga Outwash subregion which is consistent with the distribution of the PCT.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Dirty Gum- Buloke- White Cypress Pine- Ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion.

* Benchmark data used

Table B13 PCT 168

PCT 168 – Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	
Vegetation formation	Arid Shrublands (Chenopod sub-formation)
Vegetation class	Riverine Chenopod Shrublands
PCT ID	168
PCT % cleared	0
Plots sampled	T1-P1, 168-BenchA, 168-BenchB
Area of impact	Pilliga subregion 1.5 hectares Liverpool Plains subregion 7.1 hectares
Floristic description	This community is a low open shrubland / sparse forbland with low shrubs 10 to 30 centimetres high dominated by copperburrs such as *Sclerolaena divaricata, Sclerolaena birchii* and *Sclerolaena muricata*, with other chenopods such as *Salsola australis* and low saltbushes such as *Atriplex semibaccata* and *Einadia nutans*. Scattered tall shrubs such as *Hakea leucoptera, Eremophila bignoniiflora* or *Apophyllum anomalum* may be present within the PCT but were not found during the survey. Ground covers were sparse but included *Portulaca oleracea* and *Boerhavia diffusa*. Grasses include *Aristida ramosa, Enteropogon acicularis, Cynodon dactylon* and *Urochloa panicoides*.
Justification for PCT selection	The occurrence of this PCT within the proposal site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). It has been highly impacted by intensive agriculture and occurs mostly south of the Namoi River near Narrabri on private land on undulating grey soils rising out from River Red Gum communities on the river floodplain. This community has species consistent with the PCT description including *Sclerolaena* species, consistent clay soils, an appropriate distribution in the Brigalow Belt South bioregion, and is the most appropriate PCT for the community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Derived Copperburr shrubland of the NSW northern inland alluvial floodplains.

* Benchmark data used

Table B14 PCT 185

PCT 185 – Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland	
Vegetation formation	Semi-arid Woodlands (Shrubby sub-formation)
Vegetation class	Inland Rocky Hill Woodlands
PCT ID	185
PCT % cleared	50%
Plots sampled	T2-BP3, T2-BP3-2, 185_Bench
Area of impact	Inland Slopes subregion 13.5 hectares
Floristic description	Tall mallee open woodland dominated by Dwyer's Red Gum (*Eucalyptus dwyeri*), White Cypress Pine (*Callitris glaucophylla*) and/or Currawang (*Acacia doratoxylon*) occasionally with stands of Drooping She-oak (*Allocasuarina verticillata*), Poplar Box (*Eucalyptus populnea*) or Western Grey Box (*Eucalyptus microcarpa*). Grades into communities with Western Grey Box (*Eucalyptus microcarpa*) or Mugga Ironbark (*Eucalyptus sideroxylon*). Kurrajong (*Brachychiton populneus* subsp. *populneus*) occurs in some locations. The understorey contains a sparse shrub layer that may include *Cassinia laevis*, *Grevillea floribunda*, *Acacia deanei* and in some areas *Leptospermum divaricatum*. Low shrubs species include *Melichrus urceolatus, Hibbertia obtusifolia* and thickets of *Platysace lanceolata*. The ground cover is sparse and is often covered in rocks. Species include forbs such as *Gonocarpus elatus, Calotis cuneifolia, Goodenia glabra* and *Hybanthus monopetalus* and grasses such as *Austrodanthonia setacea*, *Austrostipa scabra, Austrostipa densiflora, Austrodanthonia eriantha*, *Thyridolepis mitchelliana* and *Amphipogon caricinus*. The rock ferns (*Cheilanthes* spp.) are common.
Justification for PCT selection	Although a very sparse shrub and ground layer was present due to the drought conditions at the time of survey, the community is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). It occurred on a rocky outcrop proposed to be used for a borrow pit with regrowth Dwyer's Red Gum from previous quarry activity. Although the community has been considerably altered, the distribution and landscape position are consistent with the BioNet description of the PCT and combined with recorded species is a more appropriate fit than other potential candidate PCTs such as PCT 184 and 186.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.

PCT 185 – Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland	
Photograph	 Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland

* Benchmark data used

Table B15 PCT 202

PCT 202 – Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar bioregion (including Pilliga)	
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
PCT ID	202
PCT % cleared	75%
Plots sampled	202-BenchA, 202-BenchB
Area of impact	Pilliga subregion 3.6 hectares
Floristic description	This community is a tall woodland up to 20 metres high dominated by *Eucalyptus conica* (Fuzzy Box) and intergrades with *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus populnea subsp. bimbil* (Poplar Box), Understorey shrubs are very sparse and include *Geijera parviflora, Sclerolaena birchii* and *Eremophila debilis.* The ground cover may be dense after rain but is normally mid-dense to sparse. It usually contains a rich herb/grassy flora. Forb species include *Dichondra repens*, *Einadia nutans, Lepidium hyssopifolium, Vittadinia cuneata* and *Calotis lappulacea* Grass and other species include Austrostipa verticillata, Austrostipa scabra, Chloris truncata, Paspalidium constrictum and *Carex inversa.*

PCT 202 – Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar bioregion (including Pilliga)	
Justification for PCT selection	The occurrence of this PCT is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). It occurred on flat plains near ephemeral drainage lines in the central section of the proposal site south of Gilgandra. Access to this PCT was limited to over the fence views due to private landholders not allowing access. The dominant canopy species Fuzzy Box and White Cypress Pine were observed and other potential candidate PCTs generally occur outside the distribution for this PCT.
Conservation significance	Woodland occurrences of this community within the study area are consistent with the final determination for the EEC *Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions* (BC Act)
Photograph	 Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga).

* Benchmark data used

Table B18 PCT 206

PCT 206 – Dirty Gum – White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	
Vegetation formation	Semi-arid Woodlands (shrubby sub-formation)
Vegetation class	North-west Alluvial Sand Woodlands
PCT ID	206
PCT % cleared	50%
Plots sampled	WP7, WP8, 206Bch
Area of impact	Pilliga subregion 4.9 hectares Castlereagh-Barwon subregion 5.2 hectares

PCT 206 – Dirty Gum – White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	
Floristic description	The community is mid-high open woodland with Dirty Gum (*Eucalyptus chloroclada*) as the dominant canopy species. White Cypress Pine (*Callitris glaucophylla*) is present in the midstorey, with dense regrowth occurring in patches throughout. The shrub layer is generally absent with Solanum ferocissimum the only shrub species recorded. The ground cover is variable across the community, with the better quality parts of the community containing a relatively sparse cover and dominated by native grass and forb species including *Thyridolepis mitchelliana*, *Brononia australis* and *Calotis cuneifolia*. The more degraded parts of the community are mid-dense and contain a higher proportion of weeds species such as *Arctotheca calendula*. Native species in this part of the community are dominated by *Calotis cuneifolia*, *Erodium crinitum* and *Cheilanthes sieberi*.
Justification for PCT selection	The occurrence of this PCT is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community is restricted to one location east of Gilgandra. The site was dominated by Dirty Gum on very sandy red soils. Groundcover species diversity was high and consistent with those listed on the PCT description for this species, including dominant canopy species of Dirty Gum and White Cypress Pine and groundcover species including *Aristida jerichoensis* and *Calotis cuneifolia.* The distribution, soil type and landscape position of this community are all consistent with the PCT description.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Dirty Gum – White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion.

* Benchmark data used

Table B17 PCT 244

PCT 244 – Poplar Box grassy woodland on alluvial clay - loams soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)	
Vegetation formation	Grassy Woodlands
Vegetation class	Floodplain Transition Woodlands
PCT ID	244
PCT % cleared	73%
Plots sampled	T2-P19, T2MP25, T2MP26, T2-P24, 244Bch
Area of impact	Pilliga subregion 23.8 hectares Castlereagh-Barwon subregion 16.8 hectares
Floristic description	The community is a mid-high to tall woodland or open woodland, averaging 13 metres high, dominated by *Eucalyptus populnea subsp. bimbil* (Poplar Box) with sparse occurrences of *Brachychiton populneus* (Kurrajong). The shrub layer is absent or sparse with some thickets in places. Tall shrub species include *Geijera parviflora* (Wilga) and *Eremophila glabra*. Low shrubs include *Maireana microphylla* and *Abutilon spp*. The ground cover is mid-dense to sparse and may contains low shrubs. A range of grass species is also present including *Austrostipa scabra subsp. scabra, Chloris truncata, Chloris divaricata, Austrodanthonia racemosum* and *Digitaria brownii*. Forb species include *Calotis lappulacea*, *Arthropodium minus* and *Rostellularia adscendens* subsp. *adscendens*. Weed species were apparent however sparse, including *Medicago spp*. and *Lycium ferocissimum.*
Justification for PCT selection	The community is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT occurs mostly just north of Narromine on flat alluvial plains that retain some wet/water areas after heavy rainfall and there are dense patches of Poplar Box regrowth in low lying areas. It occurs rising out from ephemeral drainage lines on alluvial clays and was heavily impacted by drought conditions due to livestock grazing. Given the flora species as described in the floristic description above, the soil type and distribution of the community are consistent with the PCT description, it is the most appropriate PCT for this community when compared to other potential candidate PCTs.
Conservation significance	The woodland occurrences are also consistent with the EEC *Poplar Box grassy woodland* (EPBC Act).

PCT 244 – Poplar Box grassy woodland on alluvial clay - loams soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)	
Photograph	 Poplar Box grassy woodland on alluvial clay-loams soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

* Benchmark data used

Table B18 PCT 248

PCT 248 – Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	
Vegetation formation	Grassy Woodlands
Vegetation class	Floodplain Transition Woodlands
PCT ID	248
PCT % cleared	80%
Plots sampled	T1-P24, T2-P37, BN1
Area of impact	Bogan-Macquarie subregion 15.8 hectares
Floristic description	This community is a tall woodland averaging about 14 metres high dominated by *Eucalyptus pilligaensis* (Pilliga Box) and *Eucalyptus populnea subsp. bimbil* (Poplar Box). Shrubs are very sparse but include *Sclerolaena birchii*, *Sclerolaena muricata* and *Maireana enchylaenoides.* The ground cover is usually mid-dense and is dominated by grasses such as *Austrostipa verticillata, Cynodon dactylon, Enteropogon acicularis* and *Rytidosperma fulvum*. Forbs such as *Sida corrugata*, *Dysphania multifida, Zaleya galericulata* and *Lepidium pseudohyssopifolium, Einadia nutans, Einadia trigonos and Neptunia gracilis* are also present.
Justification for PCT selection	This PCT is consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). The upper canopy included a general mix of Inland Grey Box, White Box, Poplar Box and Fuzzy Box as per the PCT classification. The community occurs on alluvial plains and given the distribution, landscape position and floristic description are consistent with the database description, this PCT is an appropriate fit for the community.

PCT 248 – Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	
Conservation significance	The one occurrence of this community near the Macquarie River is commensurate with Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (BC Act and Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act).
Photograph	 Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW.

Table B19 PCT 255

PCT 255 – Mugga Ironbark - Buloke- Pilliga Box - White Cypress Pine - shrubby woodland on sandstone in Dubbo region south western Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	255
PCT % cleared	50%
Plots sampled	T2-BP2A, T2-BP2, T2-BP5, T2-BP5-2
Area of impact	Pilliga subregion 7.9 hectares Bogan-Macquarie subregion 4.3 hectares
Floristic description	This community is comprised of tall woodland with trees to 20 metres high, dominated by *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus pilligaensis* (Pilliga Box) and *Callitris glaucophylla* (White Cypress Pine). A mid-dense shrub understorey is usually present unless heavily grazed. The shrub layer within this survey was sparse with the only species observed as *Solanum ferocissimum* The ground cover includes grass species such as *Austrostipa scabra subsp. scabra, Austrostipa verticillata, Eragrostis lacunaria* and *Panicum effusum*. Forb species including *Brunoniella australis, Lomandra filiformis* as well as *Cheilanthes sieberi* were also present.

PCT 255 – Mugga Ironbark - Buloke- Pilliga Box - White Cypress Pine - shrubby woodland on sandstone in Dubbo region south western Brigalow Belt South bioregion	
Justification for PCT selection	Despite the lack of shrub species within this PCT, floristic composition is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). Mugga Ironbark was dominant and occurs as a small roadside remnant north of Narromine. Although the sandstone component of this community was not evident in the plot, it did occur in the wider study area and the community is likely to have been connected to former cleared patches of the community on farming land. The floristic description, as described above, landscape position on low hills and rises and distribution of the community are consistent with the PCT description and combined make this PCT the most appropriate fit for the community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Mugga Ironbark- Buloke- Pilliga Box- White Cypress Pine- shrubby woodland on sandstone in Dubbo region south western Brigalow Belt South Bioregion.

Table B20 PCT 256

PCT 256 – Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South bioregion	
Vegetation formation	Semi-arid Woodlands (Shrubby sub-formation)
Vegetation class	Inland Rocky Hill Woodlands
PCT ID	256
PCT % cleared	23%
Plots sampled	T1-MP25
Area of impact	Pilliga subregion 0.3 hectares
Floristic description	This community consists of tall mallee woodland to about 8m high dominated by *Eucalyptus viridis* (Green Mallee). The shrub layer is sparse to mid-dense and contains species such as *Dodonaea viscosa*, *Solanum ferocissimum* and *Acacia deanei*. The ground cover is sparse and includes the grass species *Austrostipa scabra, Enteropogon acicularis* and *Austrodanthonia fulva*. *Dianella revoluta* and *Amyema spp.* were also observed in the survey.
Justification for PCT selection	The lack of shrub and grass species within this PCT are generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). Green Mallee was dominant in this very small patch within a very low rise in the Pilliga and although shrubs occurred in the adjacent PCTs they were less dominant in the Green Mallee PCT. The floristic description, including dominant canopy species, as described above, landscape position and distribution of the community are consistent with the PCT description and combined make this PCT the most appropriate fit for the community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Green Mallee tall mallee woodland on rises in the Pilliga- Goonoo regions, southern Brigalow Belt South Bioregion.

Table B21 PCT 394

PCT 394 – Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats in the Coonabarabran, Pilliga scrub regions	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	North-west Slopes Dry Sclerophyll Woodlands
PCT ID	394
PCT % cleared	36%
Plots sampled	T1-MP34, T1-MP31, T1-MP30, T1-MP42, T1-P14, T1-MP18 T1-MP22, T1-MP23, T2-MP8, 394BencDNG
Area of impact	Pilliga subregion 60.5 hectares Pilliga Outwash subregion 18.1 hectares
Floristic description	This community is a tall open forest or woodland usually dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), Blakely's Red Gum *Eucalyptus blakelyi* (Blakely's Red Gum), and *Callitris glaucophylla* (White Cypress Pine) with *Allocasuarina luehmannii* and *Brachychiton populneus.* The shrub layer is sparse to mid-dense and includes Melichrus urceolatus, *Melaleuca uncinata*, *Acacia mariae*, *Acacia murrayana, Acacia deanei* and *Geijera parviflora.* The ground cover is quite sparse with bare ground common. Grass species include *Aristida jerichoensis* and *Austrostipa scabra*. Forb species include *Dianella revoluta, Einadia hastata* and *Calotis cuneifolia*.
Justification for PCT selection	Although the occurrence of this PCT is degraded and exhibits low native species diversity, it is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This low species diversity is likely attributed to the drought conditions during the survey and history of disturbance where it predominately occurs in the Pilliga on flats. Narrow-leaved Ironbark is the dominant eucalypt with White Cypress Pine varying from moderate to high density depending on previous disturbance. This, combined with the appropriate distribution and landscape position of the community make this PCT the most appropriate fit when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	

PCT 394 – Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats in the Coonabarabran, Pilliga scrub regions	
	Narrow-leaved Ironbark, White Cypress Pine woodland on slopes and flats in the Coonabarabran, Pilliga scrub regions (woodland zone).  Narrow-leaved Ironbark, White Cypress Pine woodland on slopes and flats in the Coonabarabran, Pilliga scrub regions (post fire derived native shrubland zone).

Table B22 PCT 397

PCT 397 – Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Pilliga Outwash Dry Sclerophyll Forests
PCT ID	397
PCT % cleared	45%
Plots sampled	T1-MP33, T2-MP11, T2-MP12, T2-MP17, T2-MP39
Area of impact	Pilliga subregion 3.1 hectares Pilliga Outwash 14.3 hectares
Floristic description	This community is a tall woodland dominated by *Eucalyptus populnea subsp. bimbil* (Poplar Box) and *Callitris glaucophylla* (White Cypress Pine) with other trees including *Allocasuarina luehmannii* (Buloke). The shrub layer is sparse with low native species diversity but includes *Acacia deanii, Melichrus urceolatus* and *Solanum ferocissimum.* The ground cover is sparse and dominated by grasses and forbs such as *Austrostipa scabra subsp. scabra, Aristida ramosa, Enteropogon acicularis* and *Rytidosperma spp*. Forb species include *Lomandra leucocephala, Einadia trigonos, Cheilanthes sieberi* and *Dianella revoluta.*
Justification for PCT selection	The occurrence of this PCT within the proposal site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This PCT was dominated by White Cypress Pine with only scattered Poplar Box. The shrub layer varied across the patch and the groundcover was sparse due to drought conditions. The species that were recorded and sandy loam soils present are consistent with the classification of this PCT. The community also

PCT 397 – Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South bioregion	
	occurs in the appropriate distribution for the PCT with the scattered Poplar Box attributed to their past removal due to land use practices, as described in the database.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South bioregion

Table B23 PCT 398

PCT 398 – Narrow - leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	398
PCT % cleared	27%
Area of impact	Pilliga subregion 196.7 hectares Pilliga Outwash subregion 171.7 hectares
Plots sampled	T1-MP10, T2-MP1, T2-MP2, T2-MP5, T1-MP20, T1-MP35, T1-MP36, T1-MP3, T1-MP7, T2-MP14, T1-MP9 (woodland condition) T1-MP40, T1-MP41, T1-MP41A (shrub and Callitris cleared derived condition)
Floristic description	This community is a tall open forest dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and *Allocasuarina luehmannii* (Buloke). The shrub layer is sparse and includes *Acacia deanei*. The ground cover is also sparse and mostly covered with leaf litter. Grass species include *Aristida ramosa, Aristida jerichoensis* and *Austrostipa scabra*. The mat-rushes *Lomandra filiformis, Lomandra leucocephala* and *Cheilanthes sieberi* are also abundant. Forb species include *Calotis cuneifolia, Einadia hastata* and *Dianella revoluta*.

PCT 398 – Narrow - leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South bioregion	
Justification for PCT selection	The dominant tree species of Narrow-leaved Ironbark, Buloke and White Cypress Pine found within this community are consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). The co-dominance of Buloke and White Cypress Pine varied throughout patches of the Pilliga where it occurred most frequently with previous land use practices and disturbance contributing. The community occurs on sandy loam soils. This and the floristic description described above, combined with the appropriate distribution and landscape position of the community make this PCT the most appropriate fit when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photographs	 Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South bioregion (woodland condition).

PCT 398 – Narrow - leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South bioregion

Narrow-leaved Ironbark - White Cypress Pine- Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South bioregion (shrub and Callitris cleared condition).

Table B24 PCT 399

PCT 399 – Red Gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	399
PCT % cleared	10%
Plots sampled	T2-P11, T1-MP17, T1-MP21, T1-MP29, T2-MP3, T2-MP16, T1-MP32
Area of impact	Pilliga subregion 21.3 hectares Pilliga Outwash subregion 26.3 hectares
Floristic description	This community is a tall riparian woodland or open woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) along a watercourse. *Angophora floribunda* (Rough-barked Apple), *Callitris glaucophylla* (White Cypress Pine), and *Allocasuarina luehmannii* (Buloke) grow on adjoining sandy valley flats. The shrub layer is sparse overall and includes *Leptospermum polygalifolium*, *Acacia deanei*, *Callistemon linearis* and *Cassinia arcuata*.

PCT 399 – Red Gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South bioregion	
	Much of the ground cover in the watercourses are bare of vegetation covered with sand with patches of shrubs, sedges, water plants and rushes. Grass species include *Aristida ramosa*, whilst the forb species observed were *Wahlenbergia gracilis* and *Ajuga australis*, The sedge species *Cyperus lucidus*, and *Gahnia aspera* were identified within the community as well as *Juncus continuus*.
Justification for PCT selection	The floristic layers are highly consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). The PCT in the proposal site is dominated by Rough-barked Apple and Blakely's Red Gum occurring along sandy creeks throughout the Pilliga. The PCT is known to occur along streams in the Pilliga forests on sandstone derived soils, which is consistent with the surveyed community. Therefore, the landscape position, distribution floristics and soil type are all consistent with the description of the PCT in the BioNet database.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Red Gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South bioregion.

Table B25 PCT 404

PCT 404 – Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	404
PCT % cleared	9%
Plots sampled	AN5, T2-MP6, T2-MP7, T2-MP10
Area of impact	Pilliga subregion 23.3 hectares
Floristic description	Mid-high to tall woodland containing *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood). Shrub species include *Acacia deanei* and *Dodonaea viscosa*. The ground cover is very sparse due to disturbance. Grass species include *Enteropogon acicularis*, *Eragrostis* spp., *Aristida ramosa* and *Aristida jerichoensis*. Forb species include *Lomandra longifolia* and *Lomandra leucocephala*
Justification for PCT selection	The canopy species and additional floristic layers are generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred in the central section of the Pilliga on sandy flats grading out of a sandstone PCT. The community was dominated by Red Ironbark with scattered occurrences of White Bloodwood. Burrow Wattle occurred on the upper gentle slope of the patch. Forbs were not diverse due to drought conditions but included *Lomandra* species. The floristics and soil types, combined with the appropriate landscape position and distribution of the community make this PCT the most appropriate fit when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests.

Table B26 PCT 406

PCT 406 – White Bloodwood – Motherumbah - Red Ironbark shrubby sandstone hill woodland/open forest mainly in east Pilliga forests	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	406
PCT % cleared	6%
Plots sampled	T1-MP15, T1-MP16
Area of impact	Pilliga subregion 2.4 hectares
Floristic description	Mid-high to tall shrubby woodland or open forest dominated by White Bloodwood (*Corymbia trachyphloia* subsp. *amphistomatica*) with Motherumbah (*Acacia cheelii*) with Red Ironbark (*Eucalyptus fibrosa*) and some Black Cypress Pine (*Callitris endlicheri*). The shrub layer contains the tall shrub *Acacia cheelii* and *Allocasuarina diminuta* and other shrubs such as *Persoonia sericea*, *Leptospermum parvifolium*, *Hibbertia incana*, *Cassinia arcuata*, *Calytrix tetragona* and *Grevillea floribunda*. The ground cover is sparse and includes the grass species *Austrodanthonia induta* and *Aristida ramosa*. Sedges include *Lepidosperma laterale* and *Schoenus kennyi*. Forb species include, *Stypandra glauca*, *Gonocarpus elatus*, *Calotis lappulacea*, *Dianella revoluta var. revoluta* and *Lomandra filiformis*.
Justification for PCT selection	The occurrence of this PCT is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred in the central section of the Pilliga within the proposal site on a rise with sandstone rocks at the surface. The community was very dense and shrubby with Motherumbah dominant, although it had been impacted by fire within the last 3-5 years. White Boodwood and Red Ironbark are also present. Due to the density of shrub regrowth after the fire and drought conditions, the groundcover diversity and percent cover was very low. This PCT is the most appropriate fit when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 White Bloodwood – Motherumbah - Red Ironbark shrubby sandstone hill woodland/open forest mainly in east Pilliga forests

Table B27 PCT 409

PCT 409 – Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	409
PCT % cleared	17%
Plots sampled	T1-MP28
Area of impact	Pilliga subregion 0.8 hectares
Floristic description	This community is a mid-high to tall woodland dominated by *Eucalyptus chloroclada* (Dirty Gum), *Corymbia trachyphloia* and *Callitris glaucophylla* (White Cypress Pine). The shrub layer is sparse and consists of *Acacia mariae, Acacia deanei*, *Melichrus urceolatus*, *Brachyloma daphnoides* and *Grevillea floribunda.* The ground cover is very sparse to sparse and includes grass species such as *Austrostipa scabra* and *Aristida spp*. The mat-rushes *Lomandra leucocephala* and *Lomandra multiflora* are also present. Forb species observed includes *Einadia nutans.*
Justification for PCT selection	The occurrence of this PCT within the proposal site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred in the central section of the Pilliga within the proposal site on gently slopes grading to flats on sandy loam soils. The community was shrubby with Motherumbah dominant, although it had been impacted by fire within the last 3-5 years. Dirty Gum, White Bloodwood and White Cypress Pine are also present. Due to the density of shrub regrowth after the fire and drought conditions, the groundcover diversity and percent cover was very low. This PCT is the most appropriate fit when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South bioregion.

Table B28 PCT 414

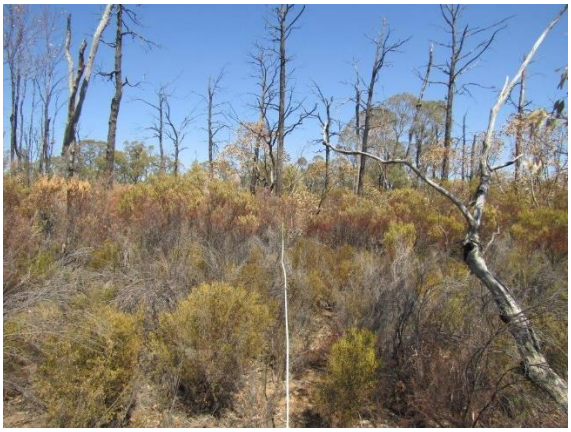
PCT 414 – White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	414
PCT % cleared	40%
Plots sampled	T1-MP27, T1-MP26, AN4
Area of impact	Pilliga subregion 7.3 hectares
Floristic description	This community is a tall mallee woodland dominated by the mallee form of *Eucalyptus dwyeri* (Dwyers Gum) with a diverse heath understorey. Another species observed within this community is *Corymbia trachyphloia (*White Bloodwood). A dense to mid-dense shrub layer is present including species such as *Grevillea floribunda*, *Melichrus urceolatus, Senna artemisioides, Cassinia arcuata, Melaleuca erubescens, Darwinia spp., Allocasuarina diminuta, Micromyrtus ciliata, Acacia burrowii* and *Acacia mariae*, The ground cover is often very sparse with bare patches of soil prevalent. Ground cover species include *Dianella revoluta*, *Lomandra leucocephala* and the vine *Cassytha pubescens.*
Justification for PCT selection	The occurrence of this PCT within the site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred in the central and southern sections of the Pilliga north of Etoo Creek within the proposal site on sandy flats. The canopy was dominated by scattered White Mallee and Red Ironbark and many of the Mallee were experiencing severe dieback. There was a dense layer of shrubs, including *Allocasuarina diminuta* and *Acacia mariae*. The shrub and canopy layer were all experiencing severe dieback and were regrowth from a previous fire. Due to the density of shrubs and drought conditions groundcover diversity was low. However, floristics across all strata and growth forms, combined with landscape position and distribution are consistent with this PCT and the most appropriate fit when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South bioregion.

Table B29 PCT 435

PCT 435 – White Box – White Cypress Pine shrub grass hills woodland in the Brigalow Belt South and Nandewar bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	North-west Slopes Dry Sclerophyll Woodlands
PCT ID	435
PCT % cleared	58%
Plots sampled	435Bench, 435BchDNG1, 435BchDNG2
Area of impact	Pilliga Outwash subregion 5.4 hectares
Floristic description	This community is a tall to mid-high woodland dominated by *Eucalyptus albens* (White Box) and *Callitris glaucophylla* (White Cypress Pine) with *Brachychiton populneus* (Kurrajong) also present. The shrub layer is sparse in the study area and includes *Acacia decora* (Western Golden Wattle, *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop-bush) and *Geijera parviflora* (Wilga). The ground cover is quite diverse and is comprised of mixed native grasses and forbs including *Bothriochloa decipiens*, *Rytidosperma* spp.*, Austrostipa scabra, Cymbopogon refractus, Chloris ventricosa, Aristida personata, Ptilotus erubescens, Lachnagrostis filiformis, Jasminum lineare, Enchylaena tomentosa* and *Chrysocephalum apiculatum.*
Justification for PCT selection	The area in which this PCT is located was included as part of the proposal post-adequacy and therefore no subsequent access or floristic surveys were completed within the vegetation community. However, flora surveys were completed in the study area for a previous GHD project (Baradine levee) and the description of the PCT identified for this proposal is consistent with the observation of the plant community on site during trips to Baradine for the proposal. The community in the proposal site occurs as a woodland form and derived native grassland form of the PCT, which is located adjacent to the woodland. Benchmark plots were used for this PCT.
Conservation significance	This community is commensurate with the threatened ecological community *White Box Yellow Box Blakey's Red Gum Woodland* listed as critically endangered under the BC Act. The community does not classify for listing under the EPBC Act.
Photograph	Not available due to surveys not being conducted.

Table B30 PCT 444

PCT 444 – Silver-leaved Ironbark grassy tall woodland on clay - loam soils on plains in the Brigalow Belt South bioregion	
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
PCT ID	444
PCT % cleared	83%
Plots sampled	T2-P20
Area of impact	Castlereagh-Barwon subregion 1.7 hectares
Floristic description	This community is a tall to mid-high woodland dominated by *Eucalyptus melanophloia* (Silver-leaved Ironbark) with *Brachychiton populneus (*Kurrajong), *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus populnea* (Poplar Box). A shrub layer is absent within the community. The ground cover is sparse due to dry conditions however, can become dense in wetter seasons. Grass species include *Rytidosperma caespitosum, Austrostipa scabra, Austrostipa verticillata, Enteropogon acicularis* and *Chloris ventricosa* Forb species include *Einadia nutans, Phyllanthus virgatus, Lepidium hyssopifolium, Dichopogon fimbriatus, Maireana enchylaenoides* and *Dichondra repens*.
Justification for PCT selection	The tree species observed and the absence of a shrub layer indicate that the occurrence of this PCT within the site is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred in the central section of the proposal site as an isolated roadside patch. It occurred on dark clay loam soils near Mount Tenandra on a flat plain. The groundcover was grassy and included *Rytidosperma* and *Austrostipa* species, all features consistent with the BioNet database description. These features make this PCT the closest fit for the community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion.

Table B31 PCT469

White Cypress Pine – Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South bioregion.	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	469
PCT % cleared	33%
Plots sampled	T2-P33
Floristic description	This community is a tall open forest or woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Allocasuarina luehmannii* (Buloke). *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus sideroxylon* was scattered outside the plot. The shrub layer is sparse but includes *Dodonaea viscosa subsp. spatulata, Solanum ferocissimum, Acacia* spp. and *Enchylaena tomentosa.* The ground cover is usually sparse and may be covered in leaf litter. Grass species include *Austrostipa verticillata, Rytidosperma setaceum, Austrostipa* spp. and *Enteropogon acicularis*. Forb species include *Brunoniella* spp., *Alternanthera denticulata, Dichondra repens* and *Einadia nutans*.
Justification for PCT selection	This described community is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location).
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South bioregion.

Table B32 PCT473

PCT 473 – Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Western Slopes Dry Sclerophyll Forests
PCT ID	473
PCT % cleared	50%
Plots sampled	T1-P4, T2-P7, T2-P10
Area of impact	Pilliga Outwash subregion 20.1 hectares
Floristic description	Tall open forest or woodland with trees including red gums (*Eucalyptus chloroclada* or *Eucalyptus blakelyi*), *Angophora floribunda*, *Callitris glaucophylla*, *Eucalyptus crebra, Allocasuarina luehmannii* or *Callitris endlicheri*. The shrub layer is sparse and includes *Pittosporum angustifolium, Lissanthe strigosa* subsp. *strigosa, Enchylaena tomentosa, Dodonaea viscosa* subsp. *cuneata*, *Geijera parviflora* and *Acacia decora*. The ground cover is sparse to mid-dense depending on rain. It includes grasses such *as Microlaena stipoides* var. *stipoides* and *Austrostipa scabra* subsp. *scabra* and forbs such as *Ranunculus sessiliflorus* var. *sessiliflorus*, *Daucus glochidiatus, Rumex brownii*, *Crassula sieberiana* subsp. *sieberiana*; climbers include *Desmodium varians* and *Glycine tabacina*; the rock fern *Cheilanthes sieberi* subsp. *sieberi* is common along the sedges *Carex inversa* and *Carex appressa*.
Justification for PCT selection	This described community is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred on flats in the Pilliga but was not associated with drainage lines. It occurred on flats in the north of the proposal site on private properties in the Bohena Creek area and occurs on sand to sandy loam soils. The groundcover was sparse and not diverse during surveys due to drought conditions, however, canopy species present during surveys, including White Cypress Pine, Buloke and red gums are consistent with the description of this PCT. Given the flora species present, the soil type and distribution of the community are consistent with the PCT description, it is the most appropriate PCT for this community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.

PCT 473 – Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	
Photograph	 Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion

Table B33 PCT 589

PCT 589 – White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
PCT ID	589
PCT % cleared	83%
Plots sampled	T1-MP37
Area of impact	Pilliga Outwash subregion one hectare
Floristic description	Tall woodland to open forest (with Callitris regrowth) dominated by White Box (*Eucalyptus albens*) and White Cypress Pine (*Callitris* glaucophylla) and sometimes with Silver-leaved Ironbark (*Eucalyptus melanophloia*) or Yellow Box (*Eucalyptus melliodora*). The shrub layer is sparse and includes *Geijera parviflora*, *Cassinia laevis*, *Notelaea microcarpa* var. *microcarpa*, *Dodonaea viscosa* subsp. *angustifolia*, *Beyeria viscosa*, *Senna* form taxon *coriacea*, *Cassinia quinquefaria* and *Bursaria spinosa* subsp. *spinosa*. The ground layer is dense to mid-dense with a well -developed mix of grasses and forbs. Grass species include *Austrostipa scabra*, *Cymbopogon refractus*, *Dichanthium sericeum* subsp. *sericeum*, *Themeda australis*, *Aristida personata*, *Austrostipa aristiglumis*, *Austrodanthonia bipartita*, *Eragrostis leptostachya* and *Aristida leptopoda*. Forb species include Dichondra species, *Asperula conferta*, *Brunoniella australis*, *Calotis lappacea*, *Cullen tenax*, *Mentha satureioides* along with the sedge *Cyperus gracilis* and the climber *Glycine tabacina*.

PCT 589 – White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	
Justification for PCT selection	This described community is generally consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). Some of these attributes were missing in this zone as it had been recently logged on private land making PCT selection difficult, however, logged trees on the ground were mostly White Box and White Cypress Pine. The distribution of the community and sandy soils are generally consistent with that described for the PCT in the BioNet database and this PCT is the most appropriate fit for the community.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion

Table B34 PCT 599

PCT 599 – Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar bioregions	
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
PCT ID	599
PCT % cleared	80%
Plots sampled	T2-P35, T2-P36
Area of impact	Bogan-Macquarie subregion 2.8 hectares
Floristic description	This community is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box) often with *Eucalyptus microcarpa* (Grey Box). The shrub layer is sparse and includes species such as *Geijera parviflora*, *Eremophila debilis, Sclerolaena muricata* and *Maireana microphylla.* The ground cover is usually mid-dense to dense dominated by grasses and forbs. Grass species include *Austrostipa aristiglumis, Cynodon dactylon, Chloris truncata, Chloris ventricosa, Paspalidium constrictum* and *Austrostipa verticillata*. Forb species include *Dichondra repens*, *Arthropodium spp., Einadia nutans, Sida cunninghamii, Vittadinia cuneata, Sida corrugata* and *Dianella longifolia*. The climbers *Glycine tabacina* and *Glycine clandestina* are also present.
Justification for PCT selection	The occurrence of this PCT within the site is consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). Yellow Box and Blakey's Red Gum were the dominant canopy species and the groundcover diversity was high even in drought conditions, likely owing to its occurrence on a narrow roadside patch with no grazing. Associated species that occur include *Glycine tabacina, Chloris ventricosa* and *Rumex brownii*. It occurred on a flat area south of the Macquarie River at the southern end of the proposal site. Although the community is located in the Darling Riverine Plains, which is outside of the distribution for the PCT in the BioNet database, the boundary of the Brigalow Belt South bioregion where the PCT is known to occur is very close to the location of the community. The PCT was added into the calculator as it is the most appropriate fit for the community due to the floristic composition, landscape position on a flat area, and most appropriate distribution when compared to other potential candidate PCTs.
Conservation significance	Some parts of this community occur south of the Macquarie River within the study area and are consistent with the final determination for the EEC as White Box Yellow Box Blakely's Red Gum Woodland (BC Act) and White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)

PCT 599 – Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar bioregions	
Photograph	 Photograph 34. Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregions.

Table B35 PCT 746

PCT 746 – Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	
Vegetation formation	Wet Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Northern Escarpment Wet Sclerophyll Forests
PCT ID	746
PCT % cleared	n/a
Plots sampled	T1-BP1, T1-BP2
Area of impact	Pilliga subregion 2.1 hectares
Floristic description	Tall to very tall open forest. The most common species in this community are *Corymbia trachyphloia* subsp. *amphistomatica* (White Bloodwood), *Eucalyptus fibrosa* (Red Ironbark) and *Callitris endlicheri* (Black Cypress Pine). In the shrub layer is *Acacia cheelii* (Motherumbah) *Acacia doratoxylon* (Currawang) *Acacia pilligaensis* (Pilliga Wattle), *Cassinia arcuata*, *Cassinia laevis* (Cough Bush), *Grevillea floribunda* subsp. *floribunda* (Seven Dwarfs Grevillea), *Homoranthus flavescens*, *Melichrus urceolatus* (Urn Heath), *Persoonia cuspidifera, Pultenaea foliolosa* (A Bush Pea) and *Xanthorrhoea acaulis*. In the ground layer there is *Dianella revoluta* (Blueberry Lily), *Digitaria breviglumis, Goodenia rotundifolia, Hibbertia obtusifolia* (Horary Guinea Flower), *Lomandra multiflora* subsp. *multiflora* (Many Flowered Mat—rush), *Pomax umbellata* (Pomax), *Schoenus ericetorum*.

PCT 746 – Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	
Justification for PCT selection	The very tall canopy layer, scattered shrubs and sparse groundcovers indicates that the occurrence of this PCT within the site is highly consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). This community occurred in the mid-section of the Pilliga on flats where it's known distribution it likely to predominantly occur. The community is dominated by Brown Bloodwood and White Cypress Pine with some occurrences of Narrow-leaved Ironbark, also known from the community. Other associated species consistent with the PCT include *Lomandra multiflora*. Given the flora species present, the landscape position and distribution of the community are consistent with the PCT description, it is the most appropriate PCT for this community when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion

Table B36 PCT 1384

PCT 1384 – White Cypress Pine – Bulloak - Ironbark woodland of the Pilliga area of the Brigalow Belt South bioregion	
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Pilliga Outwash Dry Sclerophyll Forests
PCT ID	1384
PCT % cleared	75%
Plots sampled	T1-MP12, BN7, AN6
Area of impact	Pilliga subregion 8.8 hectares
Floristic description	This community is dominated by *Callitris glaucophylla* (White Cypress Pine), *Angophora floribunda* (Rough-barked Apple) and *Allocasuarina luehmannii* (Bulloak) with occurrences of *Eucalyptus crebra* (Narrow-leaved Ironbark). This community also has a mid-dense shrub layer with species such as *Dodonaea viscosa subsp. angustissima, Melichrus urceolatus, Acacia deanei* and *Calytrix tetragona.* The ground layer is sparse with low native species diversity but includes forbs such as *Xerochrysum bracteatum* and *Dianella revoluta* as well as *Lomandra leucocephala*.
Justification for PCT selection	The occurrence of the dominant tree species of Buloke and White Cypress Pine within this community is highly consistent with the attributes described for this PCT in the BioNet Vegetation Classification database (landform position, dominant canopy, soil types, location). It occurred on flats in the northern section of the Pilliga and the canopy stratum was dense resulting in only scattered shrub cover and minimal groundcover, however species associated with the PCT include *Acacia deanei, Cheilanthes sieberi* and *Rytidosperma* spp. There is limited data in the BioNet database for the PCT, however, given the floristics, landscape position and distribution this PCT is the most appropriate PCT for this community when compared to other potential candidate PCTs.
Conservation significance	Not listed as a threatened ecological community under BC Act and EPBC Act.
Photograph	 White Cypress Pine – Bulloak - Ironbark woodland of the Pilliga area of the Brigalow Belt South bioregion.

Fauna habitat descriptions

Table B37 Fauna habitats: grassland with scattered trees

Grassland with scattered paddock trees	
Description	Dominated by exotic crop species (eg Oats) or derived native grassland. Occasional isolated paddock trees or small groups of paddock trees are present. Paddock tree species comprise Narrow-leaved Grey Box (*Eucalyptus pilligaensis*) and occasional White Cypress Pine (*Callitris glaucophylla*). Many paddock trees are hollow-bearing.
Fauna recorded	A number of bird species typically associated with open grazing country were recorded. Galahs (*Eolophus rosiecapillus*), Red-rumped Parrot (*Psephotus haematonotus*) and Eastern Rosella (*Platycercus eximius*) were recorded, often near hollows. The introduced Common Myna (*Sturnus tristis*) and Common Starling (*Sturnus vulgaris*) are likely to compete with native bird species for hollows. Small flocks of the Noisy Miner (*Manorina melanocephala*) were observed. Flocks of Welcome Swallows (*Hirundo neoxena*) were seen foraging above and in the pasture and grassland. Whistling Kites (*Haliastur sphenurus*) were observed at a nest in a paddock tree and Black Kites (*Milvus migrans*) were seen soaring above grassland. The introduced Brown Hare (*Lepus capensis*) and Fox (*Vulpes vulpes*), and Eastern Grey Kangaroo (*Macropus giganteus*) were observed in open paddocks. A range of microbats were recorded and would forage over the proposal site. Potential roosting habitat is present in hollow trees. South-eastern Morethia Skinks (*Morethia boulengeri*) and Ragged Snake-eyed Skinks (*Cryptoblepharus pannosus*) were seen basking on fallen timber, and Tree Dtellas (*Gehyra variegata*) were observed on paddock trees while spotlighting.
Threatened species recorded or likely to occur	• Spotted Harrier – observed hunting over cleared agricultural land near Narromine, and in roadside vegetation in Gilgandra • Little Eagle – not observed during surveys, but could forage over agricultural land • Square-tailed Kite – not observed during surveys, but could forage over agricultural land • Yellow-bellied Sheathtail-bat – recorded at various locations via Anabat surveys. Could roost and breed in paddock trees • Little Pied Bat – recorded north of Narrabri • Eastern Freetail Bat – recorded north of Narrabri • Five-clawed Worm-skink – not recorded, but may occur in the Narrabri area
Photograph	 Paddock trees over cropping  Derived native grassland

Table B38 Fauna habitats: woodland patches in agricultural land

Woodland patches in agricultural land	
Description	Woodland vegetation is present as various-sized patches within agricultural land. This can comprise small patches within a larger paddock, riparian vegetation retained along creek lines, linear strips along roadsides and paper roads or 'laneways', and larger patches associated with travelling stock reserves. This vegetation comprises a canopy of eucalypts and Cypress Pine, often with a sparse understory and grassy ground layer. A high density of leaf litter and fallen timber is present, particularly along paper roads and in travelling stock reserves. Hollow-bearing trees and stags are present. Connectivity between patches varies. Some patches in agricultural land are isolated from other areas. Vegetation along creek lines and roads provides narrow strips of connectivity through the highly cleared agricultural landscape. This vegetation tends to be impacted by grazing, and clearing for firewood and fencing. In publicly accessible areas such as travelling stock reserves, vegetation and habitats are impacted by creation of tracks for dirt-bike riding, and rubbish dumping.
Fauna recorded	Large patches of woodland vegetation provided habitat for a wide range of bird species. Many small woodland birds occupy these habitats. A nest of a Wedge-tailed Eagle was observed in a woodland patch on a property near Narromine. Reptiles including a Yellow-faced Whip Snake, various geckos and skinks were observed. A Shingleback was observed on a road near Narromine. Ornate Burrowing Frogs were captured in pitfall traps on a property near Gilgandra after rain.
Threatened species recorded or likely to occur	• Grey-crowned Babbler – the most common threatened species recorded during surveys, and often occurred in woodland patches in agricultural land. • Black Falcon – recorded in a small woodland patch with two Whistling Kite nests north of Narrabri, to the west of the study area • Varied Sittella – occasional records in larger woodland patches • Speckled Warbler – recorded in dense, shrubby roadside vegetation at Bohena Creek • Black-chinned Honeyeater – recorded at Leeches Creek Road near Gilgandra • Koala – there is an EES (2019a) record associated with roadside vegetation south of Narromine. No Koalas were recorded during surveys for the proposal other than in the Pilliga
Photograph	 Woodland on property south of Narromine  Woodland on property near Burroway

Table B39 Fauna habitats: the forests of the Pilliga

The forests of the Pilliga	
Description	Much of the Pilliga is dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*) and White Cypress Pine (*Callitris glaucophylla*) with a sparse understory. Other trees present include Pilliga Box (*E. pilligaensis*), Poplar Box (*E. populnea*) and White Bloodwood (*Corymbia trachyphloia*) among others. It is believed that prior to 1830 the Pilliga was an open, grassy woodland with low incidences of large old eucalypts and cypress pines. With the increase in grazing, and exclusion of fire, and later the introduction of logging, perennial grasses declined and the incidence of old trees decreased. The forest is now dominated by a mostly young overstorey of eucalypts, cypress pines and Buloke, and a dense understorey of small eucalypts, cypress pines, Buloke and shrubs, but little grass (Date et al 2002). Forests of the Pilliga are impacted by logging, fire and grazing. Logging in the Pilliga is associated with habitats which have high frequencies of Narrow-leaved Ironbark and/or White Cypress Pine. Fire is also excluded from commercially valuable stands, but is used for fuel reduction in non-commercial stands. Grazing is also used to thin cypress pine regeneration (Date et al 2002). Date et al. (2002) found that many bird species are declining in the Pilliga as a result of these disturbance regimes, and will continue to do so without adaptive management for maintaining and rehabilitating their habitats. Box-ironbark forests have a large number of logs, stumps and dead trees, due to experienced intense logging but little fire (Date et al 2002).
Fauna recorded	Date et al (2002) found the box-ironbark forests of the Pilliga are characterized by high frequencies of 12 bird species, with low frequencies of many other species. Similar results were found during the surveys, with bird diversity being lower at forest sites that at creek sites. A variety of bats were recorded by the Anabat located in a forest site. The Yellow-footed Antechinus was recorded in traps in Ironbark/Broombush. Eastern Grey Kangaroos and Red-necked Wallabies were also observed. Foxes were recorded on cameras. A variety of reptiles were recorded, including the Bearded Dragon, Nobbi Dragon, Tommy Roundhead, Tree Skink and Brown-blazed Wedgesnout Ctenotus.
Threatened species recorded or likely to occur	• Grey-crowned Babbler – the most commonly recorded threatened species in the Pilliga during surveys • Glossy Black-cockatoo – a few pairs were observed flying overhead during surveys in the Pilliga and Bohena area. A small family group was recorded at a dam in the Pilliga by a camera trap • Varied Sittella – recorded on few occasions • Brown Treecreeper – recorded on few occasions • Speckled Warbler – recorded in shrubby forest at Bohena Creek rest area • Squirrel Glider – a family group were observed at a hollow in a Narrow-leaved Ironbark adjacent to Pilliga Forest Way • Inland Forest Bat – probable record at Trap site 5 • Large-eared Pied Bat – probable record at Trap site 5 • Yellow-bellied Sheathtail Bat – definite record at trap site 5 • Pilliga Mouse – not recorded during surveys, but known to occur • Eastern Pygmy-possum – not recorded during surveys, but known to occur • Black-striped Wallaby – not recorded during surveys, but known to occur

The forests of the Pilliga	
Photograph	 Ironbark Forest over Broombush (Trap site 4)  Corymbia forest with Cypress Pine (Trap site 5)  Mallee near Site 4  Ironbark – Buloke forest  View across recently burnt forest from the Salt Caves tower, showing the limited understorey

Table B40 Fauna habitats: heath and shrublands of the Pilliga

Heathlands of the Pilliga	
Description	The proposal crosses comparatively small areas of heathy vegetation in the Pilliga, including dense heath, and a more open heath under woodland canopy. Shrub species include Broombush (*Melaleuca uncinata*), various wattles (*Acacia* spp.), *Darwinia* spp., Seven Dwarfs Grevillea (*Grevillea floribunda*), Urn-heath (*Melichrus urceolatus*), Silver Cassia (*Senna artemisioides*), Drooping Cassinia (*Cassinia arcuata*), Rosy Paperbark (*Melaleuca erubescens*), Fringed Heath Myrtle (*Micromyrtus ciliata*) and Sticky Hop-bush (*Dodonaea viscosa*). Overstory species include Narrow-leaved Ironbark (*Eucalyptus crebra*), White Cypress Pine (*Callitris glaucophylla*), mallee form of Dwyers Gum (*Eucalyptus dwyeri*) and White Bloodwood (*Corymbia trachyphloia*). Occasional hollow-bearing trees occur in woodland areas. The ground cover is often very sparse with bare patches of soil prevalent.
Fauna recorded	Heath provides forage and shelter habitat for small mammals. The yellow-footed Antechinus (*Antechinus flavipes*) was trapped in heathy vegetation. Flowering species also provide foraging habitat for a range of small birds. Reptiles such as the Nobbi Dragon were also observed.
Threatened species recorded or likely to occur	• Eastern Pygmy-possum – not recorded but known to occur • Pilliga Mouse – not recorded but known to occur • Various microbats likely to occur
Photograph	 Broombush with occasional Ironbark (Trap site 4)  Heath in the central Pilliga

Table B41 Fauna habitats: creeks of the Pilliga

Creeks of the Pilliga	
Description	Creek lines of the Pilliga have a canopy of Blakely's Red Gum and the Rough-barked Apple. Cypress and ironbarks often occur in close proximity to the creeks but these areas are described above. Blakely's Red Gums often have hollows present, and hollows also occur in the Rough-barked Apple. The shrub layer is sparse overall and includes Tantoon (*Leptospermum polygalifolium*), Dean's Wattle (*Acacia deanei*), Narrow-leaved Bottlebrush (*Callistemon linearis*) and Drooping Cassinia (*Cassinia arcuata*). Watercourses are generally bare of vegetation with occasional patches of shrubs, sedges, water plants and rushes. Woodlands on creeks had fewer stumps, logs or dead trees than box-ironbark forests, due to the lack of logging in these areas (Date et al 2002). Creeks beds are usually sandy, and no water was observed during surveys. Some ponds were present in Baradine Creek outside the Pilliga as a result of rains immediately prior to the March survey. No emergent vegetation is present in the creeks, other than Baradine Creek outside the study area. Burrows of various sizes were observed in the sandy banks and soils of the creek beds. Cumbil Creek has low outcrops of sandstone present, with small crevices that would provide habitat for reptiles such as skinks and geckos. Blakely's Red Gum woodlands associated with creek lines in the Pilliga have been found to be characterized by 36 bird species that were virtually absent from the nearby box-ironbark forests away from the creeks, including 10 threatened and declining species (Date et al 2002). Many of these species are habitat specialists, and are dependent on mature trees for abundant nectar, insect prey or nesting, or are dependent on the grassy or grass/shrub mosaic understory to forage or nest. Creek line vegetation has been subject to less logging and grazing, but moderate fire impacts (Date et al 2002).
Fauna recorded	Little evidence of arboreal mammals was recorded along creek lines. According to Stanton (2011), the Brush-tailed Possum is rare in the Pilliga area. A small number of Koala scats were recorded from Etoo Creek and Coolangala Creek. Six microbat species were trapped in the harp nets at Coolangala Creek (including forest bats, broad-nosed bats, wattled bats, and long-eared bats). This is a wide creekline surrounded by large, hollow-bearing eucalypts. It is also near the interface with cleared agricultural land, increasing the microhabitats available for foraging. Only two bat species were trapped at the smaller Rocky Creek (both forest bat species), although the anabat recorded additional species at these creeks, including broad-nosed bats and wattled bats among others. Macropods recorded included the Eastern Grey Kangaroo, Swamp Wallaby, Wallaroo and Red-necked Wallaby. The Yellow-footed Antechinus was recorded at Etoo Creek and Coolangala Creek. Diggings and tracks of Foxes were also observed. Small skinks such as the Timid Slider and Southern Rainbow Skink were trapped in funnel traps in the sandy creek beds. Geckos such as the Eastern Spiny-tailed Gecko, Wood Geckos and the Tree Dtella were also trapped or observed on shrubs and timber during spotlighting. Gould's Goannas were observed and many burrows or diggings from this species were recorded. A Lace Monitor was also recorded in the Aloes picnic area adjacent to Etoo Creek. The Ornate Burrowing Frog was trapped in pitfall traps at Rocky Creek. Additional frog species were recorded at Baradine Creek south of the study area where water remained from recent rains, including the Spotted Grass Frog, Striped Marsh Frog (Brown-striped Frog), Emerald-spotted Tree Frog, Desert Tree Frog and Eastern Sign-bearing Froglet.

Creeks of the Pilliga	
Threatened species recorded or likely to occur	• Barking Owl – Known nest trees occur near the alignment at Baradine Creek, Etoo Creek and Rocky Creek (records courtesy of Forestry Corporation), although a Barn Owl was observed at the likely nest tree at Rocky Creek, and this tree may not currently be in use by Barking Owls. The Pilliga forests support the largest Barking Owl population in NSW (EES 2019b). Stanton (2011) found that the species appeared to be associated with forests on the Pilliga Outwash rather than the less productive forests associated with the Pilliga sandstone. • Brown Treecreeper – recorded on few occasions • Koala – scats were recorded at Coolangala Creek and Etoo Creek. No individuals were observed, despite the targeted transect survey along Etoo Creek (a previous stronghold for the species). Koalas are known to have declined substantially in numbers in the Pilliga in recent years (Lunney et al 2017). • Squirrel Glider – observed in ironbark forest in the Pilliga. Would utilise riparian vegetation for denning, foraging and dispersal. • Corben's Long-eared Bat – trapped at Coolangala Creek in Baradine State Forest. • Little Pied Bat – recorded on anabats at Rocky Creek • Large-eared Pied Bat – probable Anabat record at Coolangala Creek • Eastern Bentwing Bat – definite Anabat record at Rocky Creek • Yellow-bellied Sheathtail Bat – definite Anabat record at Rocky Creek • Pale-headed Snake – one individual recorded on Cumbil Forest Road on a warm evening after rain.
Photograph	 Etoo Creek (Trap site 3)  Baradine Creek at John's Crossing (upstream of study area)  Cumbil Creek showing outcropping sandstone  Cumbil Creek showing defined channel

Table B42 Fauna habitats: rivers and associated riparian vegetation

Rivers and associated riparian vegetation	
Description	The alignment crosses the Macquarie River, Castlereagh River, Namoi River and Narrabri Creek. Only the Macquarie River, Namoi River and Narrabri Creek had water present during surveys. Both the Namoi River and Narrabri Creek appeared to comprise a large pools, while the Macquarie River was flowing at all times. The Castlereagh River flowed following a rain event immediately after surveys in March 2019, however was dry during all survey periods. Riparian vegetation comprises a canopy of large old River Red Gums (*Eucalyptus camaldulensis*), most with hollows of various sizes. A range of shrubs occur under the canopy. Emergent vegetation is present in some locations, providing habitat for small birds and frogs. Exotic trees including Willows are present in some areas. Riparian vegetation provides an important corridor through the generally cleared agricultural landscape surrounding these rivers. Riparian vegetation is disturbed by access by stock, feral pigs and people. Rubbish dumping was evident at the travelling stock reserve on the Macquarie River at Narromine.
Fauna recorded	The Little Red Flying Fox was observed at the Namoi River and Narrabri Creek. The Common Brush-tailed Possum was observed in high numbers in River Red Gums at the Castlereagh River, as well as at the Macquarie River. The Southern Boobook and Tawny Frogmouth were also recorded at these rivers. Riparian vegetation supported a high diversity of bird species, including various honeyeaters, kingfishers, parrots and cockatoos. The Nankeen Night Heron was observed at Narrabri Creek. The Southern Spiny-tailed Gecko was observed at the Castlereagh River. A skin of a brown snake (*Psuedonaja* sp.) was also collected at this location. The Emerald-spotted Tree Frog was heard calling or was observed at the Macquarie River, Namoi River and Narrabri Creek. The Long-thumbed Frog (*Limnodynastes fletcheri*) and the Ornate Burrowing Frog were observed at Narrabri Creek, and the Broad-palmed Frog was observed at a small pool at the Castlereagh River.
Threatened species recorded or likely to occur	• Grey-crowned Babbler – recorded at the Castlereagh River • Eastern Bentwing Bat – probable record at the Macquarie River and Castlereagh River • Eastern Freetail Bat – probable record at Narrabri Creek • Little Pied Bat – probable record at the Castlereagh River • Yellow-bellied Sheath-tail Bat – definite record at Narrabri Creek • Squirrel Glider – may occur in riparian vegetation, particular where this connects to the Pilliga forests
Photographs	 Macquarie River, Narromine  Castlereagh River, Curban

Rivers and associated riparian vegetation	
 Namoi River, Narrabri	 Narrabri Creek, Narrabri

Table B43 Fauna habitats: creeks and associated riparian vegetation in agricultural land

Creeks and associated riparian vegetation in agricultural land	
Description	Many small creeks cross the proposal site within predominantly cleared agricultural land. Riparian vegetation is generally retained in these areas, and provides important linkages across the landscape for fauna movement. Riparian vegetation provides habitat for a range of bird species, including many small woodland birds such as White-plumed Honeyeaters, Western Gerygones and Superb Fairy-wrens. Galahs, Australian Ringnecks and Sulphur-crested Cockatoos were commonly observed. Dominant tree species comprise River Red Gums in the south, and Blakely's Red Gums in the north. Many hollow-bearing trees are present. These creeks remain dry for much of the year, with flows occurring on occasion after heavy rain. Occasional small pools remain for longer periods of time, and provide breeding habitat for frogs.
Fauna recorded	A roadkill Carpet Python was observed on Gilmours Road near Kickabil Creek. Frogs heard calling or observed at creek lines included the Broad-palmed Frog, Eastern Sign-bearing Froglet and Emerald-spotted Tree Frog.
Threatened species recorded or likely to occur	• Yellow-bellied Sheathtail Bat – definite record at Bohena Creek and Ewenmar Creek • Little Pied Bat – probable record at Ewenmar Creek
Photographs	 Ewenmar Creek, Burroway  Kickabil Creek, Kickabil

Creeks and associated riparian vegetation in agricultural land		
	 Creek near Gilgandra after November rains	 Leeches Creek, Balladoran, after November rains

Table B44 Fauna habitats: dams, roadside ditches and soaks

Dams and roadside ditches	
Description	Farm dams are present in agricultural land. These provide water for stock as well as native fauna including frogs, turtles, birds, macropods and bats. Few contain emergent, floating or submerged aquatic vegetation. Dams are present at various locations within the Pilliga forests. During surveys there was limited water present, with only some dams containing low levels of water. These dams provide important water sources for native fauna in the forest, as generally there is no water in the ephemeral creeklines. Roadside ditches contain pools of water after heavy rain. These are often vegetated with grasses and sometimes sedges. Frogs were often heard calling from these areas.
Fauna recorded	Farm dams provide habitat for a range of fauna species. Australian Wood Ducks were commonly recorded, as were Pacific Black Ducks and White-faced Herons. Eastern Snake-necked Turtles and Red-bellied Black Snakes were observed at farm dams. Frogs recoded at dams and roadside soaks included the Emerald-spotted Tree Frog, Spotted Grass Frog. Farm dams attract insects, which in turn attract microchiropteran bats. One small puddle at a property near Narrabri had numerous Ornate Burrowing Frog tadpoles and metamorphs present. On one evening in November 2018 heavy rain fell near Narromine and eight frog species were recorded during spotlighting, including the Desert Tree Frog, Sudell's Frog, Green Tree Frog and Cameras at the dams at Coxes Road in the Pilliga recorded pigs, sheep, a feral cat, Eastern Grey Kangaroos, Red-necked Wallabies, Common Bronzewings, and Australian Ringnecks.
Threatened species recorded or likely to occur	Dams in the Pilliga are known to be an important water source for Glossy Black Cockatoos. A family group were recorded at Clay Foot Dam in the Pilliga on a remote camera Eastern Bentwing Bat – probable record at a fam dam near Gilgandra Little Pied Bat – definite record at a farm dam near Narrabri Yellow-bellied Sheathtail Bat – recorded at farm dams near Narrabri

Dams and roadside ditches

Photographs

Farm dam with no emergent vegetation, Dappo

Farm dam with some emergent vegetation, Narrabri

Coxes Road Dam, Pilliga forests

Emus at Coxes Road Dam

Glossy Black-cockatoos at Clay Foot Dam

Eastern Grey Kangaroos at Clay Foot Dam

Table B45 Fauna habitats: rocky hillsides

Dams and roadside ditches	
Description	Rocky hillsides occur in the Black Hollow area north-east of Gilgandra near the Warrumbungle Range. In these areas, the proposal is located in cleared agricultural land, with rocky areas occurring upslope of the proposal site. Rocks occur as loose and embedded surface rock on steep slopes. Rock does not occur on gentle slopes at the base of these hills, and may have been 'tidied up' historically by landowners. No caves or crevices were recorded in these areas.
Fauna recorded	A range of birds and other fauna were recorded in the areas, mainly due to the retention of woodland habitat in these areas. Species recorded included the Singing Honeyeater (*Gavicalis virescens*), White-winged Triller (*Lalage sueurii*), Red-capped Robin (*Petroica goodenovii*), Yellow-footed Antechinus (*Antechinus flavipes*) and skinks (*Carlia* spp.) among others.
Threatened species recorded or likely to occur	The proposal site is not within the distribution of species such as the Pink-tailed Legless Lizard (*Aprasia parapulchella*) or Striped Legless Lizard (*Delma impar*) that rely on surface rock.
Photographs	 Surface rock and view to adjacent agricultural land, Tabletop Mountain, Black Hollow  Surface rock on top of Tabletop Mountain, Black Hollow

TECHNICAL REPORT

01

Biodiversity development assessment report

Appendix C Likelihood of occurrence of threatened and migratory biota

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

Threatened flora

Status

CE – critically endangered, E – endangered, V – vulnerable

Table C1 – Likelihood of occurrence of threatened flora species in the proposal site

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Communities									
Brigalow (*Acacia harpophylla* dominant and co-dominant) (EPBC Act)		-	E	Recorded	Ecosystem	The listed ecological community is characterised by the presence of Brigalow (*Acacia harpophylla*) as one of the three most abundant tree species (Butler 2007). Brigalow is usually either dominant in the tree layer or co-dominant with other species such as *Casuarina cristata* (Belah), other species of *Acacia*, or species of *Eucalyptus*. Occasionally Belah, or species or *Acacia* or *Eucalyptus* may be more common than Brigalow within the broad matrix of Brigalow vegetation. The structure of the vegetation ranges from open forest to open woodland. The height of the tree layer varies from about 9 m in low rainfall areas (averaging around 500 mm per annum) to around 25 m in higher rainfall areas (averaging around 750 mm per annum) (Butler 2007). A prominent shrub layer is usually present (DAWE 2020) The edge of a linear patch of this TEC along the Newell Highway and extending onto private properties. Small area on the edge of this patch	**Not recorded:** This PCT was not recorded during alignment surveys	**Not recorded:** This PCT was not recorded during alignment surveys	**Known:** This PCT was recorded in Segment 11. In total 7.3 ha of this community will be removed.
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions		E	-	Recorded	Ecosystem	Community occurs on brown loam or clay, alluvial or colluvial soils on prior streams and abandoned channels or slight depressions on undulating plains or flats of the western slopes. Community often occurs upslope from River Red Gum communities above frequently inundated areas of the floodplain. It also occurs on colluvium soils on lower slopes and valley flats. Occurs on alluvial soils of the South West Slopes, Brigalow Belt South and Darling Riverine Plains Bioregions. Mainly in the Dubbo-Narromine-Parkes-Forbes area.	**Not recorded:** This PCT was not recorded during alignment surveys	**Not recorded:** This PCT was not recorded during alignment surveys	**Known:** This PCT was recorded in Segment 8. In total 3.6 ha of this community will be removed

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (BC Act) Grey Box (Eucalyptus microcarpa) Grassy Woodlands and derived native grasslands of South-eastern Australia (EPBC Act)		E	E	Recorded	Ecosystem	Grey box woodlands includes those woodlands in which the most characteristic tree species, *Eucalyptus microcarpa* (Inland Grey Box), is often found in association with *E. populnea subsp. bimbil* (Bimble or Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Brachychiton populneus* (Kurrajong), *Allocasuarina luehmannii* (Bulloak) or *E. melliodora* (Yellow Box), and sometimes with *E. albens* (White Box). The community occurs on fertile soils of the western slopes and plains of NSW. The community generally occurs where average rainfall is 375- 800 millimetres per annum and the mean maximum annual temperature is 22- 26°C. One large patch south of the Macquarie River (very southern end of alignment) mostly within Crown Reserve/TSR	**Not recorded:** This PCT was not recorded during alignment surveys	**Not recorded:** This PCT was not recorded during alignment surveys	**Known:** This PCT was recorded in Segment 8. In total 17.2 ha of this community will be removed.
Poplar Box grassy woodland on alluvial plains (EPBC Act)		-	E	Recorded	Ecosystem	This ecological community is comprised of native grassy eucalypt woodland where poplar/ Bimble Box is the main tree canopy species present. Other tree species may occasionally occur depending on the characteristics of the site, these include *Callitris glaucophylla* (White Cypress Pine), *Casuarina cristata* (Belah), *Eucalyptus coolabah* (Coolibah), *Eucalyptus largiflorens* (Black Box), *Eucalyptus melanophloia* (Silver-Leaved Ironbark), *Eucalyptus microcarpa* (Inland Grey Box) and *Eucalyptus pilligaensis* (Narrow-Leaved Grey Box). This community mostly occurs as scattered patches inland of the Great Dividing Range in NSW and Queensland, within the Brigalow Belt North, Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, NSW South Western Slopes and Riverina IBRA bioregions. One large patch south of the Macquarie River (very southern end of alignment) mostly within Crown Reserve/TSR.	**Not recorded:** This PCT was not recorded during alignment surveys	**Not recorded:** This PCT was not recorded during alignment surveys	**Known:** This PCT was recorded in Segment 8 and 9. In total 82.1 ha of this community will be removed.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Myall Woodland in the Darling Riverine Plains, Brigalow Bet South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (BC Act) Weeping Myall Woodlands (EPBC Act)		E	E	Recorded	Ecosystem	This ecological community is characterised by the dominance of Weeping Myall (*Acacia pendula).* The community is typically scattered across the eastern parts of the alluvial plains of the Murray-Darling river system. Typically, it occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 millimetres mean annual rainfall. The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. Occurs as one patch on private property. Not connected to any other Weeping Myall TEC	**Not recorded:** This PCT was not recorded during alignment surveys	**Not recorded:** This PCT was not recorded during alignment surveys	**Known:** This PCT was recorded in Segment 9. In total 6.5 ha of this community will be removed.
White Box Yellow Box Blakely's Red Gum Woodland (BC Act) White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)		CE	CE	Recorded		Box-Gum Woodland is found from the Queensland border in the north, to the Victorian border in the south. It occurs in the tablelands and western slopes of NSW. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candlebark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*), Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), Cabbage Gum (*E. amplifolia*) and others. One linear roadside patch extending to a small patch on private property at the southernmost end of the alignment south of the Macquarie River	**Not recorded:** This PCT was not recorded during alignment surveys	**Not recorded:** This PCT was not recorded during alignment surveys	**Known:** This PCT was recorded in Segment 8, 9. In total 8.4 ha of this community will be removed.
Flora									
Austral Toadflax	*Thesium australe*	V	V	None	Species	Found in small, scattered populations along the east coast, northern and southern tablelands. Occurs in grassland or grassy woodland. Found in association with Kangaroo Grass (*Themeda australis*). Flowers in spring and summer. Known association with Kangaroo Grass (*Themeda australis*). No suitable potential habitat is present.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Bluegrass	*Dicanthium setosum*	V	V	Near Narrabri-Bionet	Species	Species exists inland Queensland and NSW. Occurs in moderately disturbed areas like cleared woodland, grassy roadside remnants and pasture. Often found with White Box *Eucalyptus albens*, Silver-leaved Ironbark *Eucalyptus melanophloia*, Yellow-Box *Eucalyptus melliodora*, Ribbon Gum *Eucalyptus viminalis*, Winter Apple *Eremophila dibilus* and Kangaroo Grass *Themeda triandra*. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. These soil types occur mostly to the north. Consultation with BCS accountable officer, confirmed species unlikely to occur due to lack of suitable soil types and associated habitat types in proposal site.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.
Coolabah Bertya	*Bertya opponens*	V	V	Yes, one only near Bohena Creek - Bionet	Species	Coolabah Bertya occurs in a range of habitats including stony mallee ridges and cypress pine forest on red soils. The wide variation in habitat type between the populations makes the identification of critical habitat very difficult. This species is known from adjacent to Bohena Creek Rest area on the Newell Highway within the proposal site. Four individuals are known from the site. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in March, September, October and November. With the exception of Bohena Creek, the PCTs in the study area are not associated with stony or gravelly mallee ridges or sandy gully habitats; these latter habitats are typically associated with sandy outwash areas such as those found in the Pilliga Outwash sub-region to the south of Narrabri (where Jacks SF is located)	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low**: This species was not recorded during targeted surveys. Individuals previously recorded near Bohena Creek presumed to have died.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Cobar Greenhood	*Pterostylis cobarensis*	V	-	Recorded at multiple locations in the Pilliga-Bionet	Species	A terrestrial orchid with transparent flowers with brown and green markings. It has been recorded in Bourke, Nyngan, Cobar, Nymagee, Warren, Gilgandra, Narrabri, and Coonabarabran districts. Recorded from a number of reserves and state forests including Mutawintji, Gundabooka, Culgoa, Warrumbungles National Parks, Quanda, Yathong Nature Reserves, Mt Grenfell Historic Site and Bimbilwindi and Pilliga East State Forests. It prefers eucalypt woodlands, open mallee or Callitris shrublands on low stony ridges and slopes in skeletal sandy-loam soils. Associated species include *Eucalyptus morrisii, E. viridis, E. intertexta, E. vicina, Callitris glaucophylla, Geijera parviflora, Casuarina cristata, Acacia doratoxylon, Senna spp.* and *Eremophila spp*. This species was recorded at one location in Pilliga East State Forest. No evidence of the species was recorded in other suitable habitat areas surveyed in the proposal site in October, September and November. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Recorded:** This species has previously been recorded throughout the Pilliga Forrest (Segment 10) and 495 individual plants were recorded in this segment
-	*Commersonia procumbens*	V	V	Recorded at multiple locations in the Pilliga - Bionet	Species	This species is endemic to NSW, and is mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. It typically grows in sandy sites, often alongside roads. It has been recorded in Eucalyptus dealbata, and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and Callitris area. Also in *Eucalyptus fibrosa subsp. nubila, Eucalyptus dealbata, Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo. Other associated species include *Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea* species, *Exocarpos cupressiformis, Leptospermum parvifolium* and *Kunzea parvifolia.*	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Assumed presence:** This species has previously been recorded throughout the Pilliga Forrest (Segment 10) and is assumed to occur.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
						No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in March, September, October and November. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.			
Finger Panic Grass	*Digitaria porrecta*	E	-	None	Species	Distribution is from northern NSW and Southern Queensland. Occurs in native grassland, woodlands and open forests. Associated with White Box *Eucalyptus albens*, Weeping Myall *Acacia pendula*, Plains Grass *Austrostipa aristiglumis*, Downs Nutgrass *Cyperus bifax* and Flower-of-an-Hour *Hibiscus trionum*. Limited suitable habitat in native grassland, woodlands or open forest with a grassy understorey, on richer soils.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.
-	*Homoranthus darwinoides*	V	V	None	Species	Rare in the 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. The species has been collected from Lee's Pinch, but not relocated at its original locality north of Mt Coricudgy above the headwaters of Widden Brook. 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. Known from the Goonoo forest region usually in gravelly and sandy soils. Limited soil types in Pilliga forests with associated species in soil types uncommon.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.
Keiths Zieria	*Zieria ingramii*	E	E	None	Species	This species grows in dry sclerophyll forests on light sandy soil. All known populations have been recorded within *Eucalyptus – Callitris* woodland or open forest with a shrubby to heathy understory. Occurs mostly on gentle slopes in red-brown and yellow-brown sandy loams, often with a rocky surface. Lack of records in locality.	**Low:** No records for this species, or significant suitable habitat occurred. This species is unlikely to occur.	**Low:** No records for this species, or significant suitable habitat occurred. This species is unlikely to occur.	**Low:** No records for this species, or significant suitable habitat occurred. This species is unlikely to occur.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Large-leafed Monotaxis	*Monotaxis macrophylla*	E	-	None	Species	An erect herb known to have an association and subsequent distribution related to fire. This species displays properties of a fire ephemeral species, as its germination is stimulated by the passage of fire, individual plants are short-lived, a large biomass is produced in a short period of time, flowering occurs shortly after germination and populations do not persist in the absence of fire. Grows on rocky ridges and hillsides and requires fires for germination. No suitable habitat is known from the proposal site for this species.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.
Leafless Indigo	*Indigofera efoliata*	E	E	None	Species	Very rare and possibly now extinct, known only from a few collections in the Dubbo area. Mr E.F. Biddiscombe is the only person alive to have seen Indigofera efoliata in the wild, in August 1955. Sites were located along the Dubbo to Minore railway line and road, on Wallaringa and Geurie properties and in Goonoo State Forest. Recorded in Goonoo State Forest in Eucalyptus crebra and Callitris glaucophylla dry sclerophyll forest, and in Eucalyptus microcarpa and Callitris glaucophylla tall woodland. Herbarium records note the species as growing on slight rises amongst ironstone formation in stony red-brown sandy loam. Known from near Dubbo and Goonoo forest region and thought to be extinct. Known from slight rises amongst ironstone formation in stony red-brown sandy loam.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Pine Donkey Orchid	*Diuris tricolor*	V	-	Recorded at multiple locations in the Pilliga - Bionet	Species	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta,* Ironbark and Acacia shrubland. The understorey is often grassy with herbaceous plants such as Bulbine species. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in September and October. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Recorded and assumed presence:** This species has previously been recorded throughout the Pilliga Forrest (Segment 10) and was recorded in this Segment in spring 2020.. This species is also assumed to occur within part of Segment 8, based on the availability of suitable habitat and associated PCTs likely to support the species where no access was available.
-	*Prasophyllum* sp. Wybong	-	CE	Bionet – nearest records 200 kms to the east	None	Leek orchids are generally found in shrubby and grassy habitats in dry to wet soil (Jones, 2006). *Prasophyllum* sp. Wybong is known to occur in open eucalypt woodland and grassland (Holzinger, pers. comm., 2006; Copeland, pers. comm., 2009 in TSSC 2009).	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.
Scant Pomaderris	*Pomaderris queenslandica*	E	-	Bionet – some records in the Narrabri area	Species	Widely scattered but not common in north-east NSW and in Queensland. It is known from several locations on the NSW north coast and a few locations on the New England Tablelands and North West Slopes, including near Torrington and Coolata. Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks. No suitable habitat is present. Habitats in the study area lack sheltered, shrubby understories.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Silky Swainson-pea	*Swainsona sericea*	V	-	None	Species	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum Eucalyptus pauciflora Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. In the region, known from Box-Gum woodland and occasionally *Callitris* grassy habitats. Marginal suitable habitat present.	**Low:** No records for this species, or significant suitable habitat occurred. This species is unlikely to occur.	**Low:** No records for this species, or significant suitable habitat occurred. This species is unlikely to occur.	**Low:** No records for this species, or significant suitable habitat occurred. This species is unlikely to occur.
Slender Darling Pea	*Swainsona murrayana*	V	V	Recorded from roadside reserves in the mid and southern segments - Bionet	Species	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. Occurs in grassland, herbland and open Black-box woodland. Associated with low chenopod shrubs Maireana species, wallaby-grass Austrodanthonia species and spear grass Austrostipa species. Flowers from spring to early summer. Grows on heavy grey or brown clay, loam, or red cracking clays. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in September and October. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Assumed presence:** This species has previously been recorded within road reserves throughout the mid, and southern segments. The species is assumed to occur within Segment 9 and 10 based on the availability of suitable habitat and associated PCTs likely to support the species.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
Spiny Peppercress	*Lepidium aschersonii*	V	V	Multiple records from near Narrabri - Bionet	Species	Found on ridges of gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmanii*) and Grey Box (*Eucalyptus microcarpa*). In the south has been recorded growing in Bull Mallee (*Eucalyptus behriana*). Often the understorey is dominated by introduced plants. The species grows as a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in March, October, September and November. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Assumed presence:** This species has previously been recorded near Narrabri, and is assumed to occur within parts of Segment 11 based on the availability of suitable habitat and associated PCTs likely to support the species.
Native Milkwort	*Polygala linariifolia*	V	V	Recorded at multiple locations in the Pilliga - Bionet	Species	Native Milkwort is an annual or perennial herb that occurs in sandy soils in dry eucalypt forests, with a sparse understory. It has been recorded in the Pilliga area in Fuzzy Box woodland, White Cypress Pine-Bulloak – Ironbark woodland, Rough-barked Apple riparian forb-grass open forest, and Ironbark - Brown Bloodwood shrubby woodland. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in March, October and November. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed presence based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Not recorded:** Species not recorded during targeted surveys in spring 2020 in segment 10.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Multi-function compound sites Segment 1 Segment 2 Segment 3	Borrow pits Segment 4 Segment 5 Segment 6 Segment 7	Alignment Segment 8 Segment 9 Segment 10 Segment 11
-	*Tylophora linearis*	V	E	Recorded at multiple locations in the Pilliga-Bionet	Species	Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii*. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in March and October. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Recorded:** This species has previously been recorded throughout the Pilliga Forrest (Segment 10)) and was recorded during targeted surveys in spring 2020.
Winged Peppercress	*Lepidium monoplocoides*	E	E	Known from near Narrabri-Bionet	Species	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 millimetres. Predominant vegetation is usually an open woodland dominated by *Allocasuarina luehmannii* (Bulloak) and/or eucalypts, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses. Recorded in a wetland-grassland community comprising *Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma* and *Pycnosorus globosus*, on waterlogged grey-brown clay. Also recorded from a Maireana pyramidata shrubland. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site in March, October, September and November. However, the species is likely to occur and drought conditions are likely to have been a large contributing factor to species absence. The species is assumed present based on previous records, suitable potential and discussions with BCS accountable officers.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Low:** No habitat or PCTs associated with, or likely to support this species occurs within these Segments.	**Not recorded and assumed presence:** This species has previously been recorded throughout the Pilliga Forrest (Segment 10 and 11) and is assumed to occur in some locations where no access was possible during suitable survey conditions.

Threatened and migratory fauna species

This appendix provides the likelihood of occurrence assessment for threatened and migratory fauna species listed under the BC Act and EPBC Act for the proposal.

Table C2: Likelihood of occurrence of threatened and migratory fauna for the main alignment segments of the proposal

Table C3: Potential Candidate Threatened Species by IBRA subregion

Table C4: Likelihood of occurrence of potential candidate threatened fauna species at compound sites

Table C5: Likelihood of occurrence of potential candidate threatened fauna species at borrow pit sites

Status

CE – critically endangered, E – endangered, V – vulnerable, C – CAMBA, J – JAMBA, K – ROKAMBA, B – Bonn

Table C2 Likelihood of occurrence of threatened and migratory fauna for the main alignment segments of the proposal

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Likelihood of occurrence in the Narromine to Curban area (Segment 8)	Likelihood of occurrence in Curban to Pilliga area (Segment 9)	Likelihood of occurrence in Pilliga area (Segment 10)	Likelihood of occurrence in Pilliga to Narrabri area (Segment 11)
BIRDS										
Austral-asian Bittern	*Botaurus poiciloptilus*	E	E	2 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Widespread but uncommon over most NSW except the northwest. Favours permanent freshwater wetlands with tall dense reedbeds particularly *Typha spp*. and *Eleocharis spp*., with adjacent shallow, open water for foraging. Roosts during the day amongst dense reeds or rushes and feeds mainly at night on frogs, fish, yabbies, spiders, insects and snails.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Small patches of emergent reeds are present in the Macquarie River.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Australian Bustard	*Ardeotis australis*	E		5 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs in inland Australia. In NSW mainly found in the north-west corner, less often in the lower western and central west plains regions, with occasional vagrants east to the western slopes and riverine plain. Breeding confined to the north-west region. Mainly inhabits tussock and hummock grasslands, also occurs in low shrublands and low open grassy woodlands. Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and shrubland cover. Travels long distances, presumably in response to habitat and climatic conditions.	Unlikely. On eastern edge of distribution, no recent records. Not observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. Not observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. No observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. Not observed during surveys.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Likelihood of occurrence in the Narromine to Curban area (Segment 8)	Likelihood of occurrence in Curban to Pilliga area (Segment 9)	Likelihood of occurrence in Pilliga area (Segment 10)	Likelihood of occurrence in Pilliga to Narrabri area (Segment 11)
Australian Painted Snipe	*Rostratula australis*	E	E	3 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Normally found in permanent or ephemeral shallow inland wetlands, either freshwater or brackish. Nests on the ground amongst tall reed-like vegetation near water. Feeds on mudflats and the water's edge taking insects, worm and seeds. Prefers fringes of swamps, dams and nearby marshy areas with cover of grasses, lignum, low scrub or open timber.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Small patches of emergent reeds are present in the Macquarie River.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Barking Owl	*Ninox connivens*	V		344 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/ Ecosystem	Occurs from coast to inland slopes and plains, though is rare in dense, wet forests east of the Great Dividing Range and sparse in higher parts of the tablelands and in the arid zone. Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (eg in Acacia and Casuarina), or dense eucalypt canopy. Nests in hollows of large, old eucalypts including Eucalyptus camaldulensis, Eucalyptus albens, Eucalyptus polyanthemos and Eucalyptus blakelyi. Birds and mammals important prey during breeding. Territories range from 30 to 200 ha.	Likely – could breed and roost along larger watercourses, and forage in surrounding areas	Likely – could breed and roost along larger watercourses, and forage in surrounding areas	Known – largest population of the species in NSW occurs in the Pilliga forests. Recorded during surveys.	Likely – could breed and roost along larger watercourses, and forage in surrounding areas

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Likelihood of occurrence in the Narromine to Curban area (Segment 8)	Likelihood of occurrence in Curban to Pilliga area (Segment 9)	Likelihood of occurrence in Pilliga area (Segment 10)	Likelihood of occurrence in Pilliga to Narrabri area (Segment 11)
Black-breasted Buzzard	*Hamirostra melanostern on*	V		1 record within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/ Ecosystem	Sparsely distributed in areas of less than 500mm rainfall, north from north-western NSW. Inhabits a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Breeds from August to October near water in a tall tree.	Possible. Scattered records in locality. Considered a vagrant to the area. Potential foraging habitat present.	Possible. Scattered records in locality. Considered a vagrant to the area. Potential foraging habitat present.	Possible. Scattered records in locality. Considered a vagrant to the area. Potential foraging habitat present.	Possible. Scattered records in locality. Considered a vagrant to the area. Potential foraging habitat present.
Black Falcon	*Falco subniger*	V		4 records within 20 km (OEH 2020a)	Ecosystem	The Black Falcon is widely, but sparsely, distributed in NSW, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of NSW are likely to be referable to the Brown Falcon. Occurs in plains, grasslands, foothills, timbered watercourses, wetland environs, crops, and occasionally over towns and cities. Breeding occurs along timbered waterways in in land areas.	Moderate – scattered records around Narromine. Could occur throughout the alignment including agricultural areas.	Moderate – Could occur throughout the alignment including agricultural areas.	Moderate – Could occur throughout the alignment including agricultural areas.	Known – recorded in woodland patch in agricultural land near Narrabri

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Likelihood of occurrence in the Narromine to Curban area (Segment 8)	Likelihood of occurrence in Curban to Pilliga area (Segment 9)	Likelihood of occurrence in Pilliga area (Segment 10)	Likelihood of occurrence in Pilliga to Narrabri area (Segment 11)
Black-chinned Honey-eater (eastern subspecies)	*Melithreptus gularis gularis*	V		7 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Widespread in NSW, but rarely recorded east of Great Dividing Range except in Richmond and Clarence River areas and scattered sites in the Hunter, Central Coast and Illawarra regions. Mostly in upper levels of drier open forests /woodlands dominated by box and ironbark eucalypts, or less commonly smooth-barked gums, stringybarks and tea-treas. Forage over home range of >5 ha. Tend to occur within largest woodland patches in the landscape. They forage for insects, nectar and honeydew. The nest is hidden by foliage high in the crown of a tree.	Present. Recorded in small woodland patch in agricultural land south of Gilgandra.	Likely. Would occur in larger remnants.	Present. Recorded in the Pilliga.	Likely. Would occur in larger remnants.
Black-necked Stork	*Ephippiorhynchus asiaticus*	E		6 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	In NSW, becomes increasingly uncommon south of the Northern Rivers region, and rarely occurs south of Sydney. Breeding recorded as far south as Buladelah, though most breeding in NSW occurs in the north-east. Primarily inhabits permanent freshwater wetlands and surrounding vegetation including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters. Will also forage in inter-tidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water. Breeds during summer, nesting in or near a freshwater swamp.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Small patches of emergent reeds are present in the Macquarie River.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.

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Blue-billed Duck	*Oxyura australis*	V		Recorded as a predicted species within the BAM-C	Ecosystem	Partly migratory, travels short distances between breeding swamps and over-wintering lakes. Young birds disperse in April-May from breeding swamps in inland NSW to Murray River system and coastal lakes. Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. Nests in Cumbungi over deep water or in trampled Lignum, sedges or spike-rushes. Completely aquatic, swimming along the edge of dense cover.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Small patches of emergent reeds are present in the Macquarie River.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Brolga	*Grus rubicunda*	V		10 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	In NSW occurs west of the Great Dividing Range and on the north coast. Dependent on wetlands, especially shallow swamps. Often feed in dry grassland, ploughed paddocks or desert claypans.	Low – May occur on occasions in dry grasslands and wetland habitat present in agricultural areas of the study area.	Low – May occur on occasions in dry grasslands and wetland habitat present in agricultural areas of the study area.	Unlikely – no suitable habitat present	Low – May occur on occasions in dry grasslands and wetland habitat present in agricultural areas of the study area.
Brown Treecreeper (eastern sub-species)	*Climacteris picumnus victoriae*	V		229 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs from Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell to the east coast, in areas such as the Snowy River Valley, Cumberland Plain, Hunter Valley and parts of the Richmond and Clarence Valleys. Most common on the inland slopes and plains. Inhabits eucalypt woodlands and dry open forest, usually dominated by stringybarks or rough-barked species with open grassy understorey. Fallen timber is important foraging habitat. Nests in hollows in standing trees or stumps.	Likely. Would occur in larger remnants where fallen timber is present.	Possible. Could occur in larger remnants where fallen timber is present.	Present. Recorded on a number of occasions during surveys in the Pilliga. Foraging and breeding habitat present.	Likely. Would occur in larger remnants where fallen timber is present.

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Bush Stone-curlew	*Burhinus grallarius*	E		15 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Scattered distribution across NSW. Inhabits lowland grassy woodland and open forest and, in coastal areas, Casuarina and Melaleuca woodlands, saltmarsh and mangroves. Requires a low, sparse groundcover, some fallen timber and leaf litter, and a general lack of a shrubby understory (DEC 2006).	Low. May occur on occasion. Few local records.	Low. May occur on occasion. Few local records.	Likely. Scattered records from the Pilliga area.	Likely. Occasional records from the Narrabri area.
Curlew Sandpiper	*Calidris ferruginea*	E	CE	May occur within 20 km (DEE 2020a)	Species/ Ecosystem	Breeds in northern hemisphere. In Australia generally occupies littoral and estuarine habitats. In NSW mainly found in intertidal mudflats on sheltered coasts. Roosts on beaches, spits or islands on the coast/in wetlands, or in saltmarsh on rocky shores.	Nil- no intertidal habitat present in the study area.	Nil- no intertidal habitat present in the study area.	Nil- no intertidal habitat present in the study area.	Nil- no intertidal habitat present in the study area.
Diamond Firetail	*Stagonopleura guttata*	V		42 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Typically found west of the Great Dividing Range, but populations also occur in drier coastal areas including W Sydney, Hunter, Clarence and Snowy River valleys. Occurs in grassy eucalypt woodlands including Box Gum and Snow Gum communities, as well as open forest, mallee and natural and derived grasslands. Often found in riparian areas and occasionally in lightly wooded farmland. Nests in shrubby understorey or higher up under nests of other species.	Likely. Would occur in larger remnants and along watercourses.	Likely. Would occur in larger remnants and along watercourses.	Likely. Would occur in larger remnants and along watercourses.	Likely. Would occur in larger remnants and along watercourses.

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Dusky Wood-swallow	*Artamus cyanopterus cyanopterus*	V		105 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	The Dusky Woodswallow is widespread from the coast to inland, including the western slopes of the Great Dividing Range and farther west. It is often recorded in woodlands and dry open sclerophyll forests, and has also been recorded in farmland, shrublands, heathlands regenerating forests and very occasionally in moist forests or rainforests. The understorey is typically open with sparse eucalypt saplings, acacias and other shrubs, often with coarse woody debris. The nest is an open shallow untidy cup frequently built in an open hollow, crevice or stump.	Likely. Would occur in larger remnants.	Possible. Could occur in larger remnants where fallen timber is present.	Likely. Large areas of habitat present in the Pilliga forests.	Likely. Would occur in larger remnants.
Eastern Curlew	*Numenius madagascariensis*		CE, C,J,K	May occur within 20 km (DEE 2020a)	Species/ Ecosystem	Within Australia, the species has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. It is most commonly associated with sheltered coasts, and all internationally important sites for this species in Australia are on the coast. The birds are also found in saltworks and sewage farms. Breeds in Russia and north-eastern China.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Small patches of emergent reeds are present in the Macquarie River. No mapped important areas likely to occur in proposal site.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, occur along the alignment. No mapped important areas likely to occur in proposal site.	Nil. No wetland areas present in the Pilliga.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, occur along the alignment. No mapped important areas likely to occur in proposal site.

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Eastern Grass Owl	*Tyto longimembris*	V		3 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Eastern Grass Owls have been recorded occasionally in all mainland states of Australia but are most common in northern and north-eastern Australia. In NSW they are more likely to be resident in the north-east. Birdlife International maps the occurrence as being coastal northern NSW and a small area on the Murray River. Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. Always breeds on the ground. Nests are found in trodden grass, and often accessed by tunnels through vegetation. Eastern Grass Owl numbers can fluctuate greatly, increasing especially during rodent plagues.	Unlikely. No local records.	Possible. May occur in grassland in the area.	Unlikely. No suitable habitat present.	Possible. May occur in grassland in the area. Recent records to the north of Narrabri and near Wee Waa.
Eastern Osprey	*Pandion cristatus*	V		Recorded as a potential candidate species within the BAM-C	Species/ Ecosystem	Eastern Ospreys are found right around the Australian coastline, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. The species favour coastal areas, especially the mouths of large rivers, lagoons and lakes. The species breeds in NSW from July to September.	Unlikely. Outside usual distribution. May occur on rare occasions.	Unlikely. Outside usual distribution. May occur on rare occasions.	Unlikely. Outside usual distribution. May occur on rare occasions.	Unlikely. Outside usual distribution. May occur on rare occasions.

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Flame Robin	*Petroica phoenicea*	V		5 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. Migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains. Forages from low perches, feeding on invertebrates taken from the ground, tree trunks, logs and other coarse woody debris. Fallen logs and coarse woody debris are important habitat components. Open cup nest of plant fibres and cobweb is often built near the ground in a sheltered niche, ledge or shallow cavity in a tree, stump or bank.	Possible – may occur on occasion in larger remnants.	Possible – may occur on occasion in larger remnants.	Possible – may occur on occasion.	Possible – may occur on occasion in larger remnants.
Flock Bronze-wing	*Phaps histrionica*	E		Recorded as a predicted species within the BAM-C	Ecosystem	Patchily distributed and rarely observed in NSW. It is likely to occur north of Broken Hill and west of Cobar when conditions are right. Observed in a variety of vegetation types, including grassy plains, saltbush, spinifex and open mulga. Its preferred habitat is tussock grassland, particularly Mitchell grassland.	Unlikely. Outside usual distribution.	Unlikely. Outside usual distribution.	Unlikely. Outside usual distribution.	Unlikely. Outside usual distribution.
Freckled Duck	*Stictonetta naevosa*	V		4 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Breeds in large, ephemeral swamps in the Murray-Darling, particularly along the Paroo and Lachlan Rivers and other Riverina rivers. In drier times moves to more permanent waters. Disperses during extensive inland droughts and may be found in coastal areas during such times. Prefers freshwater swamps/creeks with dense Cumbungi, Lignum or tea-tree. Nests in dense vegetation at or near water level.	Possible. May occur at farm dams and along rivers on occasion.	Possible. May occur at farm dams and along rivers on occasion.	Low. Limited water bodies present. May occur on rare occasions at dams.	Possible. May occur at farm dams and along rivers on occasion.

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Gilbert's Whistler	*Pachycephala inornata*	V		2 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs in arid and semi-arid timbered habitats in mallee shrubland, and occasionally in box-ironbark woodlands, Cypress Pine, Belah woodlands and River Red Gum forests. Within mallee, the species often occurs in association with an understorey of spinifex and low shrubs of acacias, hakeas, sennas and grevilleas. In woodland habitats, the understorey contains areas of dense shrubbery, particularly dense regrowth thickets of Callitris. Occurs across most of NSW's semi-arid and arid regions. Diet consists primarily of insects and spiders, but may also include seeds and fruits. Breeding occurs from August - November, with nesting occurring 2 m above the ground in the fork of densely foliaged prickly plants such as acacias.	Possible. Within the northern edge of its current distribution. Could forage in Box-ironbark woodlands and Cypress Woodlands.	Possible. Within the northern edge of its current distribution. Could forage in Box-ironbark woodlands and Cypress Woodlands.	Likely. Within the northern edge of its current distribution. Could forage in Box-ironbark woodlands and Cypress Woodlands. Previously recorded in adjacent Merriwindi SF and Timallallie NP.	Possible. Within the northern edge of its current distribution. Could forage in Box-ironbark woodlands and Cypress Woodlands.
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V		180 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Widespread but uncommon from coast to southern tablelands and central western plains. Feeds almost exclusively on the seeds of Allocasuarina species. Prefers woodland and open forests, rarely away from Allocasuarina. Roost in leafy canopy trees, preferably eucalypts, usually <1 km from feeding site. Nests in large (approx. 20 centimetres) hollows in trees, stumps or limbs, usually in Eucalypts (Higgins 1999).	Possible. May occur in areas of Allocasuarina and Casuarina in larger woodland patches in agricultural land.	Possible. May occur in areas of Allocasuarina and Casuarina in larger woodland patches in agricultural land.	Present. Large areas of foraging and breeding habitat present.	Present. Areas of foraging and breeding habitat present in larger remnants.

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Grey-crowned Babbler (eastern sub-species)	*Pomatostomus temporalis temporalis*	V		679 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs on western slopes and plains, as well as in the Hunter Valley and several locations on the north coast. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Family groups have territories between 1-50 (generally around 10) ha. Nests typically built in shrubs or sapling eucalypts.	Present. Individuals recorded throughout the study area in roadside remnants and other small patches of vegetation. Would forage and breed in these areas.	Present. Individuals recorded throughout the study area in roadside remnants and other small patches of vegetation. Would forage and breed in these areas.	Present. Individuals recorded in a number of locations through the Pilliga. Would forage and breed in these areas.	Present. Individuals recorded throughout the study area in roadside remnants and other small patches of vegetation. Would forage and breed in these areas.
Grey Falcon	*Falco hypoleucos*	E		1 record within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Inhabits shrubland, grassland and wooded watercourses of arid and semi-arid regions, and occasionally open woodlands throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Breeding only occurs within arid areas of the Great Dividing Range. Its diet consists of other birds, especially parrots and pigeons, reptiles and small mammals. Nesting occurs in disused nests of other birds of prey and ravens, high in a living eucalypt near water or a watercourse. Breeding occurs in late winter and early spring.	Likely. Potential foraging and breeding habitat present in larger remnants.	Likely. Potential foraging and breeding habitat present in larger remnants.	Likely. Potential foraging and breeding habitat present throughout the Pilliga forests.	Likely. Potential foraging and breeding habitat present in larger remnants.

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Hall's Babbler	*Pomatostomus halli*	V		1 record within 20 km (OEH 2020a)	Ecosystem	Hall's Babbler occurs in central-eastern Australia, from Cobar north into south-western Queensland, particularly along or west of the Warrego River. Most records are west of Lightening Ridge and Cobar. There is one recent record in the Pilliga, well outside the usual range of this species. This could be a misidentification of a White-browed Babbler. It inhabits dry Acacia scrub, mainly Mulga, with a grassy understorey including spinifex, on ridges and plains with either sandy or stony soils. Occasionally occurs in open dry Eucalyptus (Bimblebox) woodland, and mulga- or eucalypt-lined watercourses.	Unlikely. Outside known range.	Unlikely. Outside known range.	Possible. One recent record in the area, well outside the main distribution of the species.	Unlikely. Outside known range.
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	V		46 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Considered a sedentary species, but local seasonal movements are possible. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Occurrence is positively associated with patch size, and with components of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Nests on low, live or dead forks or branches of trees or stumps, or occasionally on fallen trees or limbs.	Likely. Would occur in larger remnants.	Possible. Could occur in larger remnants where fallen timber is present.	Likely. Large areas of habitat present in the Pilliga forests.	Likely. Would occur in larger remnants.

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Little Eagle	*Hieraaetus morphnoides*	V		31 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Likely. Potential foraging and breeding habitat present in larger remnants.	Present. Foraging and breeding habitat present in larger remnants.	Likely. Potential foraging and breeding habitat present throughout the Pilliga forests.	Likely. Potential foraging and breeding habitat present in larger remnants.
Little Lorikeet	*Glossopsitta pusilla*	V		41 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs from coast to western slopes of the Great Dividing Range. Inhabits dry, open eucalypt forests and woodlands. Occurrence is positively associated with patch size, and with components of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Feed primarily on profusely-flowering eucalypts and a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands Eucalyptus albens and E. melliodora are particularly important food sources for pollen and nectar respectively. Mostly nests in small (opening approx. 3cm) hollows in living, smooth-barked eucalypts, especially Eucalyptus viminalis, E. blakelyi and E. dealbata. Most breeding records are from the western slopes.	Possible – may occur on occasion in larger remnants.	Possible – may occur on occasion in larger remnants.	Likely – all records in the locality occur from the Pilliga to just north of Narrabri. Important breeding and feeding resources are likely to be present within the Pilliga.	Likely – all records in the locality occur from the Pilliga to just north of Narrabri. Breeding and foraging resources are present in larger patches.

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Magpie Goose	*Anseranas semipalmata*	V		12 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs in the tropics, increasing numbers in central and northern NSW and vagrants to south-east NSW. Inhabits shallow wetlands containing dense rushes or sedges, and nearby dry land used for grazing. It feeds on grasses, bulbs and rhizomes and roosts in tall vegetation within wetland areas. Breeding occurs predominately in monsoonal areas and is unlikely in SE NSW. Nests are formed in trees over deep water.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Small patches of emergent reeds are present in the Macquarie River.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	V		19 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs in arid and semi-arid NSW, regularly as far east as Bourke and Griffith and occasionally further east as vagrants. Occupies habitat in arid semi-desert scrublands, savannahs and sparse woodlands, where there is fresh surface water and large hollow trees for nesting. These birds have been recorded in forest, woodland and shrub land, including mulga, mallee, Acacia, Eucalyptus and Callitris associations. It has also been recorded in cropping areas throughout its range. Large areas of suitable habitat are required for a viable population to exist.	Unlikely. Occurs at the eastern extent of its range.	Unlikely. Occurs at the eastern extent of its range.	Possible. Potential foraging habitat present throughout the Pilliga forests.	Unlikely. Occurs at the eastern extent of its range.

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Malleefowl	*Leipoa ocellata*	E	V	6 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs in semi-arid to arid mallee country in the south-west of NSW. Its NSW stronghold is centred on Mallee Cliffs NP, extending east to Balranald and with scattered records north to Mungo NP. There are also populations in the Scotia mallee (W of the Darling River), central NSW (chiefly Yathong, Nombinnie and Round Hill NR), and Dubbo (Goonoo forest). Occasional records exist from the Pilliga (pre-2000), around Cobar and Goulburn River NP. Inhabits predominately mallee communities, apparently preferring areas of sandy soil, abundant leaf litter, dense canopy and an abundance of food shrubs and herbs (especially legumes). Less frequently found in other eucalypt woodlands such as *Eucalyptus microcarpa*, Ironbark and *E. populnea* woodlands with thick understorey, and Mulga and native Cypress Pine communities.	Nil. No suitable habitat present.	Nil. No suitable habitat present.	Unlikely. A small area of potential habitat within Pilliga East State Forest, however the species is considered extinct in the Pilliga (Date eta l 2002).	Unlikely – the species is considered extinct in the Pilliga and is highly unlikely to persist in roadside remnants along the Newell Highway.
Masked Owl	*Tyto novaehollandiae*	V		8 records within 20 km, last recorded 2006 (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 m. Roosts and breeds in large (>40 cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	Possible. May breed in larger remnants and forage in adjacent agricultural land and roadsides.	Possible. May breed in larger remnants and forage in adjacent agricultural land and roadsides.	Likely. Would breed and forage in the area.	Possible. May breed in larger remnants and forage in adjacent agricultural land and roadsides.

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Painted Honey-eater	*Grantiella picta*	V	V	20 records within 20 km (OEH 2020a); Breeding known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Nomadic, occurring in low densities across most of NSW. Highest concentrations and almost all breeding occur on inland slopes of the Great Dividing Range. Inhabits Boree, Brigalow and Box Gum woodlands and Box-Ironbark forests. Specialist forager on the fruits of mistletoes, preferably of the Amyema genus. Nests in outer tree canopy.	Possible. May occur in larger remnants where mistletoe is present.	Possible. May occur in larger remnants where mistletoe is present.	Likely. Pilliga is an important area for this species.	Likely. Potential foraging and breeding habitat present in larger remnants.
Pied Honey-eater	*Certhionyx variegatus*	V		Recorded as a predicted species within the BAM-C	Ecosystem	The Pied Honeyeater is widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. It occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought. The species is highly nomadic, following the erratic flowering of shrubs; can be locally common at times.	Possible. May occur on occasion.	Possible. May occur on occasion.	Possible. May occur on occasion.	Possible. May occur on occasion.
Powerful Owl	*Ninox strenua*	V		Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from the coast to the western slopes. Solitary and sedentary species. Inhabits a range of habitats from woodland and open sclerophyll forest to tall open wet forest and rainforest. Prefers large tracts of vegetation. Nests in large tree hollows (> 0.5 m deep), in large eucalypts (dbh 80-240 centimetres) that are at least 150 years old. Pairs have high fidelity to a small number of hollow-bearing nest trees and defend a large home range of 400 - 1,450 ha. Forages within open and closed woodlands as well as open areas.	Low. Outside usual range.	Low. Outside usual range.	Low. Outside usual range. Not known to occur in the Pilliga forests.	Low. Outside usual range.

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Red-backed Button-quail	*Turnix maculosus*	V		Recorded as a potential candidate species within the BAM-C	Species	The Red-backed Button-quail is recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW. The population around Sydney was last recorded in 1912. In NSW, the Red-backed Button-quail is said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): speargrass *Heteropogon*, Blady Grass *Imperata cylindrica*, Triodia, Sorghum, and Buffel Grass *Cenchrus ciliaris*.	Unlikely. Outside usual range.	Unlikely. Outside usual range.	Unlikely. Outside usual range.	Unlikely. Outside usual range.
Red Goshawk	*Erythrotriorchis radiatus*	CE	V	Likely to occur within 20 km (DEE 2020a)	Species	Very rare in NSW, generally confined to the Northern Rivers bioregion with most records in the Clarence River catchment with few around the lower Richmond and Tweed Rivers. Inhabit open woodland and forest, preferring mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Preferred habitats include a mosaic of vegetation types, a large population of birds (prey) and permanent water. Adults have large home ranges (up to 120 km^2 in NT), and in NSW appear to move from nesting areas in the ranges to coastal areas to coastal plains. Generally breed in tall trees within 1 km of a river or wetland.	Low. Outside usual range. Vagrant individuals may occur on occasion.	Low. Outside usual range. Vagrant individuals may occur on occasion.	Low. Outside usual range. Vagrant individuals may occur on occasion.	Low. Outside usual range. Vagrant individuals may occur on occasion.

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Red-tailed Black-cockatoo (inland species)	*Calyptohynchus banksia samueli*	V		Recorded as a potential candidate species within the BAM-C	Species/Ecosystem	The Red-tailed Black-Cockatoo (inland subspecies) is known to occur around watercourses and overflows of the Darling, Paroo, Bogan, Macquarie and Barwon Rivers extending in an arc along the Darling River from Wentworth in the south to Bourke in the north. It extends east to Walgett on the Barwon and south through to the Macquarie Marshes. It prefers Eucalyptus forest and woodlands, particularly river red gum and coolabah lined water courses. In the arid zone, it prefers eucalypts along larger watercourses and associated Acacia and Casuarina woodlands nearby.	Unlikely. Outside usual range.	Unlikely. Outside usual range.	Unlikely. Outside usual range.	Unlikely. Outside usual range.
Red-tailed Tropicbird	*Phaethon rubricauda*	V	C,J	2 records within 20 km (OEH 2020a)	Species	A marine bird which breeds in coastal cliffs and under bushes in tropical Australia. Nests on cliffs of the northern hills and southern mountains on the main island at Lord Howe Island. Vagrant birds occur in coastal NSW waters, and occasionally even inland, particularly after storm events.	Unlikely. No coastal habitat present (oceans or rocky islands). Vagrant birds may occur on very rare occasions.	Unlikely. No coastal habitat present (oceans or rocky islands). Vagrant birds may occur on very rare occasions.	Unlikely. No coastal habitat present (oceans or rocky islands). Vagrant birds may occur on very rare occasions.	Unlikely. No coastal habitat present (oceans or rocky islands). Vagrant birds may occur on very rare occasions.

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Regent Honey-eater	*Anthochaera phrygia*	CE	CE	17 records within 20 km, last recorded 2003 (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Eco system	In NSW confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. Inhabits dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	Unlikely. No important foraging habitat present.	Unlikely. No important foraging habitat present.	Possible. May occur in larger remnants on occasion while on migration from the Burraba breeding area to important habitat areas in the south of the Pilliga.	Possible. May occur in larger remnants on occasion while on migration from the Burraba breeding area to important habitat areas in the south of the Pilliga.
Scarlet Robin	*Petroica boodang*	V		5 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	In NSW occurs from coast to inland slopes. Breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within open understorey of shrubs and grasses and sometimes in open areas. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees. Abundant logs and coarse woody debris are important habitat components.	Possible – may occur on occasion in larger remnants.	Possible – may occur on occasion in larger remnants.	Possible – may occur on occasion.	Possible – may occur on occasion in larger remnants.

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Speckled Warbler	*Chthonicola sagittata*	V		430 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Within NSW most frequently reported from the hills and tablelands of the Great Dividing Range, rarely from the coast. Inhabits a wide range of Eucalyptus-dominated communities with a grassy understorey, a sparse shrub layer, often on rocky ridges or in gullies. Sedentary and requires large, relatively undisturbed remnants to persist in an area. Forages on the ground for seeds and insects, and nests in a slight hollow in the ground or at the base of a low dense plant.	Possible – may occur on occasion in larger remnants.	Possible – may occur on occasion in larger remnants.	Likely – could occur throughout the Pilliga.	Present – recorded in the Bohena Creek area. Would occur in larger remnants in this section.
Spotted Harrier	*Circus assimilis*	V		34 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs throughout Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Inhabits grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (eg chenopods). Most commonly in native grassland, but also in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn).	Present – recorded south of the Macquarie River on two occasions and near Gilgandra. Would forage over agricultural land and forested remnants.	Likely. Would forage over agricultural land and forested remnants.	Unlikely. Preferred open country habitats not present.	Likely. Would forage over agricultural land and forested remnants.

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Square-tailed Kite	*Lophoictinia isura*	V		26records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Eco system	Occurs across NSW, resident in North, northeast and along west-flowing rivers. Summer breeding migrant to southeast of state. Inhabits a variety of habitats including woodlands and open forests, with preference for timbered watercourses. Favours productive forests on the coastal plain, box-ironbark-gum woodlands on the inland slopes, and Coolibah/River Red Gum on the inland plains. In Sydney area nests in mature living trees within 100m of ephemeral/permanent watercourse. Large home range > 100 km^2.	Likely. Potential foraging and breeding habitat present in larger remnants.	Likely. Potential foraging and breeding habitat present in larger remnants.	Likely. Potential foraging and breeding habitat present throughout the Pilliga forests.	Likely. Potential foraging and breeding habitat present in larger remnants.
Squatter Pigeon	*Geophaps scripta scripta*	CE	V	May occur within 20 km (DEE 2020a). Recorded as a potential candidate species within the BAM-C	Species	Found from north Queensland to the North West Slopes of NSW and extending down to the Liverpool Plains and Dubbo. Today they are very rare in the southern parts of their range. Was previously considered extinct in NSW, however there have been recent sightings at Dthinna Dthinnawan National Park and the Bruxner Highway near Texas on the border of NSW and Queensland. Grassy woodlands and plains, preferring sandy areas and usually close to water.	Low. Outside usual range. Not observed during surveys.	Low. Outside usual range. Not observed during surveys.	Low. Outside usual range. Not observed during surveys.	Low. Outside usual range. Not observed during surveys.

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Superb Parrot	*Polytelis swainsonii*	V	V	69 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Eco system	Occurs as a single population in the South-west Slopes and Riverina bioregions. Two core breeding areas: between Cowra and Yass – Grenfell, Cootamundra and Coolac in the SW Slopes, and along the Murray, Edward and Murrumbidgee Rivers in the Riverina. Birds breeding in the SW slopes migrate north to the Namoi/Gwydir Rivers for winter. Inhabits Box Gum, Box – Cypress Pine and Boree woodlands and River Red Gum Forest. Nest in hollow trees, in tall riparian River Red Gum communities (Riverina area) or open Box Gum woodland or isolated paddock trees (SW Slopes). Mainly forages in grassy box woodlands, up to 10 km from breeding sites.	Likely – may occur as non-breeding flocks in remnant vegetation outside the breeding season.	Present – recorded in a roadside remnant. Likely to be non-breeding visitors to the area.	Low – preferred grassy woodland habitat not present.	Likely – may occur as non-breeding flocks in remnant vegetation outside the breeding season.
Swift Parrot	*Lathamus discolor*	E	CE	1 record within 20 km, last recorded 2000 (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Eco system	Migratory, travelling to the mainland from March to October. Breeds in Tasmania from September to January. On the mainland, it mostly occurs in the southeast foraging on winter flowering eucalypts and lerps, with records of the species between Adelaide and Brisbane. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. Eucalyptus robusta, Corymbia maculata and C. gummifera dominated coastal forests are also important habitat.	Unlikely. May occur on rare occasions.	Unlikely. May occur on rare occasions.	Unlikely. May occur on rare occasions. Important habitat for this species is identified in the eastern Pilliga. Only one record occurs within 20 km of the alignment.	Unlikely. May occur on rare occasions.

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Turquoise Parrot	*Neophema pulchella*	V		150 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs from coast to inland slopes. In coastal area, most common between Hunter and Northern Rivers, and further south in S Coast. Inhabits open eucalypt woodlands and forests, typically with a grassy understorey. Favours edges of woodlands adjoining grasslands or timbered creek lines and ridges. Feeds on the seeds of native and introduced grasses and other herbs. Grasslands and open areas provide important foraging habitat for this species while woodlands provide important roosting and breeding habitat. Nests in tree hollows, logs or posts from August to December.	Likely. Would occur in woodland patches and riparian vegetation adjacent to agricultural land.	Likely. Would occur in woodland patches and riparian vegetation adjacent to agricultural land.	Likely. Would occur in forest on the edges of the Pilliga	Likely. Would occur in woodland patches and riparian vegetation adjacent to agricultural land.
Varied Sittella	*Daphoenositta chrysoptera*	V		124 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Present. Would occur in larger remnants.	Possible. May occur in larger remnants.	Present. Recorded on a number of occasions during surveys in the Pilliga. Foraging and breeding habitat present.	Likely. Would occur in larger remnants.

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White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V		6 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Eco system	Primarily coastal but may extend inland over major river systems. Breeds close to water, mainly in tall open forest/woodland but also in dense forest, rainforest, closed scrub or remnant trees. Usually forages over large expanses of open water, but also over open terrestrial habitats (eg grasslands).	Low. Limited open water present. May occur along the Macquarie River on occasion. No large stick nests observed near water.	Low. Limited open water present. May occur along the Castlereagh River on occasion. No large stick nests observed near water.	Unlikely. No suitable foraging habitat present.	Low. Limited open water present. May occur along the Namoi River on occasion. No large stick nests observed near water.
White-fronted Chat	*Epthianura albifrons*	V		7 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	This species occurs from southern Queensland to Western Australia and down to Tasmania, mostly in temperate to arid climates and very rarely in sub-tropical areas. It is found in damp open habitats, particularly wetlands containing saltmarsh areas that are bordered by open grasslands. Along the coast they are found in estuarine and marshy habitats with vegetation <1 m tall, and in open grasslands and areas bordering wetlands. Inland, they are often observed in grassy plains, saltlakes and saltpans along waterway margins.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.

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White-throated Needletail	*Hirundapus caudacutus*		V, C,J,K	21 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a)	n/a	Recorded along NSW coast to the western slopes and occasionally from the inland plains. Breeds in northern hemisphere. Almost exclusively aerial while in Australia. Occur above most habitat types, but are more frequently recorded above more densely vegetated habitats (rainforest, open forest and heathland) than over woodland or treeless areas.	Possible. May occur on occasion.	Possible. May occur on occasion.	Possible. May occur on occasion.	Possible. May occur on occasion.
MAMMALS										
Bilby	*Macrotis lagotis*	Presumed extinct	V	12498 records within 20 km (OEH 2020a)	n/a	A hundred years ago, Bilbies were common in many habitats throughout Australia, from the dry interior to temperate coastal regions. The Bilby prefers arid habitats with spinifex grass and acacia shrub. Changes to the Bilby's habitat have seen their numbers greatly reduced and today the species is nationally listed as vulnerable, and is presumed extinct in NSW. A population has been reintroduced into the Australian Wildlife Conservancy's fenced, predator-free area in the northern Pilliga as part of the Reintroduction of Locally Extinct Mammals project.	Nil. Extinct in the wild. No suitable habitat present.	Nil. Extinct in the wild. No suitable habitat present.	Nil. Extinct in the wild. The proposal site is located about 7 km from the fenced AWC site.	Nil. Extinct in the wild. No suitable habitat present.

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Black-striped Wallaby	*Macropus dorsalis*	E		17,561 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Occurs on the far north coast and western slopes of NSW. On the north-west slopes occurs in Brigalow remnants to south of Narrabri. Preferred habitats characterised by dense low (up to 3 m) woody or shrubby vegetation, near open grassy foraging areas. On the north-west slopes associated with dense vegetation including brigalow, ooline and vine-thickets. On the north-coast closely associated with dry rainforest but also recorded from moist eucalypt forest with dense understorey.	Nil – outside known range	Unlikely – outside known range. May occur in forested patches near Baradine.	Likely – main distribution is the Pilliga area	Likely – main distribution is the Pilliga area and may occur in forested areas near Narrabri
Bridled Nailtail Wallaby	*Onychogalea fraenata*	Presumed extinct	E	23996 records within 20 km (OEH 2020a)	n/a	The distribution of the Bridled Nailtail Wallaby has declined rapidly since European settlement and now only occurs in a small area of central Queensland. It is currently presumed extinct in NSW and for over 30 years the species was believed to be extinct across its range. A population has been reintroduced into the Australian Wildlife Conservancy's fenced, predator-free area in the northern Pilliga as part of the Reintroduction of Locally Extinct Mammals project.	Nil. Extinct in the wild in NSW.	Nil. Extinct in the wild in NSW.	Nil. Extinct in the wild in NSW. The proposal site is located about 7 km from the fenced AWC site.	Nil. Extinct in the wild in NSW.

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Bristle-faced Free-tailed Bat	*Setirostris eleryi*	E		Recorded as a potential candidate species within the BAM-C	Species	In NSW, the species has been recently recorded from only three disjunct locations: thirteen individuals from Gundabooka National Park, south of Bourke; one individual from Dhinnia Dthinawan Nature Reserve (formerly Bebo State Forest), north of Warialda two individuals near Bonshaw. Appears to be extremely rare throughout its range. Nationally, it has been recorded from only 15 locations	Unlikely. Outside known range.	Unlikely. Outside known range.	Unlikely. Outside known range.	Unlikely. Outside known range.
Brush-tailed Rock-wallaby	*Petrogale penicillata*	E	V	41 records within 20 km, last recorded 2005 (OEH 2020a); Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs from the Shoalhaven north to the Queensland border. Now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. Occurs on rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. Diet consists of vegetation in adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present

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Corben's Long-eared Bat	*Nyctophilus corbeni*	V	V	69 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Little known about the biology or social structure of these bats – rarely recorded and scattered distribution. Limited distribution that is restricted to the Murray-Darling Basin and western slopes in south-eastern Australia. Occur in a wide range of habitats including River Red Gum, Black Box, Allocasuarina, Belah, Mallee, open woodlands and savannahs, but are most common in box, ironbark and cypress open forests and buloke woodlands of inland northern NSW. In SA known to roost in tree hollows less than 3 m above the ground with multiple small entrances, elsewhere they roost in fissures in branches and under exfoliating bark. Tree hollows used as maternity sites.	Likely. Could forage and breed in woodland remnants.	Likely. Could forage and breed in woodland remnants.	Present. Recorded at Trap site 1 (Coolangala Creek). Large areas of foraging and breeding habitat present.	Likely. Could forage and breed in woodland remnants.
Eastern Cave Bat	*Vespadelus troughtoni*	V		8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs in NE NSW south to Kempsey and west to the Warrumbungles. Inhabits rainforest margins, wet and dry sclerophyll forests through to drier forests and woodlands in semi-arid environments. All records are within close proximity to sandstone or volcanic escarpments. Roosts in overhangs and caves, mines, boulder piles, abandoned Fairy Martin nests and occasionally in buildings, and regularly switches between alternate roost colonies. Forages over a small area, but are capable of flying 500 m over clear paddocks.	Unlikely. Outside known range. No breeding habitat nearby.	Possible. May occur near outlier hills associated with the Warrumbungles.	Possible. Known to occur in the Pilliga. No breeding habitat present near the proposal site.	Possible. Known to occur in the Pilliga. No breeding habitat present near the proposal site.

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Eastern Pygmy-possum	*Cercartetus nanus*	V		11 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs along the east coast of NSW, and inland to the Pilliga, Dubbo, Parkes and Wagga Wagga. Inhabits range of habitats from coastal heath and woodland though open and closed forests, subalpine heath and rainforest. Inhabits rainforest, sclerophyll forests and heath. Banksia spp. and myrtaceous shrubs and trees are favoured food sources and nesting subject sites in drier habitats. Diet mostly pollen and nectar from *Banksia spp., Eucalyptus spp., Callistemon spp*. and insects. Nests in hollows in trees, under the bark of Eucalypts, forks of tea-trees, abandoned bird nests and Xanthorrhoea bases.	Nil. No suitable habitat present.	Nil. No suitable habitat present.	Likely. Known to occur in the Pilliga	Possible. May occur in larger remnants connected to the Pilliga.
Greater Broad-nosed Bat	*Scoteanax ruepellii*	V		Recorded as a predicted species within the BAM-C	Ecosystem	Occurs on the east coast and Great Dividing Range. Inhabits a variety of habitats from woodland to wet and dry sclerophyll forests and rainforest, also remnant paddock trees and timber-lined creeks, typically below 500 m asl. Forages in relatively uncluttered areas, using natural or man-made openings in denser habitats. Usually roosts in tree hollows or fissures but also under exfoliating bark or in the roofs of old buildings. Females congregate in maternal roosts in suitable hollow trees.	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.

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Greater Glider	*Petauroides volans*		V	May occur within 20 km (DEE 2020a)	Species	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. It prefers taller montane, moist eucalypt forest with relatively old trees and abundant hollows.	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	8 records within 20 km (OEH 2020a); Foraging, feeding or related behaviour may occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Roosts in camps within 20 km of a regular food source, typically in gullies, close to water and in vegetation with a dense canopy. Forages in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, swamps and street trees, particularly in eucalypts, melaleucas and banksias. Highly mobile with movements largely determined by food availability (Eby and Law 2008). Will also forage in urban gardens and cultivated fruit crops.	Low – proposal occurs along the edge of the species' range. Individuals may forage on site on occasion.	Low – proposal occurs along the edge of the species' range. Individuals may forage on site on occasion.	Low – proposal occurs along the edge of the species' range. Individuals may forage on site on occasion.	Low – proposal occurs along the edge of the species' range. Individuals may forage on site on occasion.

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Koala	*Phascolarctos cinereus*	V	V	663 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from coast to inland slopes and plains. Restricted to areas of preferred feed trees in eucalypt woodlands and forests. Home range varies depending on habitat quality, from < 2 to several hundred hectares.	Likely. One local record south of Narromine. May occur on occasion in roadside vegetation and riparian areas.	Possible. May occur on occasion in roadside remnants and riparian vegetation.	Present. Recorded at two locations during surveys. Large areas of habitat present.	Likely – would occur in larger remnants, particularly those connected to the Pilliga forests.
Kultarr	*Antechinomys laniger*	E		Recorded as a predicted species within the BAM-C	Ecosystem	Widespread across arid and semi-arid NSW but present in very low numbers, recent records have come primarily from the Cobar and Brewarrina region. A terrestrial insectivore that inhabits open country, especially claypans among Acacia woodlands. It shelters by day in hollow logs or tree-stumps, beneath saltbush and spinifex tussocks, in deep cracks in the soil and in the burrows of other animals. Populations appear to fluctuate seasonally in response to environmental stresses, including declines following periods of drought and intensive flooding.	Unlikely. Outside usual range.	Unlikely. Outside usual range.	Unlikely. Outside usual range.	Unlikely. Outside usual range.

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Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V		12 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Generally occurs east of the Great Dividing Range along NSW coast (Churchill 2008). Inhabits various habitats from open grasslands to woodlands, wet and dry sclerophyll forests and rainforest. Essentially a cave bat but may also roost in road culverts, stormwater tunnels and other man-made structures. Only four known maternity caves in NSW, near Wee Jasper, Bungonia, Kempsey and Texas. Females may travel hundreds of kilometres to the nearest maternal colony.	Likely. Probable calls recorded. Would forage throughout the area. Limited roosting habitat present.	Likely. Probable calls recorded. Would forage throughout the area. Limited roosting habitat present.	Present. Definite calls recorded. Would forage throughout the area. No roosting habitat present.	Likely. Would forage throughout the area. Limited roosting habitat present.
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	5 records within 20 km (OEH 2020a); Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs from the coast to the western slopes of the divide. Largest numbers of records from sandstone escarpment country in the Sydney Basin and Hunter Valley (Hoye and Schulz 2008). Roosts in caves and mines and most commonly recorded from dry sclerophyll forests and woodlands. An insectivorous species that flies over the canopy or along creek beds (Churchill 2008). In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.	Unlikely. No suitable breeding habitat and no preferred foraging habitat present.	Unlikely. No suitable breeding habitat and no preferred foraging habitat present.	Likely. Probable call recorded in the Pilliga. No breeding habitat present within 2 km of the proposal site, and no preferred foraging habitat present.	Unlikely. No suitable breeding habitat and no preferred foraging habitat present.
Little Pied Bat	*Chalinolobus picatus*	V		212 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Found in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings in dry open forest and woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, and Bimble box communities. They feed on moths and other flying invertebrates.	Likely. Probable calls recorded. Would forage and breed throughout woodland patches in the area.	Likely. Probable calls recorded. Would forage and breed throughout woodland patches in the area.	Present. Definite calls recorded. Would forage and breed throughout the Pilliga.	Likely. Probable calls recorded. Would forage and breed throughout woodland patches in the area.

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Northern Free-tailed Bat	*Ozimops lumsdenae*	V		67 records within 20 km (OEH 2020a)	Ecosystem	The Northern Free-tailed Bat is widely distributed across northern Australia from Western Australia to Queensland, extending south to the north-east corner of NSW. The only confirmed record in NSW is of a colony found in the roof of a house in Murwillumbah, however, calls have been detected from a few other locations in the far north east of the State. It inhabits a range of vegetation types in northern Australia, from rainforests to open forests and woodlands, and are often recorded along watercourses. The species can also occur in towns and cities, and roost mainly in tree hollows but relatively large colonies have been found under house roofs in urban areas in Queensland.	Possible. Within the possible range of the species. May forage and breed in woodland patches in the area.	Possible. Within the possible range of the species. May forage and breed in woodland patches in the area.	Unlikely. Outside mapped range.	Possible. Within the possible range of the species. May forage and breed in woodland patches in the area.
Pilliga Mouse	*Pseudomys pilligaensis*	V	V	137 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Mainly confined to low-nutrient deep sands of the Pilliga region, though an individual was also recorded from the Warrumbungles following major fires in 2013. Appears to prefer areas with sparse groundcover. Occur in highest numbers in recently burnt moist gullies; areas dominated by broombush; and areas with bloodwood overstorey and *Acacia burrowii* understorey.	Nil – no suitable habitat, outside known range.	Nil – no suitable habitat, outside known range.	Likely. Many records and large amounts of habitat present in the Pilliga.	Unlikely. May occur on rare occasions in forest connected to the Pilliga.

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Rufous Bettong	*Aepyprymnus rufescens*	V		3 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Inhabits a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter. Sleeps during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log. At night feeds on grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects. The original range from Coen in north Queensland to central Victoria has been reduced to a patchy distribution from Cooktown, Queensland, to north-eastern NSW. In NSW it has largely vanished from inland areas, although there are unconfirmed records from the Pilliga and Torrington districts.	Nil – no suitable habitat, outside known range.	Unlikely. May occur on rare occasions in forest connected to the Pilliga.	Possible. Previously thought to be extinct in the Pilliga, but there have been recent observations. Could occur on occasion in the proposal site.	Unlikely. May occur on rare occasions in forest connected to the Pilliga.
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	2 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Inhabits a range of environments including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den sites are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, usually traversed along densely vegetated creek lines.	Unlikely. Limited suitable habitat present.	Unlikely. Limited suitable habitat present.	Likely. Known to occur in the Pilliga. May occur on occasion in the proposal site.	Likely. Known to occur in the Pilliga. May occur on occasion in larger remnants.

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Squirrel Glider	*Petaurus norfolcensis*	V		22 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs along the drier inland slopes as well as coastal habitats. Inhabits woodland and open forest with a Eucalyptus, Corymbia or Angophora overstorey and a shrubby understorey of Acacia or Banksia. Key habitat components include reliable winter and early-spring flowering Eucalypts, Banksia or other nectar sources, and hollow-bearing trees for roost and nest sites (van der Ree and Suckling 2008, Quin et al 2004), with social groups moving between multiple hollows. Social groups include one or two adult males and females with offspring, and have home ranges of 5-10ha within NSW (van der Ree and Suckling 2008, Kavanagh 2004).	Unlikely. No large patches of vegetation present, few local records.	Unlikely. May occur on rare occasions in forest connected to the Pilliga.	Present. Recorded in the proposal site. Would forage and breed throughout the Pilliga.	Possible. May occur in forest and linear remnants connected to the Pilliga.
Stripe-faced Dunnart	*Sminthopsis macroura*	V		Recorded as a predicted species within the BAM-C	Ecosystem	Widespread across northern and central Australia. In NSW rare on the Central and North West Slopes, with eastern-most records in recent times around Dubbo, Coonabarabran, Warialda and Ashford. Inhabit native dry grasslands and low dry shrublands, often along drainage lines. Shelter in soil cracks, grass tussocks or under rocks and logs. Prefers relatively ungrazed habitats with higher diversity and understorey cover.	Unlikely. Occurs at the eastern extent of its range, however not recorded within 20 km.	Unlikely. Occurs at the eastern extent of its range, however not recorded within 20 km.	Unlikely. Occurs at the eastern extent of its range, however not recorded within 20 km.	Unlikely. Occurs at the eastern extent of its range, however not recorded within 20 km.

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Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		1039 records within 20 km (OEH 2020a); Recorded as a predicted species within the BAM-C	Ecosystem	Migrates from tropics to SE Australia in summer. Forages across a range of habitats including those with and without trees, from wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grasslands and desert. Roosts communally in large tree hollows and buildings.	Present. Recorded during surveys. Would forage and breed throughout the area.	Likely. Would forage and breed throughout the area.	Present. Recorded during surveys. Would forage and breed throughout the area.	Present. Recorded during surveys. Would forage and breed throughout the area.
REPTILES										
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	V	V	Likely to occur within 20 km (DEE 2020a)	Species	The Border Thick-tailed Gecko occurs in the New England Tableland, Nandewar and Brigalow Belt South Bioregions in northern NSW and in south-east Queensland. The Border Thick-tailed Gecko is a nocturnal species that shelters by day and is most commonly found in undisturbed habitat remnants on rocky outcrops and stony hills within eucalypt and cypress-pine open forest or woodland between 500-1100 m elevation.	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.	Unlikely. Distribution is north of proposal site. Limited suitable habitat likely to be present
Five-clawed Worm-skink	*Anomalopus mackayi*	E	V	2 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a) Recorded as a predicted species within the BAM-C	Ecosystem	Patchily distributed on the north-west slopes and plains of NSW between Ashford, Mungindi and Walgett and north int Queensland. Inhabits deep burrows and soil cracks in grassy White Box woodland on moist black soils and River Red Gum - Coolibah - Bimble Box woodland on cracking clays. Has also been recorded in grassland areas and open paddocks with scattered trees.	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.	Moderate – potential habitat present in red gum and white box communities along the northern side of the Pilliga

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Pale-headed Snake	*Hoplocephalus bitorquatus*	V		14 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs north from Tuggerah along the coast and to the western side of the Great Divide, historically recorded as far west as Mungindi and Quambone. Inhabits dry eucalypt forests and woodlands, cypress woodland and occasionally in rainforest or moist eucalypt forest. West of the Great Dividing Range in NSW the species, has been recently recorded in sites dominated by Narrow-leaved Ironbark, Black Box and Silver-leaf Ironbark woodland and Coolabah (Fitzgerald et al 2010). In near-coastal areas has been recorded in Broad-leaved Ironbark, Spotted Gum, Forest Red Gum and Grey Gum forests (Fitzgerald et al 2010). Favours streamside areas, particularly in drier habitats. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.	Possible. May occur in riparian vegetation.	Possible. May occur in riparian vegetation.	Present. Individual recorded near a creekline in the Pilliga. Likely to occur in association with riparian areas throughout the Pilliga.	Likely. Known to occur along the Namoi River. Likely to occur in association with riparian areas also at Narrabri Creek and Bohena Creek.
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Populations occur in the Queanbeyan/Canberra district, Cooma, Yass, Bathurst, Albury and West Wyalong areas. Inhabits grassland and open woodland with substantial embedded rock cover in sunny situations. Recorded in both native and non-native grasslands. Usually recorded under small rocks (150-600 millimetres basal area) shallowly embedded in the soil (2-5 centimetres, and use ant burrows under these rocks.	Nil. Outside known range. Suitable geology absent.	Unlikely – may occur near outlier hills associated with the Warrumbungles. No rocky habitat present in the proposal site.	Unlikely. Outside known range. No suitable habitat. Suitable geology absent.	Unlikely. Outside known range. Suitable geology absent.

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Striped Legless Lizard	*Delma impar*	V	V	Known to occur within 20 km (DEE 2020a)	Species	Occurs in the Southern Tablelands, South-west Slopes and possibly the Riverina. Found in natural or secondary grassland or open areas in grassy eucalypt woodland. May occur in modified grasslands with high exotic grass cover. Shelters in base of grass tussocks, under rocks or logs or in soil cracks (Smith and Robertson 1999).	Unlikely. Known distribution is south of proposal, mainly around Canberra and Goulburn areas. Limited suitable habitat likely to be present	Nil. Outside known range.	Nil. Outside known range.	Nil. Outside known range.
Woma	*Aspidites ramsayi*	V		Recorded as a predicted species within the BAM-C	Ecosystem	The Woma occurs in north-western NSW, east to about Louth and Bourke. In was last recorded in these eastern districts in the late 1890s, and in 1983 from the Tibooburra region. Its range and abundance in south-eastern Australia is considered to be undergoing serious decline. It inhabits subtropical to temperate deserts and sandy plains, as well as dunefields and deep cracking black soil plains in semi-arid areas. It can also occur in hummock grasslands, shrublands and woodlands.	Unlikely. Outside current range.	Unlikely. Outside current range.	Unlikely. Outside current range.	Unlikely. Outside current range.
FROGS										
Sloane's Froglet	*Crinia sloanei*	V		2 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. Majority of records are from the Riverina. This species has been recorded over 900 times in the first year of the FrogID App, with all records from the Albury-Corowa area along the Murray.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentify-cations.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.

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MIGRATORY BIRDS										
Common Sandpiper	*Actitis hypoleucos*		C,J,K	May occur within 20 km (DEE 2020a)	n/a	Does not breed in Australia. When in Australia it is found on all coastlines and in inland areas, but is concentrated in the north and west with important areas in WA, the NT and Qld. Utilises a wide range of coastal and inland wetlands with varying salinity levels.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Curlew Sandpiper	*Calidris ferruginea*	E	CE, C,J,K	May occur within 20 km (DEE 2020a)	Species/Eco system	Breeds in northern hemisphere. In Australia generally occupies littoral and estuarine habitats. In NSW mainly found in intertidal mudflats on sheltered coasts. Roosts on beaches, spits or islands on the coast/in wetlands, or in saltmarsh on rocky shores.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.

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Eastern Curlew	*Numenius madagascariensis*		CE, C,J,K	May occur within 20 km (DEE 2020a)	n/a	Within Australia, the species has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. It is most commonly associated with sheltered coasts, and all internationally important sites for this species in Australia are on the coast. The birds are also found in saltworks and sewage farms. Breeds in Russia and north-eastern China.	Unlikely. No suitable wetland areas present. Proposal would impact farm dams, generally with little emergent vegetation. No mapped important areas likely to occur in proposal site.	Unlikely. No suitable wetland areas present. Proposal would impact farm dams, generally with little emergent vegetation. No mapped important areas likely to occur in proposal site.	Nil. No wetland areas present in the Pilliga.	Unlikely. No suitable wetland areas present. Proposal would impact farm dams, generally with little emergent vegetation. No mapped important areas likely to occur in proposal site.
Fork-tailed Swift	*Apus pacificus*		C,J,K	2 records within 20 km (OEH 2020a)	n/a	Recorded in all regions of NSW. Non- breeding, and almost exclusively aerial while in Australia. Occurs over urban and rural areas as well as areas of native vegetation.	Present. Large flock recorded south of Gilgandra.	Likely. Would occur on occasion above the proposal.	Likely. Would occur on occasion above the proposal.	Likely. Would occur on occasion above the proposal.
Glossy Ibis	*Plegadis falcinellus*		C	5 records within 20 km (OEH 2020a)	n/a	Occurs throughout eastern and northern Australia, east of the Kimberley and Eyre Peninsula. Largest areas of prime habitat are inland and northern floodplains, with largest numbers in the Top End and Channel Country. Preferred habitats are freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. Breeds at limited locations, with most records from the Murray Darling Basin (NSW), western Riverina (VIC), south-east (SA), Channel Country (Qld/ SA) and lower Ord/Keep Rivers (WA).	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.

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Latham's Snipe	*Gallinago hardwickii*		C,J,K	5 records within 20 km (OEH 2020a); May occur within 20 km (DEE 2020a)	n/a	Occurs along the coast and west of the Great Dividing Range. Non breeding visitor to Australia. Inhabit permanent and ephemeral wetlands up to 2000 m asl. Typically in open, freshwater wetlands with low, dense vegetation (incl. swamps, flooded grasslands and heathlands). Can also occur in saline/brackish habitats and in modified or artificial habitats close to human activity.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Marsh Sandpiper	*Tringa stagnatilis*		C,J,K	2 records within 20 km, last recorded 2007 (OEH 2020a)	n/a	Breeds in N Hemisphere. Occurs in coastal and inland wetlands, including freshwater and estuarine habitats, throughout Australia. All regions of NSW but particularly central and south coasts and western slopes and plains. Sites of national importance in NSW include Parkes wetlands, Macquarie Marshes and Tullakool Evaporation Ponds.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Likelihood of occurrence in the Narromine to Curban area (Segment 8)	Likelihood of occurrence in Curban to Pilliga area (Segment 9)	Likelihood of occurrence in Pilliga area (Segment 10)	Likelihood of occurrence in Pilliga to Narrabri area (Segment 11)
Pectoral Sandpiper	*Calidris melanotos*		J,K	May occur within 20 km (DEE 2020a)	n/a	Widespread but scattered records across NSW, east of the divide and in the Riverina and Lower Western regions. Breeds in the northern hemisphere. In Australasia, prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Usually in coastal or near-coastal habitats, and prefers wetlands with open mudflats and low emergent or fringing vegetation such as grass or samphire.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
Rufous Fantail	*Rhipidura rufifrons*		B	Known to occur within 20 km (DEE 2020a)	n/a	Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas (Birds Australia 2008).	Unlikely – may occur on rare occasions. The proposal site is located within the core non-breeding range, but not the core breeding range	Unlikely – may occur on rare occasions. The proposal site is located within the core non-breeding range, but not the core breeding range	Unlikely – may occur on rare occasions. The proposal site is located within the core non-breeding range, but not the core breeding range	Unlikely – may occur on rare occasions. The proposal site is located within the core non-breeding range, but not the core breeding range
Satin Flycatcher	*Myiagra cyanoleuca*		B	Known to occur within 20 km (DEE 2020a)	n/a	In NSW widespread on and east of the Great Divide, sparsely scattered on the western slopes, very occasional records on the western plains. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, often near wetlands and watercourses. On migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Generally not in rainforests.	Unlikely. Proposal outside core non-breeding and core breeding range.	Unlikely. Proposal outside core non-breeding and core breeding range.	Unlikely. Proposal outside core non-breeding and core breeding range.	Unlikely. Proposal outside core non-breeding and core breeding range.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Likelihood of occurrence in the Narromine to Curban area (Segment 8)	Likelihood of occurrence in Curban to Pilliga area (Segment 9)	Likelihood of occurrence in Pilliga area (Segment 10)	Likelihood of occurrence in Pilliga to Narrabri area (Segment 11)
Sharp-tailed Sandpiper	*Calidris acuminata*		C,J,K	3 records within 20 km, last recorded 2007 (OEH 2020a); Known to occur within 20 km (DEE 2020a)	n/a	Spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. Breeds in northern Siberia.	Possible. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Most records in the area are associated with the Narromine Wetlands and Backwater Cowal. These areas would not be impacted by the proposal.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Castlereagh River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed.	Unlikely. No suitable wetland areas present.	Unlikely. No suitable wetland areas present. Various farm dams, generally with little emergent vegetation, also occur along the alignment. Dense areas of emergent reeds are present in the Namoi River. This river would be crossed by a large bridge, and no clearing of reedbeds is proposed. There would be no impact on Narrabri Lake, where better quality habitat is located.
White-throated Needletail	*Hirundapus caudacutus*		V C,J,K	21 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a)	n/a	Recorded along NSW coast to the western slopes and occasionally from the inland plains. Breeds in northern hemisphere. Almost exclusively aerial while in Australia. Occur above most habitat types, but are more frequently recorded above more densely vegetated habitats (rainforest, open forest and heathland) than over woodland or treeless areas.	Possible. Would occur on occasion above the proposal.	Possible. Would occur on occasion above the proposal.	Possible. Would occur on occasion above the proposal.	Possible. Would occur on occasion above the proposal.
Yellow Wagtail	*Motacilla flava*		C,J,K	May occur within 20 km (DEE 2020a)	n/a	This species breeds in temperate Europe and Asia. They occur within Australia in open country habitat with disturbed ground and some water. Recorded in short grass and bare ground, swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land and town lawns.	Unlikely. Proposal outside core non-breeding and core breeding range.	Unlikely. Proposal outside core non-breeding and core breeding range.	Unlikely. Proposal outside core non-breeding and core breeding range.	Unlikely. Proposal outside core non-breeding and core breeding range.

Table C3 Potential Candidate Threatened Species by IBRA subregion

Common name	BC Act Status	EPBC Act Status	Credit type (BC Act)	Inland Slopes (Borrow Pit A)	Bogan-Macquarie (Borrow Pit B, Narromine Compound, alignment to just north of Macquarie River)	Castlereagh-Barwon (Oxley Highway - Castlereagh River, Hubbards Lane to Box Ridge Road, Quanda, Curban compound)	Pilliga (Borrow Pit C, Borrow Pit D, alignment from north of Macquarie River to Oxley Highway, Castlereagh River to Hubbards Lane, Box Ridge Road to Quanda, Quanda to Caledonia Road, Aloes Road to Sparrow Road)	Pilliga Outwash (Narrabri Compound, alignment north of Baradine Road to Aloes Road, Sparrow Road to north of Namoi River)	Liverpool Plains (north of Namoi River to Killarney Gap Road)	Northern Basalts (north of Killarney Gap road)
BIRDS										
Australasian Bittern	E	E	Ecosystem	Known	Known	Known	Known	Known	Predicted	Predicted
Australian Bustard	E		Species	Not present	Known	Known	Predicted	Known	Known	Predicted
Australian Painted Snipe	E	E	Ecosystem	Known	Known	Known	Known	Known	Known	Predicted
Barking Owl	V		Species/ Ecosystem	Known	Known	Known	Known	Known	Known	Known
Black-breasted Buzzard	V		Species/ Ecosystem	Known	Predicted	Predicted	Known	Predicted	Known	Known
Black Falcon	V		Ecosystem	Known	Known/Predicted	Known/Predicted	Known/Predicted	Known/Predicted	Known/Predicted	Known/Predicted
Black-chinned Honeyeater (eastern subspecies)	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Black-necked Stork	E		Ecosystem	Known	Known	Known	Predicted	Known	Known	Known
Blue-billed Duck	V		Ecosystem	Known	Known	Known	Predicted	Known	Known	Predicted
Brolga	V		Ecosystem	Known	Known	Known	Predicted	Known	Known	Predicted
Brown Treecreeper (eastern subspecies)	V		Ecosystem	Known	Known	Not present	Known	Not present	Known	Known
Bush Stone-curlew	E		Species	Known	Known	Known	Known	Known	Known	Predicted

Common name	BC Act Status	EPBC Act Status	Credit type (BC Act)	Inland Slopes (Borrow Pit A)	Bogan-Macquarie (Borrow Pit B, Narromine Compound, alignment to just north of Macquarie River)	Castlereagh-Barwon (Oxley Highway - Castlereagh River, Hubbards Lane to Box Ridge Road, Quanda, Curban compound)	Pilliga (Borrow Pit C, Borrow Pit D, alignment from north of Macquarie River to Oxley Highway, Castlereagh River to Hubbards Lane, Box Ridge Road to Quanda, Quanda to Caledonia Road, Aloes Road to Sparrow Road)	Pilliga Outwash (Narrabri Compound, alignment north of Baradine Road to Aloes Road, Sparrow Road to north of Namoi River)	Liverpool Plains (north of Namoi River to Killarney Gap Road)	Northern Basalts (north of Killarney Gap road)
Curlew Sandpiper	E	CE	Species/ Ecosystem	Known	Known	Not present	Not present	Not present	Not present	Not present
Diamond Firetail	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Dusky Woodswallow	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Eastern Curlew		CE, C,J,K	Species/ Ecosystem	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Eastern Osprey	V		Ecosystem	Not present	Predicted	Not present	Not present	Not present	Not present	Not present
Flame Robin	V		Ecosystem	Known	Predicted	Predicted	Known	Not present	Known	Not present
Freckled Duck	V		Ecosystem	Known	Known	Known	Predicted	Known	Known	Predicted
Gilbert's Whistler	V		Ecosystem	Known	Predicted	Predicted	Known	Known	Not present	Not present
Glossy Black-Cockatoo	V		Species/ Ecosystem	Known	Known	Known	Known	Known	Known	Known
Grey-crowned Babbler (eastern subspecies)	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Grey Falcon	E		Ecosystem	Known	Not present	Known	Known	Predicted	Known	Not present
Hooded Robin (south-eastern form)	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Little Eagle	V		Species/ Ecosystem	Known	Known	Known	Known	Known	Known	Known
Little Lorikeet	V		Ecosystem	Known	Not present	Not present	Known	Known	Known	Known
Magpie Goose	V		Ecosystem	Known	Known	Known	Known	Known	Known	Not present

Common name	BC Act Status	EPBC Act Status	Credit type (BC Act)	Inland Slopes (Borrow Pit A)	Bogan-Macquarie (Borrow Pit B, Narromine Compound, alignment to just north of Macquarie River)	Castlereagh-Barwon (Oxley Highway - Castlereagh River, Hubbards Lane to Box Ridge Road, Quanda, Curban compound)	Pilliga (Borrow Pit C, Borrow Pit D, alignment from north of Macquarie River to Oxley Highway, Castlereagh River to Hubbards Lane, Box Ridge Road to Quanda, Quanda to Caledonia Road, Aloes Road to Sparrow Road)	Pilliga Outwash (Narrabri Compound, alignment north of Baradine Road to Aloes Road, Sparrow Road to north of Namoi River)	Liverpool Plains (north of Namoi River to Killarney Gap Road)	Northern Basalts (north of Killarney Gap road)
Major Mitchell's Cockatoo	V		Species/ Ecosystem	Known	Known	Known	Known	Predicted	Not present	Not present
Malleefowl	E	V	Ecosystem	Known	Predicted	Not present	Known	Predicted	Predicted	Not present
Masked Owl	V		Species/ Ecosystem	Known	Known	Known	Known	Known	Known	Known
Painted Honeyeater	V	V	Ecosystem	Known	Known	Known	Known	Known	Known	Known
Powerful Owl	V		Species/ Ecosystem	Known	Not present	Not present	Known	Not present	Predicted	Not present
Red-backed Button-quail	V		Species	Not present	Predicted	Not present	Not present	Not present	Not present	Not present
Red Goshawk	CE	V	Species	Not present	Not present	Not present	Not present	Not present	Not present	Not present
Red-tailed Black-cockatoo (inland species)	V		Species/Ecosystem	Not present	Known	Known	Not present	Not present	Not present	Not present
Regent Honeyeater	CE	CE	Species/ Ecosystem	Known	Not present	Not present	Known	Not present	Known	Predicted
Scarlet Robin	V		Ecosystem	Known	Not present	Known	Known	Not present	Known	Not present
Speckled Warbler	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Spotted Harrier	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Square-tailed Kite	V		Species/Ecosystem	Known	Known	Known	Known	Known	Known	Known
Squatter Pigeon	CE	V	Species	Not present	Not present	Predicted	Not present	Not present	Not present	Known

Common name	BC Act Status	EPBC Act Status	Credit type (BC Act)	Inland Slopes (Borrow Pit A)	Bogan-Macquarie (Borrow Pit B, Narromine Compound, alignment to just north of Macquarie River)	Castlereagh-Barwon (Oxley Highway - Castlereagh River, Hubbards Lane to Box Ridge Road, Quanda, Curban compound)	Pilliga (Borrow Pit C, Borrow Pit D, alignment from north of Macquarie River to Oxley Highway, Castlereagh River to Hubbards Lane, Box Ridge Road to Quanda, Quanda to Caledonia Road, Aloes Road to Sparrow Road)	Pilliga Outwash (Narrabri Compound, alignment north of Baradine Road to Aloes Road, Sparrow Road to north of Namoi River)	Liverpool Plains (north of Namoi River to Killarney Gap Road)	Northern Basalts (north of Killarney Gap road)
Superb Parrot	V	V	Species/ Ecosystem	Known	Known	Known	Known	Known	Known	Not present
Swift Parrot	E	CE	Species/ Ecosystem	Known	Not present	Not present	Known	Predicted	Known	Predicted
Turquoise Parrot	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Varied Sittella	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
White-bellied Sea-Eagle		V	Species/ Ecosystem	Known/predicted	Known/predicted	Known/predicted	Known/predicted	Known/predicted	Known/predicted	Known/predicted
White-fronted Chat	V		Ecosystem	Known	Known	Known	Known	Not present	Known	Not present
White-throated Needletail		V, C,J,K	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bristle-faced Free-tailed Bat	E		Species	Not present	Not present	Known	Not present	Not present	Not present	Known
Corben's Long-eared Bat	V	V	Ecosystem	Known	Predicted	Predicted	Known	Known	Known	Known
Eastern Cave Bat	V		Species	Not present	Not present	Not present	Known	Known	Known	Known
Greater Broad-nosed Bat	V		Ecosystem	Not present	Not present	Not present	Predicted	Not present	Known	Not present
Grey-headed Flying-fox	V	V	Species/ Ecosystem	Known	Known	Not present	Known	Not present	Known	Known
Large Bent-winged Bat	V		Species/ Ecosystem	Known	Not present	Not present	Known	Not present	Known	Known
Large-eared Pied Bat	V	V	Species	Known	Not present	Not present	Known	Not present	Not present	Known

Common name	BC Act Status	EPBC Act Status	Credit type (BC Act)	Inland Slopes (Borrow Pit A)	Bogan-Macquarie (Borrow Pit B, Narromine Compound, alignment to just north of Macquarie River)	Castlereagh-Barwon (Oxley Highway - Castlereagh River, Hubbards Lane to Box Ridge Road, Quanda, Curban compound)	Pilliga (Borrow Pit C, Borrow Pit D, alignment from north of Macquarie River to Oxley Highway, Castlereagh River to Hubbards Lane, Box Ridge Road to Quanda, Quanda to Caledonia Road, Aloes Road to Sparrow Road)	Pilliga Outwash (Narrabri Compound, alignment north of Baradine Road to Aloes Road, Sparrow Road to north of Namoi River)	Liverpool Plains (north of Namoi River to Killarney Gap Road)	Northern Basalts (north of Killarney Gap road)
Little Pied Bat	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Yellow-bellied Sheathtail-bat	V		Ecosystem	Known	Known	Known	Known	Known	Known	Known
Black-striped Wallaby	E		Ecosystem	Not present	Not present	Not present	Known	Known	Known (north of Gunnedah)	Known
Brush-tailed Rock-wallaby	E	V	Species	Known	Not present	Not present	Known	Not present	Known	Not present
Eastern Pygmy-possum	V		Species	Known	Not present	Not present	Known	Known	Known	Predicted
Greater Glider		V	Species	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Koala	V	V	Species/ Ecosystem	Known	Known	Known	Known	Known	Known	Known
Pilliga Mouse	V	V	Ecosystem	Not present	Not present	Not present	Known	Known	Predicted	Not present
Rufous Bettong	V		Species	Not present	Not present	Not present	Known	Known	Predicted	Predicted
Spotted-tailed Quoll	V	E	Ecosystem	Known	Known	Known	Known	Known	Known	Predicted
Squirrel Glider	V		Species	Known	Not present	Not present	Known	Known	Known	Known
Stripe-faced Dunnart	V		Ecosystem	Not present	Known	Known	Predicted	Predicted	Predicted	Known
Border Thick-tailed Gecko	V	V	Species	Not present	Not present	Not present	Not present	Not present	Predicted	Known
Five-clawed Worm-skink	E	V	Ecosystem	Not present	Not present	Known	Not present	Known	Not present	Known
Pale-headed Snake	V		Species	Predicted	Predicted	Known	Known	Known	Known	Known

Common name	BC Act Status	EPBC Act Status	Credit type (BC Act)	Inland Slopes (Borrow Pit A)	Bogan-Macquarie (Borrow Pit B, Narromine Compound, alignment to just north of Macquarie River)	Castlereagh-Barwon (Oxley Highway - Castlereagh River, Hubbards Lane to Box Ridge Road, Quanda, Curban compound)	Pilliga (Borrow Pit C, Borrow Pit D, alignment from north of Macquarie River to Oxley Highway, Castlereagh River to Hubbards Lane, Box Ridge Road to Quanda, Quanda to Caledonia Road, Aloes Road to Sparrow Road)	Pilliga Outwash (Narrabri Compound, alignment north of Baradine Road to Aloes Road, Sparrow Road to north of Namoi River)	Liverpool Plains (north of Namoi River to Killarney Gap Road)	Northern Basalts (north of Killarney Gap road)
Pink-tailed Legless Lizard	V	V	Species	Known	Not present	Not present	Predicted	Not present	Not present	Not present
Striped Legless Lizard	V	V	Species	Known	Not present	Not present	Not present	Not present	Not present	Not present
Sloane's Froglet	V		Species	Known	Known	Known	Predicted	Known	Not present	Not present

Table C4 Likelihood of occurrence of potential candidate threatened fauna species at compound sites

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Sloane's Froglet	*Crinia sloanei*	V		Recorded as a potential candidate species within the BAM-C	Species	Typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. Majority of records are from the Riverina.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.
Australian Bustard	*Ardeotis australis*	E		Recorded as a potential candidate species within the BAM-C	Species	Occurs in inland Australia. In NSW mainly found in the north-west corner, less often in the lower western and central west plains regions, with occasional vagrants east to the western slopes and riverine plain. Breeding confined to the north-west region. Mainly inhabits tussock and hummock grasslands, also occurs in low shrublands and low open grassy woodlands. Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and shrubland cover. Travels long distances, presumably in response to habitat and climatic conditions.	Unlikely. On eastern edge of distribution, no recent records. Site predominantly cropped. Not observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. Site cropped. Not observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. No observed during surveys.
Barking Owl	*Ninox connivens*	V		333 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from coast to inland slopes and plains, though is rare in dense, wet forests east of the Great Dividing Range and sparse in higher parts of the tablelands and in the arid zone. Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (eg in Acacia and Casuarina), or dense eucalypt canopy. Nests in hollows of large, old eucalypts including *Eucalyptus camaldulensis, Eucalyptus albens, Eucalyptus polyanthemos* and *Eucalyptus blakelyi*. Birds and mammals important prey during breeding. Territories range from 30 to 200 ha.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Black-breasted Buzzard	*Hamirostra melanosternon*	V		Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Sparsely distributed in areas of less than 500mm rainfall, north from north-western NSW. Inhabits a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Breeds from August to October near water in a tall tree.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.
Bush Stone-curlew	*Burhinus grallarius*	E		11 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Scattered distribution across NSW. Inhabits lowland grassy woodland and open forest and, in coastal areas, Casuarina and Melaleuca woodlands, saltmarsh and mangroves. Requires a low, sparse groundcover, some fallen timber and leaf litter, and a general lack of a shrubby understory (DEC 2006).	Low. Predominantly cropped. No local records. Not observed during surveys	Low. Site does not contain native vegetation. No nearby records. No observed during surveys.	Possible. Limited woodland habitat present. Not observed during surveys.
Curlew Sandpiper	*Calidris ferruginea*	E	CE	May occur within 20 km (DEE 2020a)	Species/Ecosystem	Breeds in northern hemisphere. In Australia generally occupies littoral and estuarine habitats. In NSW mainly found in intertidal mudflats on sheltered coasts. Roosts on beaches, spits or islands on the coast/in wetlands, or in saltmarsh on rocky shores.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
Eastern Curlew	*Numenius madagascariensis*		CE, C,J,K	May occur within 20 km (DEE 2020a)	Species/Ecosystem	Within Australia, the species has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. It is most commonly associated with sheltered coasts, and all internationally important sites for this species in Australia are on the coast. The birds are also found in saltworks and sewage farms. Breeds in Russia and north-eastern China.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V		107 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Widespread but uncommon from coast to southern tablelands and central western plains. Feeds almost exclusively on the seeds of Allocasuarina species. Prefers woodland and open forests, rarely away from Allocasuarina. Roost in leafy canopy trees, preferably eucalypts, usually <1 km from feeding site. Nests in large (approx. 20 centimetres) hollows in trees, stumps or limbs, usually in Eucalypts (Higgins 1999).	Unlikely. Not recorded in the Narromine areas during surveys. Site mostly cropped. No foraging habitat present. Unlikely to breed on site given lack of foraging habitat and distance from water.	Nil. No native vegetation or hollow-bearing trees present.	Unlikely. Site mostly cropped. Limited potential foraging habitat present. Unlikely to breed on site given lack of foraging habitat and distance from water.
Little Eagle	*Hieraaetus morphnoides*	V		18 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Unlikely. Limited native vegetation. No nest trees observed.	Nil. No native vegetation or large trees present.	Unlikely. Limited native vegetation. No nest trees observed.
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	V		Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs in arid and semi-arid NSW, regularly as far east as Bourke and Griffith and occasionally further east as vagrants. Occupies habitat in arid semi-desert scrublands, savannahs and sparse woodlands, where there is fresh surface water and large hollow trees for nesting. These birds have been recorded in forest, woodland and shrub land, including mulga, mallee, Acacia, Eucalyptus and Callitris associations. It has also been recorded in cropping areas throughout its range (Queensland Government EPA Agency, 2007). Large areas of suitable habitat are required for a viable population to exist (Webster et al undated).	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Masked Owl	*Tyto novaehollandiae*	V		4 records within 20 km, last recorded 2006 (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 metres. Roosts and breeds in large (>40cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.
Powerful Owl	*Ninox strenua*	V		Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from the coast to the western slopes. Solitary and sedentary species. Inhabits a range of habitats from woodland and open sclerophyll forest to tall open wet forest and rainforest. Prefers large tracts of vegetation. Nests in large tree hollows (> 0.5 m deep), in large eucalypts (dbh 80-240 centimetres) that are at least 150 years old. Pairs have high fidelity to a small number of hollow-bearing nest trees and defend a large home range of 400 - 1,450 ha. Forages within open and closed woodlands as well as open areas.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.
Red Goshawk	*Erythrotriorchis radiatus*	CE	V	Likely to occur within 20 km (DEE 2020a)	Species	Very rare in NSW, generally confined to the Northern Rivers bioregion with most records in the Clarence River catchment with few around the lower Richmond and Tweed Rivers. Inhabit open woodland and forest, preferring mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Preferred habitats include a mosaic of vegetation types, a large population of birds (prey) and permanent water. Adults have large home ranges (up to 120 km^2 in NT), and in NSW appear to move from nesting areas in the ranges to coastal areas to coastal plains. Generally breed in tall trees within 1 km of a river or wetland.	Nil. Outside usual range (not recorded in IBRA subregion).	Nil. Outside usual range (not recorded in IBRA subregion). Site does not contain native vegetation.	Nil. Outside usual range (not recorded in IBRA subregion).

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Regent Honeyeater	*Anthochaera phrygia*	CE	CE	1 record within 20 km, last recorded 2003 (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	In NSW confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. Inhabits dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
Square-tailed Kite	*Lophoictinia isura*	V		8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs across NSW, resident in North, northeast and along west-flowing rivers. Summer breeding migrant to southeast of state. Inhabits a variety of habitats including woodlands and open forests, with preference for timbered watercourses. Favours productive forests on the coastal plain, box-ironbark-gum woodlands on the inland slopes, and Coolibah/River Red Gum on the inland plains. In Sydney area nests in mature living trees within 100m of ephemeral/permanent watercourse. Large home range > 100 km^2.	Unlikely. Limited native vegetation. No nest trees observed.	Nil. No native vegetation or large trees present.	Unlikely. Limited native vegetation. No nest trees observed.
Squatter Pigeon	*Geophaps scripta scripta*	CE	V	May occur within 20 km (DEE 2020a)	Species	Found from north Queensland to the North West Slopes of NSW and extending down to the Liverpool Plains and Dubbo. Today they are very rare in the southern parts of their range. Grassy woodlands and plains, preferring sandy areas and usually close to water.	Low. Outside usual range. Site predominantly cropped. Not observed during surveys.	Low. Outside usual range. Not observed during surveys. Site does not contain native vegetation.	Low. Outside usual range (not recorded in IBRA subregion).

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Superb Parrot	*Polytelis swainsonii*	V	V	49 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs as a single population in the South-west Slopes and Riverina bioregions. Two core breeding areas: between Cowra and Yass – Grenfell, Cootamundra and Coolac in the SW Slopes, and along the Murray, Edward and Murrumbidgee Rivers in the Riverina. Birds breeding in the SW slopes migrate north to the Namoi/Gwydir Rivers for winter. Inhabits Box Gum, Box – Cypress Pine and Boree woodlands and River Red Gum Forest. Nest in hollow trees, in tall riparian River Red Gum communities (Riverina area) or open Box Gum woodland or isolated paddock trees (SW Slopes). Mainly forages in grassy box woodlands, up to 10 km from breeding sites.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.
Swift Parrot	*Lathamus discolor*	E	CE	1 record within 20 km, last recorded 2000 (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Migratory, travelling to the mainland from March to October. Breeds in Tasmania from September to January. On the mainland, it mostly occurs in the southeast foraging on winter flowering eucalypts and lerps, with records of the species between Adelaide and Brisbane. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. Eucalyptus robusta, Corymbia maculata and C. gummifera dominated coastal forests are also important habitat.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V		5 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Primarily coastal but may extend inland over major river systems. Breeds close to water, mainly in tall open forest/woodland but also in dense forest, rainforest, closed scrub or remnant trees. Usually forages over large expanses of open water, but also over open terrestrial habitats (eg grasslands).	Unlikely. Limited native vegetation. No nest trees observed.	Nil. No native vegetation or large trees present.	Unlikely. Limited native vegetation. No nest trees observed.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Brush-tailed Rock-wallaby	*Petrogale penicillata*	E	V	38 records within 20 km, last recorded 2005 (OEH 2020a); Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs from the Shoalhaven north to the Queensland border. Now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. Occurs on rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. Diet consists of vegetation in adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present
Eastern Cave Bat	*Vespadelus troughtoni*	V		8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs in NE NSW south to Kempsey and west to the Warrumbungles. Inhabits rainforest margins, wet and dry sclerophyll forests through to drier forests and woodlands in semi-arid environments. All records are within close proximity to sandstone or volcanic escarpments. Roosts in overhangs and caves, mines, boulder piles, abandoned Fairy Martin nests and occasionally in buildings, and regularly switches between alternate roost colonies. Forages over a small area, but are capable of flying 500 m over clear paddocks.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. No breeding habitat nearby. Limited native vegetation present. Limited connectivity to larger areas of suitable habitat.
Eastern Pygmy-possum	*Cercartetus nanus*	V		7 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs along the east coast of NSW, and inland to the Pilliga, Dubbo, Parkes and Wagga Wagga. Inhabits range of habitats from coastal heath and woodland though open and closed forests, subalpine heath and rainforest. Inhabits rainforest, sclerophyll forests and heath. Banksia spp. and myrtaceous shrubs and trees are favoured food sources and nesting subject sites in drier habitats. Diet mostly pollen and nectar from Banksia spp., Eucalyptus spp., Callistemon spp. and insects. Nests in hollows in trees, under the bark of Eucalypts, forks of tea-trees, abandoned bird nests and Xanthorrhoea bases.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Greater Glider	*Petauroides volans*		V	May occur within 20 km (DEE 2020a)	Species	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. It prefers taller montane, moist eucalypt forest with relatively old trees and abundant hollows.	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	5 records within 20 km (OEH 2020a); Foraging, feeding or related behaviour may occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Roosts in camps within 20 km of a regular food source, typically in gullies, close to water and in vegetation with a dense canopy. Forages in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, swamps and street trees, particularly in eucalypts, melaleucas and banksias. Highly mobile with movements largely determined by food availability (Eby and Law 2008). Will also forage in urban gardens and cultivated fruit crops.	Nil. No breeding camps present.	Nil. No breeding camps present.	Nil. No breeding camps present.
Koala	*Phascolarctos cinereus*	V	V	523 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from coast to inland slopes and plains. Restricted to areas of preferred feed trees in eucalypt woodlands and forests. Home range varies depending on habitat quality, from < 2 to several hundred hectares.	Likely. Within 10 km of a record in roadside vegetation. May occur in native woodland vegetation on occasion.	Nil. No native vegetation present.	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V		2 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Generally occurs east of the Great Dividing Range along NSW coast. Inhabits various habitats from open grasslands to woodlands, wet and dry sclerophyll forests and rainforest. Essentially a cave bat but may also roost in road culverts, stormwater tunnels and other man-made structures. Only 4 known maternity caves in NSW, near Wee Jasper, Bungonia, Kempsey and Texas. Females may travel hundreds of kilometres to the nearest maternal colony.	Nil. No breeding caves present.	Nil. No breeding caves present.	Nil. No breeding caves present.
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	3 records within 20 km (OEH 2020a); Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs from the coast to the western slopes of the divide. Largest numbers of records from sandstone escarpment country in the Sydney Basin and Hunter Valley. Roosts in caves and mines and most commonly recorded from dry sclerophyll forests and woodlands. An insectivorous species that flies over the canopy or along creek beds. In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Unlikely. No breeding habitat nearby. Limited native vegetation present.
Rufous Bettong	*Aepyprymnus rufescens*	V		2 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Inhabits a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter. Sleeps during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log. At night feeds on grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects. The original range from Coen in north Queensland to central Victoria has been reduced to a patchy distribution from Cooktown, Queensland, to north-eastern NSW. In NSW it has largely vanished from inland areas, although there are unconfirmed records from the Pilliga and Torrington districts.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Squirrel Glider	*Petaurus norfolcensis*	V		14 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs along the drier inland slopes as well as coastal habitats. Inhabits woodland and open forest with a Eucalyptus, Corymbia or Angophora overstorey and a shrubby understorey of Acacia or Banksia. Key habitat components include reliable winter and early-spring flowering Eucalypts, Banksia or other nectar sources, and hollow-bearing trees for roost and nest sites (van der Ree and Suckling 2008, Quin et al 2004), with social groups moving between multiple hollows. Social groups include one or two adult males and females with offspring, and have home ranges of 5-10 ha within NSW.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.
Curlew Sandpiper	*Calidris ferruginea*	E	CE, C,J,K	May occur within 20 km (DEE 2020a)	Species/Ecosystem	Breeds in northern hemisphere. In Australia generally occupies littoral and estuarine habitats. In NSW mainly found in intertidal mudflats on sheltered coasts. Roosts on beaches, spits or islands on the coast/in wetlands, or in saltmarsh on rocky shores.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	V	V	Likely to occur within 20 km (DEE 2020a)	Species	The Border Thick-tailed Gecko occurs in the New England Tableland, Nandewar and Brigalow Belt South Bioregions in northern NSW and in south-east Queensland. The Border Thick-tailed Gecko is a nocturnal species that shelters by day and is most commonly found in undisturbed habitat remnants on rocky outcrops and stony hills within eucalypt and cypress-pine open forest or woodland between 500-1100 m elevation.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).

Common name	Scientific name	BC Act Status	EPBC Act Status	Source	Credit type (BC Act)	Habitat association	Segment 1 – Narromine multi-function compound	Segment 2 – Curban multi-function compound	Segment 3 – Narrabri multi-function compound
Pale-headed Snake	*Hoplocephalus bitorquatus*	V		8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs north from Tuggerah along the coast and to the western side of the Great Divide, historically recorded as far west as Mungindi and Quambone. Inhabits dry eucalypt forests and woodlands, cypress woodland and occasionally in rainforest or moist eucalypt forest. West of the Great Dividing Range in NSW the species, has been recently recorded in sites dominated by Narrow-leaved Ironbark, Black Box and Silver-leaf Ironbark woodland and Coolabah (Fitzgerald et al 2010). In near-coastal areas has been recorded in Broad-leaved Ironbark, Spotted Gum, Forest Red Gum and Grey Gum forests (Fitzgerald et al 2010). Favours streamside areas, particularly in drier habitats. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. No connectivity to riparian habitat.
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Populations occur in the Queanbeyan/Canberra district, Cooma, Yass, Bathurst, Albury and West Wyalong areas. Inhabits grassland and open woodland with substantial embedded rock cover in sunny situations. Recorded in both native and non-native grasslands. Usually recorded under small rocks (150-600 millimetres basal area) shallowly embedded in the soil (2-5 centimetres and use ant burrows under these rocks.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.
Striped Legless Lizard	*Delma impar*	V	V	Known to occur within 20 km (DEE 2020a)	Species	Occurs in the Southern Tablelands, South-west Slopes and possibly the Riverina. Found in natural or secondary grassland or open areas in grassy eucalypt woodland. May occur in modified grasslands with high exotic grass cover. Shelters in base of grass tussocks, under rocks or logs or in soil cracks.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.

Table C5 Likelihood of occurrence of threatened species at Borrow Pits

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Sloane's Froglet	Recorded as a potential candidate species within the BAM-C	Species	Typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. Majority of records are from the Riverina.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.	Low. Recent research has found no evidence of the species in the northern portion of the range, and previous records are likely to be misidentifications.
Australian Bustard	Recorded as a potential candidate species within the BAM-C	Species	Occurs in inland Australia. In NSW mainly found in the north-west corner, less often in the lower western and central west plains regions, with occasional vagrants east to the western slopes and riverine plain. Breeding confined to the north-west region. Mainly inhabits tussock and hummock grasslands, also occurs in low shrublands and low open grassy woodlands. Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and shrubland cover. Travels long distances, presumably in response to habitat and climatic conditions.	Unlikely. On eastern edge of distribution, no recent records. Site predominantly cropped. Not observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. No observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. Site predominantly cropped. Not observed during surveys.	Unlikely. On eastern edge of distribution, no recent records. No observed during surveys.
Barking Owl	333 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/E cosystem	Occurs from coast to inland slopes and plains, though is rare in dense, wet forests east of the Great Dividing Range and sparse in higher parts of the tablelands and in the arid zone. Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (eg in Acacia and Casuarina), or dense eucalypt canopy. Nests in hollows of large, old eucalypts including *Eucalyptus camaldulensis, Eucalyptus albens, Eucalyptus polyanthemos* and *Eucalyptus blakelyi*. Birds and mammals important prey during breeding. Territories range from 30 to 200 ha.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Black-breasted Buzzard	Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Sparsely distributed in areas of less than 500mm rainfall, north from north-western NSW. Inhabits a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Breeds from August to October near water in a tall tree.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.
Bush Stone-curlew	11 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Scattered distribution across NSW. Inhabits lowland grassy woodland and open forest and, in coastal areas, Casuarina and Melaleuca woodlands, saltmarsh and mangroves. Requires a low, sparse groundcover, some fallen timber and leaf litter, and a general lack of a shrubby understory (DEC 2006).	Unlikely. Limited woodland habitat present. Not observed during surveys. No local records.	Unlikely. Limited woodland habitat present. Not observed during surveys. No local records.	Unlikely. Limited woodland habitat present. Not observed during surveys. No local records.	Possible. Limited woodland habitat present. Not observed during surveys. Located within 10 km of a recent record and could occur on occasion.
Curlew Sandpiper	May occur within 20 km (DEE 2020a)	Species/Ecosystem	Breeds in northern hemisphere. In Australia generally occupies littoral and estuarine habitats. In NSW mainly found in intertidal mudflats on sheltered coasts. Roosts on beaches, spits or islands on the coast/in wetlands, or in saltmarsh on rocky shores.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
Curlew Sandpiper	May occur within 20 km (DEE 2020a)	Species/Ecosystem	Breeds in northern hemisphere. In Australia generally occupies littoral and estuarine habitats. In NSW mainly found in intertidal mudflats on sheltered coasts. Roosts on beaches, spits or islands on the coast/in wetlands, or in saltmarsh on rocky shores.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
Eastern Curlew	May occur within 20 km (DEE 2020a)	Species/Ecosystem	Within Australia, the species has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. It is most commonly associated with sheltered coasts, and all internationally important sites for this species in Australia are on the coast. The birds are also found in saltworks and sewage farms. Breeds in Russia and north-eastern China.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Glossy Black-Cockatoo	107 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Widespread but uncommon from coast to southern tablelands and central western plains. Feeds almost exclusively on the seeds of Allocasuarina species. Prefers woodland and open forests, rarely away from Allocasuarina. Roost in leafy canopy trees, preferably eucalypts, usually <1 km from feeding site. Nests in large (approx. 20 centimetres) hollows in trees, stumps or limbs, usually in Eucalypts (Higgins 1999).	Unlikely. Not recorded in the Narromine areas during surveys. No foraging habitat present. Unlikely to breed on site given lack of foraging habitat and distance from water.	Unlikely. Not recorded in the Narromine areas during surveys. No foraging habitat present. Unlikely to breed on site given lack of foraging habitat and distance from water.	Unlikely. Not recorded in the Narromine areas during surveys. No foraging habitat present. Unlikely to breed on site given lack of foraging habitat and distance from water.	Unlikely. Site mostly cleared. Limited foraging habitat present. Unlikely to nest on site.
Little Eagle	18 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Unlikely. Limited native vegetation. No nest trees observed.	Unlikely. Limited native vegetation. No nest trees observed.	Unlikely. Limited native vegetation. No nest trees observed.	Unlikely. Limited native vegetation. No nest trees observed.
Major Mitchell's Cockatoo	Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs in arid and semi-arid NSW, regularly as far east as Bourke and Griffith and occasionally further east as vagrants. Occupies habitat in arid semi-desert scrublands, savannahs and sparse woodlands, where there is fresh surface water and large hollow trees for nesting. These birds have been recorded in forest, woodland and shrub land, including mulga, mallee, Acacia, Eucalyptus and Callitris associations. It has also been recorded in cropping areas throughout its range. Large areas of suitable habitat are required for a viable population to exist.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Masked Owl	4 records within 20 km, last recorded 2006 (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 metres. Roosts and breeds in large (>40 cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.
Powerful Owl	Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from the coast to the western slopes. Solitary and sedentary species. Inhabits a range of habitats from woodland and open sclerophyll forest to tall open wet forest and rainforest. Prefers large tracts of vegetation. Nests in large tree hollows (> 0.5 m deep), in large eucalypts (dbh 80-240 centimetres) that are at least 150 years old. Pairs have high fidelity to a small number of hollow-bearing nest trees and defend a large home range of 400 - 1,450 ha. Forages within open and closed woodlands as well as open areas.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.	Nil. Outside usual range. No suitable breeding habitat (hollow-bearing trees along drainage lines) present.
Red Goshawk	Likely to occur within 20 km (DEE 2020a)	Species	Very rare in NSW, generally confined to the Northern Rivers bioregion with most records in the Clarence River catchment with few around the lower Richmond and Tweed Rivers. Inhabit open woodland and forest, preferring mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Preferred habitats include a mosaic of vegetation types, a large population of birds (prey) and permanent water. Adults have large home ranges (up to 120 km^2 in NT), and in NSW appear to move from nesting areas in the ranges to coastal areas to coastal plains. Generally breed in tall trees within 1 km of a river or wetland.	Nil. Outside usual range (not recorded in IBRA subregion).	Nil. Outside usual range (not recorded in IBRA subregion).	Nil. Outside usual range (not recorded in IBRA subregion).	Nil. Outside usual range (not recorded in IBRA subregion).

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Regent Honeyeater	1 record within 20 km, last recorded 2003 (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/E cosystem	In NSW confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. Inhabits dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
Square-tailed Kite	8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/E cosystem	Occurs across NSW, resident in North, northeast and along west-flowing rivers. Summer breeding migrant to southeast of state. Inhabits a variety of habitats including woodlands and open forests, with preference for timbered watercourses. Favours productive forests on the coastal plain, box-ironbark-gum woodlands on the inland slopes, and Coolibah/River Red Gum on the inland plains. In Sydney area nests in mature living trees within 100 m of ephemeral/permanent watercourse. Large home range > 100 km^2.	Unlikely. Limited native vegetation. No nest trees observed.	Unlikely. Limited native vegetation. No nest trees observed.	Unlikely. Limited native vegetation. No nest trees observed.	Unlikely. Limited native vegetation. No nest trees observed.
Squatter Pigeon	May occur within 20 km (DEE 2020a)	Species	Found from north Queensland to the North West Slopes of NSW and extending down to the Liverpool Plains and Dubbo. Today they are very rare in the southern parts of their range. Grassy woodlands and plains, preferring sandy areas and usually close to water.	Low. Outside usual range (not recorded in IBRA subregion).	Low. Outside usual range. Not observed during surveys.	Low. Outside usual range. Not observed during surveys.	Low. Outside usual range (not recorded in IBRA subregion).

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Superb Parrot	49 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs as a single population in the South-west Slopes and Riverina bioregions. Two core breeding areas: between Cowra and Yass – Grenfell, Cootamundra and Coolac in the SW Slopes, and along the Murray, Edward and Murrumbidgee Rivers in the Riverina. Birds breeding in the SW slopes migrate north to the Namoi/Gwydir Rivers for winter. Inhabits Box Gum, Box – Cypress Pine and Boree woodlands and River Red Gum Forest. Nest in hollow trees, in tall riparian River Red Gum communities (Riverina area) or open Box Gum woodland or isolated paddock trees (SW Slopes). Mainly forages in grassy box woodlands, up to 10 km from breeding sites.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.	Nil. Non-breeding vagrant species to the area.
Swift Parrot	1 record within 20 km, last recorded 2000 (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Migratory, travelling to the mainland from March to October. Breeds in Tasmania from September to January. On the mainland, it mostly occurs in the southeast foraging on winter flowering eucalypts and lerps, with records of the species between Adelaide and Brisbane. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. Eucalyptus robusta, Corymbia maculata and C. gummifera dominated coastal forests are also important habitat.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.	Nil. No important habitat present.
White-bellied Sea-Eagle	5 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Primarily coastal but may extend inland over major river systems. Breeds close to water, mainly in tall open forest/woodland but also in dense forest, rainforest, closed scrub or remnant trees. Usually forages over large expanses of open water, but also over open terrestrial habitats (eg grasslands).	Nil. Not near large waterbody. No nest trees observed.	Nil. Not near large waterbody. No nest trees observed.	Nil. No nest trees observed.	Nil. Not near large waterbody. No nest trees observed.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Brush-tailed Rock-wallaby	38 records within 20 km, last recorded 2005 (OEH 2020a); Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs from the Shoalhaven north to the Queensland border. Now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. Occurs on rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. Diet consists of vegetation in adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present
Eastern Cave Bat	8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs in NE NSW south to Kempsey and west to the Warrumbungles. Inhabits rainforest margins, wet and dry sclerophyll forests through to drier forests and woodlands in semi-arid environments. All records are within close proximity to sandstone or volcanic escarpments. Roosts in overhangs and caves, mines, boulder piles, abandoned Fairy Martin nests and occasionally in buildings, and regularly switches between alternate roost colonies. Forages over a small area, but are capable of flying 500 m over clear paddocks (Churchill 2008, Parnaby et al 2008).	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. No breeding habitat nearby. Limited native vegetation present. Limited connectivity to larger areas of suitable habitat.
Eastern Pygmy-possum	7 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs along the east coast of NSW, and inland to the Pilliga, Dubbo, Parkes and Wagga Wagga. Inhabits range of habitats from coastal heath and woodland though open and closed forests, subalpine heath and rainforest (Tulloch and Dickman 1995). Inhabits rainforest, sclerophyll forests and heath. Banksia spp. and myrtaceous shrubs and trees are favoured food sources and nesting subject sites in drier habitats. Diet mostly pollen and nectar from Banksia spp., Eucalyptus spp., Callistemon spp. and insects (Ward and Turner 2008). Nests in hollows in trees, under the bark of Eucalypts, forks of tea-trees, abandoned bird nests and Xanthorrhoea bases (Ward and Turner 2008, Tulloch and Dickman 2006).	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. Limited connectivity to larger areas of suitable habitat in adjacent state forest.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Greater Glider	May occur within 20 km (DEE 2020a)	Species	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. It prefers taller montane, moist eucalypt forest with relatively old trees and abundant hollows.	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present	Nil. No suitable habitat present
Grey-headed Flying-fox	5 records within 20 km (OEH 2020a); Foraging, feeding or related behaviour may occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Roosts in camps within 20 km of a regular food source, typically in gullies, close to water and in vegetation with a dense canopy. Forages in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, swamps and street trees, particularly in eucalypts, melaleucas and banksias. Highly mobile with movements largely determined by food availability (Eby and Law 2008). Will also forage in urban gardens and cultivated fruit crops.	Nil. No breeding camps present.	Nil. No breeding camps present.	Nil. No breeding camps present.	Nil. No breeding camps present.
Koala	523 records within 20 km (OEH 2020a); Known to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Occurs from coast to inland slopes and plains. Restricted to areas of preferred feed trees in eucalypt woodlands and forests. Home range varies depending on habitat quality, from < 2 to several hundred ha.	Likely. Within 10 km of a record in roadside vegetation near Narromine. May occur in native woodland vegetation on occasion.	Likely. Within 10 km of a record in roadside vegetation near Narromine. May occur in native woodland vegetation on occasion.	Likely. Within 10 km of a record in roadside vegetation near Narromine. May occur in native woodland vegetation on occasion.	Likely. Within 10 km of a record in roadside vegetation. May occur in native woodland vegetation on occasion.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Large Bent-winged Bat	2 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C; Recorded as a predicted species within the BAM-C	Species/Ecosystem	Generally occurs east of the Great Dividing Range along NSW coast (Churchill 2008). Inhabits various habitats from open grasslands to woodlands, wet and dry sclerophyll forests and rainforest. Essentially a cave bat but may also roost in road culverts, stormwater tunnels and other man-made structures. Only four known maternity caves in NSW, near Wee Jasper, Bungonia, Kempsey and Texas. Females may travel hundreds of kilometres to the nearest maternal colony (Churchill 2008).	Nil. No breeding caves present.	Nil. No breeding caves present.	Nil. No breeding caves present.	Nil. No breeding caves present.
Large-eared Pied Bat	3 records within 20 km (OEH 2020a); Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs from the coast to the western slopes of the divide. Largest numbers of records from sandstone escarpment country in the Sydney Basin and Hunter Valley (Hoye and Schulz 2008). Roosts in caves and mines and most commonly recorded from dry sclerophyll forests and woodlands. An insectivorous species that flies over the canopy or along creek beds (Churchill 2008). In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.	Unlikely. No breeding habitat nearby. Limited native vegetation present.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Nil. Outside known range (not known from IBRA subregion). No breeding habitat nearby.	Unlikely. No breeding habitat nearby. Limited native vegetation present.
Rufous Bettong	2 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Inhabits a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter. Sleeps during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log. At night feeds on grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects. The original range from Coen in north Queensland to central Victoria has been reduced to a patchy distribution from Cooktown, Queensland, to north-eastern NSW. In NSW it has largely vanished from inland areas, although there are unconfirmed records from the Pilliga and Torrington districts.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Squirrel Glider	14 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs along the drier inland slopes as well as coastal habitats. Inhabits woodland and open forest with a Eucalyptus, Corymbia or Angophora overstorey and a shrubby understorey of Acacia or Banksia. Key habitat components include reliable winter and early-spring flowering Eucalypts, Banksia or other nectar sources, and hollow-bearing trees for roost and nest sites (van der Ree and Suckling 2008, Quin et al 2004), with social groups moving between multiple hollows. Social groups include one or two adult males and females with offspring, and have home ranges of 5-10 ha within NSW (van der Ree and Suckling 2008, Kavanagh 2004).	Unlikely. Limited native vegetation present. No connectivity to larger areas of suitable habitat.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Possible. Narrow strip of vegetation present. Some connectivity to Jacks Creek State Forest.
Border Thick-tailed Gecko	Likely to occur within 20 km (DEE 2020a)	Species	The Border Thick-tailed Gecko occurs in the New England Tableland, Nandewar and Brigalow Belt South Bioregions in northern NSW and in south-east Queensland. The Border Thick-tailed Gecko is a nocturnal species that shelters by day (NSW OEH 2013p) and is most commonly found in undisturbed habitat remnants on rocky outcrops and stony hills within eucalypt and cypress-pine open forest or woodland between 500-1100 m elevation.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion).
Pale-headed Snake	8 records within 20 km (OEH 2020a); Recorded as a potential candidate species within the BAM-C	Species	Occurs north from Tuggerah along the coast and to the western side of the Great Divide, historically recorded as far west as Mungindi and Quambone. Inhabits dry eucalypt forests and woodlands, cypress woodland and occasionally in rainforest or moist eucalypt forest. West of the Great Dividing Range in NSW the species, has been recently recorded in sites dominated by Narrow-leaved Ironbark, Black Box and Silver-leaf Ironbark woodland and Coolabah (Fitzgerald et al 2010). In near-coastal areas has been recorded in Broad-leaved Ironbark, Spotted Gum, Forest Red Gum and Grey Gum forests (Fitzgerald et al 2010). Favours streamside areas, particularly in drier habitats. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range.	Nil. Outside known range (not known from IBRA subregion).	Unlikely. Limited native vegetation present. No connectivity to riparian habitat.

Common name	Source	Credit type (BC Act)	Habitat association	Segment 4 – Borrow Pit A	Segment 5 – Borrow Pit B	Segment 6 – Borrow Pit C	Segment 7– Borrow Pit D
Pink-tailed Legless Lizard	Likely to occur within 20 km (DEE 2020a); Recorded as a potential candidate species within the BAM-C	Species	Populations occur in the Queanbeyan/Canberra district, Cooma, Yass, Bathurst, Albury and West Wyalong areas. Inhabits grassland and open woodland with substantial embedded rock cover in sunny situations. Recorded in both native and non-native grasslands. Usually recorded under small rocks (150-600 millimetres basal area) shallowly embedded in the soil (2-5 centimetres, and use ant burrows under these rocks.	Possible. Rocky habitat present. Known to occur in the IBRA subregion. Suitable vegetation types present.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion). No surface rock present.	Nil. Outside known range (not known from IBRA subregion). No surface rock present.
Striped Legless Lizard	Known to occur within 20 km (DEE 2020a)	Species	Occurs in the Southern Tablelands, South-west Slopes and possibly the Riverina. Found in natural or secondary grassland or open areas in grassy eucalypt woodland. May occur in modified grasslands with high exotic grass cover. Shelters in base of grass tussocks, under rocks or logs or in soil cracks (Smith and Robertson 1999).	Unlikely. Rocky habitat present. Known to occur in the IBRA subregion. No suitable vegetation types present.	Nil. Outside known range (not known from IBRA subregion).	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.	Nil. Outside known range (not known from IBRA subregion). No rocky habitat present.

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Appendix D Survey effort and timing

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

Table D1 Credit species survey month matrix

Key: Blue fill: approved survey months
Bold black: surveys undertaken in these months

Species	Presence	Survey months					
Ardeotis australis Australian Bustard	No (surveyed)	Jan	Feb	**Mar**	Apr	May	**Jun**
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Burhinus grallarius Bush Stone-curlew	Yes (assumed present)	Jan	Feb	**Mar**	Apr	May	**Jun**
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Hoplocephalus bitorquatus Pale-headed Snake	Yes (surveyed)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	Aug	Sep	Oct	**Nov**	Dec
Lophoictinia isura Square-tailed Kite	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Ninox connivens Barking Owl	Yes (surveyed)	Jan	Feb	Mar	Apr	May	Jun
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Swainsona murrayana Slender Darling Pea	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	Aug	**Sep**	Oct	Nov	Dec
Tyto novaehollandiae Masked Owl	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	**Aug**	Sep	Oct	Nov	Dec
Hieraaetus morphnoides Little Eagle	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	**Aug**	**Sep**	**Oct**	Nov	Dec
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	Jan	Feb	Mar	Apr	May	Jun
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec

Species	Presence	Survey months					
Aepyprymnus rufescens Rufous Bettong	Yes (surveyed)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	Jan	Feb	Mar	Apr	May	Jun
		Jul	Aug	**Sep**	Oct	**Nov**	Dec
Bertya opponens Coolabah Bertya	No (surveyed)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	Aug	**Sep**	**Oct**	**Nov**	Dec
Diuris tricolor Pine Donkey Orchid	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	**Aug**	**Sep**	**Oct**	Nov	Dec
Calyptorhynchus lathami Glossy Black-Cockatoo	Yes (surveyed)	Jan	Feb	**Mar**	Apr	May	**Jun**
		Jul	**Aug**	**Sep**	Oct	Nov	Dec
Cercartetus nanus Eastern Pygmy-possum	Yes (assumed present)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	Aug	Sep	**Oct**	**Nov**	Dec
Lepidium aschersonii Spiny Peppercress	Yes (assumed present)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	Aug	Sep	Oct	**Nov**	Dec
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	Jan	Feb	**Mar**	Apr	May	**Jun**
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Phascolarctos cinereus Koala	Yes (surveyed)	Jan	Feb	**Mar**	Apr	May	**Jun**
		Jul	**Aug**	**Sep**	**Oct**	**Nov**	Dec
Polygala linariifolia Native Milkwort	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	Aug	Sep	**Oct**	**Nov**	Dec

Species	Presence	Survey months					
Pterostylis cobarensis Greenhood Orchid	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	Jan	Feb	Mar	Apr	May	Jun
		Jul	Aug	**Sep**	**Oct**	**Nov**	Dec
Commersonia procumbens	Yes (assumed present)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	Aug	**Sep**	**Oct**	**Nov**	Dec
Tylophora linearis	Yes (assumed present)	Jan	Feb	**Mar**	Apr	May	Jun
		Jul	Aug	Sep	**Oct**	**Nov**	Dec
Lepidium monoplocoides Winged Peppercress	Yes (assumed present)	Jan	Feb	Mar	Apr	May	Jun
		Jul	Aug	Sep	Oct	**Nov**	Dec

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Appendix E Flora survey results

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet									0.2	500													0.1	50					0.1	20	0.1	20	0.1	20			0.1	30			
FG	Acanthaceae		*Brunoniella spp.*																																										
FG	Acanthaceae		*Rostellularia adscendens*	-																							0.1	10																	
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-															0.1	2																									
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																																									
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																									
FG	Aizoaceae		*Trianthema triquetra*																																										
FG	Aizoaceae		*Zaleya galericulata*	Hogweed																																									
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed											0.1	20					0.1	2	0.1	2																			0.1	20	0.1
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																																									
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed	0.1	20	0.1	10											0.1	20																									
FG	Amaranthaceae		*Alternanthera spp.*																																										
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed			0.1	1																																					
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																																										
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																																									
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																															0.1	2									
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																									
FG	Anthericaceae		*Arthropodium minus*	-																																									
FG	Anthericaceae		*Arthropodium spp.*																																										
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																																									
FG	Anthericaceae		*Thysanotus spp.*																																				0.1	1					
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																																									
FG	Anthericaceae		*Tricoryne elatior*																																										
FG	Apiaceae		*Actinotus gibbonsii*																																										
SG	Apiaceae	*	*Apiaceae sp.*																																										
FG	Apiaceae		*Centella asiatica*	Indian Pennywort															0.1	20																									
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																																					0.1	10			
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																																									
FG	Apiaceae		*Eryngium spp.*																																										
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																																									
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																																									
OG	Apocynaceae		*Tylophora linearis*	-																																									
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																																									
FG	Asphodelaceae		*Bulbine semibarbata*																																										
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																																									
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed							0.1	1			0.1	50																							0.2	50			0.1	5	
FG	Asteraceae		*Asteraceae sp.*																																										
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																																									
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																																									
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																																									
FG	Asteraceae		*Brachyscome spp.*																0.1	10																									
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																																									
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy									0.1	5																							0.1	2	0.1	50	0.1	20			
FG	Asteraceae		*Calotis hispidula*	Bogan Flea																																							0.1	1	
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy															0.1	10			3	50	0.1	20	0.1	20	0.1	20									0.1	10	0.1	10	0.1	2	
FG	Asteraceae		*Calotis scapigera*																																										
FG	Asteraceae		*Calotis spp.*																																										
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle																																									
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush																																									
SG	Asteraceae		*Cassinia spp.*																																										
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																			0.1	2																					
FG	Asteraceae		*Centipeda cunninghamii*																																										
FG	Asteraceae		*Centipeda thespidioides*																																										
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																									
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting					0.1	2	0.1	30							0.1	50																									
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																									
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																																									
FG	Asteraceae		*Conyza spp.*																																										
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																									
FG	Asteraceae		*Cotula australis*																																										
FG	Asteraceae		*Cotula spp.*																																										
EX	Asteraceae	*	*Cotula spp.*																																										
FG	Asteraceae		*Eclipta platyglossa*	-																																							0.1	2	

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
FG	Asteraceae		*Euchiton involucratus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																							0.1	20																	
FG	Asteraceae	*	*Gnaphalium spp.*	-																																									
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Hyalosperma spp.*																																										
FG	Asteraceae		*Hyalosperma spp.*																																										
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																																									
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear							0.1	50																							0.1	20			0.2	50					
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions																																									
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																																									
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																																									
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																																									
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Leptorhynchos spp.*																																										
FG	Asteraceae		*Myriocephalus pluriflorus*																																										
SG	Asteraceae		*Olearia pimeleoides*	-																																									
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																																									
SG	Asteraceae		*Ozothamnus diosmifolius*																																										
FG	Asteraceae		*Picris spp.*																																										
FG	Asteraceae		*Podolepis spp.*																																										
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																										
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																																									
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle																																			0.1	1					
EX	Asteraceae	*	*Stuartina meulleri*																																										
FG	Asteraceae		*Stuartina spp.*																																										
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion																																									
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																																									
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed					0.1	1													0.1	2	0.1	5	0.1	2	0.1	20					0.1	10			0.1	20	0.1	10			
FG	Asteraceae		*Vittadinia triloba*																																										
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr			0.1	2																																					
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																																			0.1	20					
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse																			0.1	5															0.1	2					
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																									
FG	Boraginaceae		*Hackelia suaveolens*	-																																									
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																			0.1	1																					
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																																									
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																									
EX	Brassicaceae	*	*Brassica spp.*		0.1	10	0.1	20																																					
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																									
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse	0.1	2					0.1	15																																	
FG	Brassicaceae		*Harmsiodoxa spp.*																																										
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																																									
EX	Brassicaceae	*	*Lepidium africanum*																																										
EX	Brassicaceae	*	*Lepidium bonariense*	-																																									
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress											0.1	20	0.1	2																											
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress																																									
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																																									
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed	0.1	30	0.2	100																					0.1	20															
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																									
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																																									
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear																			0.2	50			0.1	20						2											
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear					0.1	2	0.2	10	0.1	1					0.1	2														3											
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia			0.1	10																																					0.1
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																							0.1	10	
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell																																									
FG	Campanulaceae		*Wahlenbergia gracilenta*																																										
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell			0.1	1	0.1	2													0.1	5	0.1	2	0.1	5	0.1	10													0.1	5	
FG	Campanulaceae		*Wahlenbergia luteola*																																										
FG	Campanulaceae		*Wahlenbergia planiflora*																																										

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species																																									
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell							0.1	10							0.1	30																									
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																																									
SG	Capparaceae		*Capparis mitchelli*	Wild Orange																																									
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																									
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-							0.1	20																																	
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																																									
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																																									
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																										
EX	Caryophyllaceae	*	*Spergularia spp.*																																										
SG	Casuarinaceae		*Allocasuarina diminuta*	-																																									
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak																							15	20															20	4	
SG	Casuarinaceae		*Allocasuarina spp.*																																										
TG	Casuarinaceae		*Casuarina cristata*	Belah																									0.5	1															
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																																									
SG	Celastraceae		*Denhamia cunninghamii*	-																																									
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																										
SG	Chenopodiaceae		*Atriplex leptocarpa*																																										
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																																									
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																																									
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush	0.1	1													0.1	2					0.1	2													0.1	10					
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																																									
SG	Chenopodiaceae		*Chenopodium desertorum*																																										
FG	Chenopodiaceae		*Chenopodium melanocarpum*																																										
EX	Chenopodiaceae	*	*Chenopodium spp.*																																										
FG	Chenopodiaceae		*Chenopodium spp.*																																										
SG	Chenopodiaceae		*Dissocarpus paradoxus*																																										
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																																									
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																																									
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed											0.1	20	0.1	20																					0.1	30					
FG	Chenopodiaceae		*Dysphania spp.*																																										
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush									0.1	1			0.1	10	0.1	10																									
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush	0.1	20	0.1	5									0.1	20	0.1	3	0.1	10	0.1	1			0.1	10	0.1	10									0.1	10	0.1	20			
FG	Chenopodiaceae		*Einadia polygonoides*	-											0.1	20	0.1	50							0.1	10	0.1	10	0.1	20											0.1	5			0.1
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed			0.1	10							0.1	10									0.1	10			2	100					0.1	3					0.1	30			
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush	0.1	20	0.1	5					0.1	50																					0.1	10									
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																																									
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush			0.1	5					0.2	100											0.1	1							0.1	10	0.1	5	0.1	10			0.1	10	0.1	10	
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush															0.1	1																									
SG	Chenopodiaceae		*Maireana spp.*																						0.1	1																			
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																									0.1	10															
SG	Chenopodiaceae		*Salsola australis*	-	0.1	10																	0.1	1					0.1	1															
SG	Chenopodiaceae		*Salsola kali*	-																																									
SG	Chenopodiaceae		*Salsola spp.*																																										
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr	5	300									0.1	5																											0.1	5	
SG	Chenopodiaceae		*Sclerolaena diacantha*																																										
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr	0.1	20																	0.1	1																					
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly	10	600	0.2	20									0.1	50					0.1	1					0.1	5													0.1	20	0.1
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																																									
SG	Chenopodiaceae		*Sclerolaena tricuspis*																																										
FG	Commelinaceae		*Commelina cyanea*	-																									0.1	15															
FG	Commelinaceae		*Commelina spp.*																																										
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed																																							0.1	2	
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed			0.1	80											0.1	20			0.1	5											0.1	3							0.1	20	0.1
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions									0.2	100																															
FG	Crassulaceae		*Crassula colorata*	-																																									
FG	Crassulaceae		*Crassula sieberiana*																																										
FG	Crassulaceae		*Crassula spp.*																																										
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon											0.1	4																													
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine					25	30															10	10	10	10			50	100	10	8	10	4	7	20	5	11	2	14			
GG	Cyperaceae		*Baumea spp.*																																										
GG	Cyperaceae		*Carex appressa*	Tall Sedge																	0.1	15																							
GG	Cyperaceae		*Carex inversa*	-			0.1	5	0.1	50							0.2	50	0.1	30			0.1	20	0.1	50															0.1	2	5	100	0.1

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
GG	Cyperaceae		*Carex spp.*																																										
GG	Cyperaceae		*Cyathochaeta diandra*	-																																									
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge							0.1	10																																	
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																										
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																																									
GG	Cyperaceae		*Cyperus spp.*																0.1	10	0.1	10																							
GG	Cyperaceae		*Eleocharis spp.*																																										
GG	Cyperaceae		*Eleocharis spp.*																																										
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																			0.1	1			0.1	20	
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																																									
GG	Cyperaceae		*Gahnia spp.*																																										
GG	Cyperaceae		*Lepidosperma laterale*	-																																									
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																																									
GG	Cyperaceae		*Schoenus kennyi*	-																																									
GG	Cyperaceae		*Schoenus spp.*																																										
SG	Dilleniaceae		*Hibbertia linearis*	-																																									
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower																																									
SG	Dilleniaceae		*Hibbertia riparia*																																										
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																																									
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																																									
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath																																									
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																																									
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																					0.1	2																			
FG	Euphorbiaceae		*Chamaesyce drummondii*																																										
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed											0.1	10																							0.1	10					
FG	Euphorbiaceae		*Euphorbia spp.*																																										
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																																									
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																																									
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																																									
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																																									
TG	Fabaceae		*Acacia cheelii*	Motherumbah																																									
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																																									
SG	Fabaceae		*Acacia deanei*	Deans Wattle																																									
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																																									
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																	0.2	10							
TG	Fabaceae		*Acacia decurrens*	Black Wattle																																									
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																																									
TG	Fabaceae		*Acacia harpophylla*	Brigalow									20	9			15	20																											
TG	Fabaceae		*Acacia homalophylla*	Yarran																																									
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																																									
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle																																									
SG	Fabaceae		*Acacia montana*	Mallee Wattle																																									
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																																									
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																							0.1	2													0.1	4			
TG	Fabaceae		*Acacia pendula*	Weeping Myall																																									
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																																									
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																																									
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																																									
SG	Fabaceae		*Acacia spp.*																																0.1	1									
SG	Fabaceae		*Acacia spp.*																																										
SG	Fabaceae		*Acacia stenophylla*																																										
SG	Fabaceae		*Acacia subulata*																																										
SG	Fabaceae		*Acacia trineura*																																										
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																																									
SG	Fabaceae		*Bossiaea concolor*																																										
SG	Fabaceae		*Bossiaea spp.*																																										
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																																									
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil							0.1	10							0.1	5																									
OG	Fabaceae		*Desmodium spp.*																																										
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																							0.1	1																	
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																																									
SG	Fabaceae		*Dillwynia sp.*																																										
OG	Fabaceae		*Glycine clandestina*	-																					0.1	10															0.1	10	0.1	2	

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																							0.1	1																	
OG	Fabaceae		*Glycine tabacina*	-															0.1	20															0.1	1									
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																																									
SG	Fabaceae		*Hovea apiculata*	-																																									
EX	Fabaceae	*	*Lotus spp.*																																				0.1	1					
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																									
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic																																									
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																																									
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic	0.1	20									0.1	10	0.1	30					0.1	50					0.1	10									0.1	20			0.1	5	0.1
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																																									
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																									
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant	0.1	50	0.1	10															0.1	20																			0.1	2	
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea sp.*																																										
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																																									
FG	Fabaceae		*Senna barclayana*	Smooth Senna			0.1	1													0.1	20																							
SG	Fabaceae		*Senna sp.*																																										
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea															0.1	2																									
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																									
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover							0.1	20																											0.1	3					
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																																									
EX	Fabaceae	*	*Trifolium sp.*																																										
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																																									
EX	Fabaceae	*	*Vicia spp.*																		0.1	20																							
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																										
SG	Fabaceae (Faboideae)		*Cullen tenax*																																										
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																										
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																										
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																										
EX	Gentianaceae	*	*Centaurium erythraea*																																										
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																																									
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill																																			0.1	50					
FG	Goodeniaceae		*Brunonia australis*																																										
FG	Goodeniaceae		*Dampiera adpressa*																																										
FG	Goodeniaceae		*Goodenia cycloptera*	-																																			0.1	20					
FG	Goodeniaceae		*Goodenia fasicularis*	-																																									
FG	Goodeniaceae		*Goodenia glabra*																																										
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																																									
FG	Goodeniaceae		*Goodenia rotundifolia*	-																																									
FG	Haloragaceae		*Gonocarpus elatus*																																										
GG	Juncaceae		*Juncus continuus*	-																																									
GG	Juncaceae		*Juncus spp.*																																										
GG	Juncaceae		*Juncus subsecundus*	-							0.1	7			0.1	5			1	60																							0.1	10	0.1
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																																									
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																	0.1	1							0.1	1															
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower									0.1	1																															
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed																																									
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																																									
FG	Lamiaceae		*Teucrium betchei*	-																									0.1	1															
SG	Lamiaceae		*Westringia cheelii*	-																																									
SG	Lamiaceae		*Westringia spp.*																																										
OG	Lauraaceae		*Cassytha melantha*																																										
OG	Lauraaceae		*Cassytha pubescens*	-																																									
FG	Linaceae		*Linum marginale*																																										
FG	Lobeliaceae		*Lobelia concolor*																																										
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush					0.1	1																							0.1	10			0.1	10							
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																	0.1	5			0.1	2			
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush																																									
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																																									
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush					0.1	20									0.5	15																									
GG	Lomandraceae		*Lomandra spp.*																																										
OG	Loranthaceae		*Amyema miquelii*	-																																									

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
OG	Loranthaceae		*Amyema quandang*	-																																									
OG	Loranthaceae		*Amyema spp.*																																										
FG	Lythraceae		*Lythrum hyssopifolia*																																										
SG	Malvaceae		*Abutilon otocarpum*																																										
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush																																									
SG	Malvaceae		*Abutilon spp.*																																										
TG	Malvaceae		*Brachychiton populneus*	Kurrajong															0.1	1											0.1	1									0.2	3				
SG	Malvaceae		*Commersonia procumbens*																																										
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow																			0.1	20											0.1	1									
EX	Malvaceae	*	*Malva spp.*				0.1	20																																					
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow	0.1	20																																							
FG	Malvaceae		*Sida corrugata*	Corrugated Sida	0.1	5							0.1	5									0.1	10	0.1	2			0.1	20					0.1	5							0.1	10	0.1
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida			0.1	10					0.1	15					0.1	10															0.1	5									
FG	Malvaceae		*Sida hackettiana*	Golden Rod																							0.1	20	0.1	10													0.1	20	
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne	0.1	1	0.2	80											0.1	10	0.1	20																							
EX	Malvaceae	*	*Sida spinosa*	-																																									
EX	Malvaceae	*	*Sida spp.*																																										
FG	Malvaceae		*Sida trichopoda*																																										
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																																							0.1	3	0.1
TG	Meliaceae		*Melia azedarach*	White Cedar															0.1	5																									
SG	Myrtaceae		*Acacia sp*																																										
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple															10	2																									
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																									
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle																																									
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood																																									
SG	Myrtaceae		*Darwinia spp.*																																										
TG	Myrtaceae		*Eucalyptus albens*	White Box																																									
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum															35	18																									
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum			40	2													15	5																							
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum					25	40																					5	4									0.5	2			
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																																									
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																																									
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark																																									
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																																									
TG	Myrtaceae		*Eucalyptus dwyeri*	-																																									
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark																																									
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																																									
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																																					1	2			
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																									20	3															
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box									7	1													20	2	5	2			10	1			2	3			2	1	1	1	
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box																					15	4									10	12	2	1	0.2	1	0.1	1			
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box									5	1																															
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark																													5	1											
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																																									
SG	Myrtaceae		*Harmogia densifolia*	-																																									
SG	Myrtaceae		*Homoranthus flavescens*	-																																									
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																																									
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																									
SG	Myrtaceae		*Leptospermum spp.*																																										
SG	Myrtaceae		*Melaleuca erubescens*	-																																									
SG	Myrtaceae		*Melaleuca erubescens*																																										
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																																									
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle																																									
SG	Myrtaceae		*Micromyrtus sessilis*	-																																									
SG	Myrtaceae		*Micromyrtus spp.*																																										
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine	0.4	200	0.1	10													0.1	50	0.1	50	0.1	30	0.1	50	0.1	50									0.1	20			0.1	2	
FG	Nyctaginaceae		*Boerhavia dominii*																																										
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																																									
OG	Oleaceae		*Jasminum spp.*																0.1	2																									
TG	Oleaceae		*Notelaea microcarpa*																																										
TG	Oleaceae		*Notelaea spp.*						0.1	1																																			

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
EX	Onagraceae	*	*Oenothera mollissima*	-							0.1	20																																	
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid					0.1	1																																			
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																									
FG	Orchidaceae		*Orchidaceae spp.*																0.1	1																									
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Oxalidaceae		*Oxalis chnoodes*																																										
EX	Oxalidaceae	*	*Oxalis corniculata*	-							0.1	20																																	
FG	Oxalidaceae		*Oxalis exilis*	-																					0.1	10	0.1	1	0.1	5	0.1	1													
FG	Oxalidaceae		*Oxalis perennans*	-	0.1	1	0.2	30											0.1	30	0.1	10	0.1	20											0.1	2			0.1	10	0.1	10			
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																									
FG	Oxalidaceae		*Oxalis spp.*																																										
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																																									
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily															0.1	1																					0.1	2			
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily									0.1	2																															
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily																																									
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																																									
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																																									
SG	Phyllanthaceae		*Phyllanthus hirtellus*																																										
FG	Phyllanthaceae		*Phyllanthus spp.*																0.1	5															0.1	1									
FG	Phyllanthaceae		*Phyllanthus virgatus*	-					0.1	1																																			
FG	Plantaginaceae		*Plantago gaudichaudii*																																										
EX	Plantaginaceae	*	*Plantago sp.*																																										
FG	Plantaginaceae		*Plantago spp.*																																										
FG	Plantaginaceae		*Plantago turrifera*	-																																									
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																			0.1	10					
GG	Poaceae		*Anthosachne scabra*	Wheatgrass																									0.1	10															
GG	Poaceae		*Aristida acuta*																																										
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																			1	50																					
GG	Poaceae		*Aristida calycina*																																										
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass																																									
GG	Poaceae		*Aristida longicollis*	-																																									
GG	Poaceae		*Aristida muricata*	-																																									
GG	Poaceae		*Aristida personata*	Purple Wire-grass																																									
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass	0.1	50			0.1	10	0.1	20			10	100			10	100			10	1000			0.2	20							0.1	20	0.1	50	0.1	50			1	50	
GG	Poaceae		*Aristida spp.*																																										
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass																																									
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																																									
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																																									
GG	Poaceae		*Austrostipa densiflora*																																										
GG	Poaceae		*Austrostipa falcata*																																										
GG	Poaceae		*Austrostipa nodosa*																																										
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass																																									
GG	Poaceae		*Austrostipa scabra*	Speargrass																									0.2	200	0.1	30	0.1	50	0.1	30			0.2	100	0.2	80			
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																																									
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																																									
GG	Poaceae		*Austrostipa setacea*																																										
GG	Poaceae		*Austrostipa sp.*																																										
GG	Poaceae		*Austrostipa spp.*																																										
GG	Poaceae		*Austrostipa variabilis*																																										
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass															0.1	20					0.5	50			0.2	20			0.1	7					0.1	30	0.1	20			
EX	Poaceae	*	*Avena barbata*	Bearded Oats																			1	100																					
EX	Poaceae	*	*Avena fatua*	Wild Oats																																									
GG	Poaceae		*Bothriochloa decipiens*	Red Grass	0.1	20	0.1	20											1	50																									
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																																										
GG	Poaceae		*Bothriochloa macra*	Red Grass																																									
GG	Poaceae		*Bothriochloa spp.*						0.1	5																																			
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass			0.1	10																																					
GG	Poaceae		*Bromus diandrus*																																										
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																																									
GG	Poaceae		*Bromus spp.*																																										
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed							0.1	5			0.1	5																													
GG	Poaceae		*Chloris divaricata*	Slender Chloris																																									
GG	Poaceae		*Chloris divaricata var. divaricata*																																										

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																	0.1	10																							
GG	Poaceae		*Chloris spp.*																																										
GG	Poaceae		*Chloris truncata*	Windmill Grass											0.1	20							5	500							0.1	10											1	50	
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass																															0.1	10	0.1	10					1	100	
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																																									
GG	Poaceae		*Cymbopogon refractus*																																										
GG	Poaceae		*Cynodon dactylon*	Couch	7	500	0.1	80			65	500			15	200					0.1	50	0.1	10					0.1	30									0.1	20					
GG	Poaceae		*Dactyloctenium radulans*	Button Grass											0.1	20																													
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																			0.1	10																					
GG	Poaceae		*Dichanthium sp.*																																										
GG	Poaceae		*Dichanthium spp.*																																										
GG	Poaceae		*Digitaria ammophila*																																										
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass					0.1	20																													0.1	10	0.1	10			
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																																									
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass							0.1	10																																	
GG	Poaceae		*Digitaria ramularis*																																										
GG	Poaceae		*Digitaria spp.*																0.1	20																									
GG	Poaceae		*Echinochloa spp.*																																										
GG	Poaceae		*Echinopogon spp.*																																				0.1	1					
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																																									
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																																									
GG	Poaceae		*Enneapogon spp.*																																										
GG	Poaceae		*Enteropogon acicularis*	-	0.1	30	0.1	50	0.1	20			0.1	10	0.2	50	0.1	20					5	500	0.1	50	1	50	0.5	200					0.1	50	0.1	20	0.2	100	0.1	50	1	50	0.1
GG	Poaceae		*Eragrostis alveiformis*																																										
GG	Poaceae		*Eragrostis australasica*	-																																									
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass									0.1	20	0.1	3			0.1	2							1	10																	
EX	Poaceae	*	*Eragrostis cilianensis*																																										
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																									
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																																									
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																									
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																									0.1	10	0.1	20	0.1	20	0.1	20			0.1	50					
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass															0.1	10																									
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass							20	50			0.1	5																													
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																									
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																																									
GG	Poaceae		*Eragrostis spp.*																																										
GG	Poaceae		*Eriachne spp.*																																										
GG	Poaceae		*Eriochloa australiensis*	-											0.1	20																													
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																																									
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass																																			0.1	5			0.1	20	
EX	Poaceae	*	*Hordeum spp.*		0.1	50	0.1	30																																					
GG	Poaceae		*Imperata cylindrica*	Blady Grass															1	80																									
GG	Poaceae		*Lachnagrostis spp.*																																										
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass			0.1	10													0.1	20	0.1	20					0.1	15									0.1	20			5	200	0.1
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass																																									
GG	Poaceae		*Microlaena stipoides*																																										
GG	Poaceae		*Panicum decompositum*																																										
GG	Poaceae		*Panicum effusum*	Hairy Panic					0.1	20																					0.1	20	0.1	10			0.1	20			0.2	50			
GG	Poaceae		*Panicum spp.*																																										
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass	0.1	5	3	500					5	200																															
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass											0.1	5					25	100	0.1	20					0.3	100					0.1	20			0.1	20	0.1	20			
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass																																									2
GG	Poaceae		*Paspalidium spp.*																																										
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																																									
GG	Poaceae		*Phragmites australis*	Common Reed																	0.2	30																							
GG	Poaceae		*Poa sieberiana*	-																			0.1	10			0.5	50																	
GG	Poaceae		*Poa spp.*																																										
GG	Poaceae		*Poaceae sp.*																																										
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																									
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																																									
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																																									
GG	Poaceae		*Rytidosperma duttonianum*	-																																									
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass									0.1	1									0.1	20	0.2	100			0.1	50			0.1	20					0.1	10	0.1	20	0.5	30	

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
GG	Poaceae		*Rytidosperma racemosum*	-																															0.1	10									0.1
GG	Poaceae		*Rytidosperma racemosum*																																										
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																																									
GG	Poaceae		*Rytidosperma spp.*																																		0.1	10							
GG	Poaceae		*Rytidosperma spp.*																																										
EX	Poaceae	*	*Setaria parviflora*	-																																									
GG	Poaceae		*Setaria spp.*	A Setaria species																																									
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																																									
GG	Poaceae		*Sporobolus caroli*	Fairy Grass											0.1	2	0.1	10					0.1	20																					
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass															0.1	10																									
GG	Poaceae		*Sporobolus spp.*																																										
GG	Poaceae		*Themeda spp.*																																										
GG	Poaceae		*Themeda triandra*	Kangaroo Grass															0.2	50																									
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass									0.1	5																	0.1	50													
GG	Poaceae		*Tragus australianus*	Small Burrgrass											0.1	3																													
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass	0.1	20	0.1	30															0.1	10																					
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue							0.1	10																																	
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																																									
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass									0.1	20																															
GG	Poaceae spp.		*Poaceae spp.*																																										
SG	Polygonaceae		*Duma florulenta*	Lignum																																									0.2
EX	Polygonaceae	*	*Emex spinosa*	-																																									
EX	Polygonaceae	*	*Emex spp.*																																										
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																																									
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed									0.1	20																															
FG	Polygonaceae		*Rumex brownii*	Swamp Dock			0.1	50											0.1	1	0.1	20	0.1	5																	0.1	1	0.1	10	
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																																									
FG	Portulacaceae		*Calandrinia eremaea*	-																																			0.1	50					
FG	Portulacaceae		*Portulaca oleracea*	Pigweed	0.1	30																			0.1	2	0.1	5	0.1	2															
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli							0.1	1																																	
FG	Portulacaceae		*Portulaca spp.*																																										
FG	Portulacaceae		*Portulaca spp.*																																										
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea																																									
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																	0.1	4							
SG	Proteaceae		*Persoonia sericea*	-																																									
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																																									
EG	Pteridaceae		*Cheilanthes sieberi*	-																											0.1	1	0.1	1					0.1	30					
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																									
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																																									
SG	Rhamnaceae		*Cryptandra spp.*																																										
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																																									
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																	0.1	2																							
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																																									
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																					0.1	2			
SG	Rutaceae		*Boronia occidentalis*	-																																									
SG	Rutaceae		*Geijera parviflora*	Wilga																					10	7	0.5	2							0.2	1	0.1	1	0.5	1	0.2	4			
SG	Rutaceae		*Philotheca brevifolia*	-																																									
SG	Rutaceae		*Philotheca ciliata*	-																																									
SG	Rutaceae		*Philotheca spp.*																																										
SG	Santalaceae		*Exocarpos spp.*																																										
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood																																									
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																															0.1	2									
SG	Sapindaceae		*Dodonaea boronifolia*																																										
SG	Sapindaceae		*Dodonaea hetromorpha*																																										
SG	Sapindaceae		*Dodonaea spp.*																																										
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-									0.1	10													0.1	2							0.1	10	5	30			0.1	10			
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple																					0.1	50			0.1	1															
SG	Scrophulariaceae		*Eremophila deserti*																																										
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																															0.3	10									

GF	Family	Exotic	Scientific name	Common Name	T1-P1		T1-P2		T1-P3		T1-P4		T1-P5		T1-P6		T1-P7		T1-P8		T1-P9		T1-P10		T1-P11		T1-P12		T1-P13		T1-P14		T1-P15		T1-P16		T1-P17		T1-P18		T1-P19		T1-P20		T1-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																															0.5	13									
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda									1	20																							0.3	10							
SG	Scrophulariaceae		*Eremophila spp.*						0.1	1																																			
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																																									
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																																									
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn			0.2	10									0.1	5	0.1	2							0.1	5											0.1	2	0.1	5			0.1
SG	Solanaceae		*Lycium spp.*																																										
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																																									
FG	Solanaceae		*Solanum cleistogamum*																																										
FG	Solanaceae		*Solanum ellipticum*																																										
SG	Solanaceae		*Solanum erianthum*	Potato Tree	0.2	100																																							
FG	Solanaceae		*Solanum esuriale*	Quena																			0.1	20					0.1	1													0.1	10	0.1
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush																											0.1	50	0.1	30	0.1	20			0.1	1	0.1	20			
SG	Solanaceae		*Solanum jucundum*																																										
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																																									
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																																			0.1	1	0.1	5			
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																																									
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																																									
SG	Thymelaeaceae		*Pimelea spp.*																								0.1	2																	
EX	Urticaceae	*	*Urtica urens*	Small Nettle																																									
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest															0.1	20																									
HT	Verbenaceae	*	*Phyla canescens*	-																																									
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia			2	500																																					
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop			0.1	1													0.1	2																	0.1	10					
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																			0.1	5																					
FG	Violaceae		*Hybanthus spp.*																																										
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-																																									
OG	Zamiaceae		*Macrozamia glaucophylla*	-																																									
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																																									
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop																																									

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																																								0.1	20
FG	Acanthaceae		*Brunoniella spp.*																																										
FG	Acanthaceae		*Rostellularia adscendens*	-																																									
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																																									
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																																									
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																									
FG	Aizoaceae		*Trianthema triquetra*																																										
FG	Aizoaceae		*Zaleya galericulata*	Hogweed						0.2	50																																	0.1	10
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed	10					0.1	10			0.1	1	0.1	5			0.1	5																								
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																				0.1	20																				
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed										0.3	50																														
FG	Amaranthaceae		*Alternanthera spp.*															0.2	50																										
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																0.1	5																								
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																																										
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																						0.1	5													0.1	1	0.2	50		
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree								0.2	1																																
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																									
FG	Anthericaceae		*Arthropodium minus*	-																																									
FG	Anthericaceae		*Arthropodium spp.*																																										
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																																									
FG	Anthericaceae		*Thysanotus spp.*																																										
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																																									
FG	Anthericaceae		*Tricoryne elatior*																																										
FG	Apiaceae		*Actinotus gibbonsii*																																										
SG	Apiaceae	*	*Apiaceae sp.*																																										
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																																									
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																																									
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																0.1	1																								
FG	Apiaceae		*Eryngium spp.*																																										
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																																									
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																																									
OG	Apocynaceae		*Tylophora linearis*	-																																									
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																																									
FG	Asphodelaceae		*Bulbine semibarbata*																																										
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																																									
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed		0.1	20			0.1	20							0.1	10													0.5	100											0.1	5
FG	Asteraceae		*Asteraceae sp.*																																										
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																																									
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																																									
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																																									
FG	Asteraceae		*Brachyscome spp.*																																										
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																																									
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy																						0.1	1																		
FG	Asteraceae		*Calotis hispidula*	Bogan Flea														0.2	200																										
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy				0.1	50											0.1	1																							0.1	10
FG	Asteraceae		*Calotis scapigera*																																										
FG	Asteraceae		*Calotis spp.*															0.1	1																										
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle		0.1	50	0.1	50									0.1	10													0.1	1											0.1	5
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush																																									
SG	Asteraceae		*Cassinia spp.*																																										
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																																									
FG	Asteraceae		*Centipeda cunninghamii*																																										
FG	Asteraceae		*Centipeda thespidioides*																																										
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																									
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting																						0.1	1					0.1	2												
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																									
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																																						0.1	1		
FG	Asteraceae		*Conyza spp.*																																										
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																								0.1	1
FG	Asteraceae		*Cotula australis*																																										
FG	Asteraceae		*Cotula spp.*																																										
EX	Asteraceae	*	*Cotula spp.*																																										
FG	Asteraceae		*Eclipta platyglossa*	-																																									

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Asteraceae		*Euchiton involucratus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																																									
FG	Asteraceae	*	*Gnaphalium spp.*	-																																									
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed		0.1	20																																						
FG	Asteraceae		*Hyalosperma spp.*																																										
FG	Asteraceae		*Hyalosperma spp.*															0.8	1000																										
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																																				0.1	10	0.1	10		
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear																												0.1	5												
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions														0.1	50																										
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																																									
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons												0.1	5																												
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																																									
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Leptorhynchos spp.*																													0.1	5												
FG	Asteraceae		*Myriocephalus pluriflorus*																																										
SG	Asteraceae		*Olearia pimeleoides*	-																																									
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																																									
SG	Asteraceae		*Ozothamnus diosmifolius*																																										
FG	Asteraceae		*Picris spp.*													0.1	2																												
FG	Asteraceae		*Podolepis spp.*																																										
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																										
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle								0.1	10																											0.1	1				
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle								0.1	10			0.1	1			0.1	1																			0.1	5				
EX	Asteraceae	*	*Stuartina meulleri*																																										
FG	Asteraceae		*Stuartina spp.*																																										
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion												0.1	1	0.1	2																										
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																																									
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed				0.1	50							0.1	5	0.1	20							0.1	2					0.1	2									0.1	5	0.1	2
FG	Asteraceae		*Vittadinia triloba*																																										
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr										0.1	5																														
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																								0.1	1																
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse						0.1	10	0.1	20																													0.5	200	0.1	5
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																									
FG	Boraginaceae		*Hackelia suaveolens*	-																												0.1	1												
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope		0.1	1	0.1	10																																				
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																																									
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																						0.6	200		
EX	Brassicaceae	*	*Brassica spp.*																																										
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																				0.1	10				
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																																									
FG	Brassicaceae		*Harmsiodoxa spp.*																																										
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																																									
EX	Brassicaceae	*	*Lepidium africanum*																																										
EX	Brassicaceae	*	*Lepidium bonariense*	-																																									
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																																									
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress												0.1	1	0.1	2																										
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress				0.1	20	0.2	60																																		
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed						5	100			0.2	50	0.5	100																											0.1	50
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																									
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket										0.1	10									0.1	1																				
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear																		0.2	30			0.1	1	0.3	100											0.5	30	0.2	20	0.1	2
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear																0.1	2									0.1	1									0.1	1	0.1	1		
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia	1																																								
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																									
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell		0.1	20																																						
FG	Campanulaceae		*Wahlenbergia gracilenta*																																										
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell				0.1	50																																				
FG	Campanulaceae		*Wahlenbergia luteola*																																										
FG	Campanulaceae		*Wahlenbergia planiflora*																																										

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species														0.1	3	0.1	50											0.1	1												
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell																																						0.1	1		
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																		0.1	1																						
SG	Capparaceae		*Capparis mitchelli*	Wild Orange																																									
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																									
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																																									
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																												0.1	1												
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																												0.1	1												
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																										
EX	Caryophyllaceae	*	*Spergularia spp.*																																										
SG	Casuarinaceae		*Allocasuarina diminuta*	-																																									
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak																						0.1	1	0.5	10																
SG	Casuarinaceae		*Allocasuarina spp.*																																										
TG	Casuarinaceae		*Casuarina cristata*	Belah																																									
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																1	2																								
SG	Celastraceae		*Denhamia cunninghamii*	-																																									
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																										
SG	Chenopodiaceae		*Atriplex leptocarpa*																																										
EX	Chenopodiaceae	*	*Atriplex prostrata*	-								0.1	1																																
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-										0.1	20																														
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush																																									
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																																									
SG	Chenopodiaceae		*Chenopodium desertorum*																																										
FG	Chenopodiaceae		*Chenopodium melanocarpum*																																										
EX	Chenopodiaceae	*	*Chenopodium spp.*																																										
FG	Chenopodiaceae		*Chenopodium spp.*																																										
SG	Chenopodiaceae		*Dissocarpus paradoxus*																																										
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																																									
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot						0.1	1																																		
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed		0.1	5	0.1	10	0.1	20																																		
FG	Chenopodiaceae		*Dysphania spp.*																																										
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush																		0.1	1			0.1	60	3	500																
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush						0.1	10			0.2	40	0.1	2	0.1	5			0.1	5					0.2	100	0.1	2	0.1	1							0.1	10	0.1	2	0.1	10
FG	Chenopodiaceae		*Einadia polygonoides*	-	1																																								
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed						0.1	20																																		
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush																		0.2	2																						
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																																									
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush						0.1	10											0.1	10																					0.1	2
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush																										0.1	1														
SG	Chenopodiaceae		*Maireana spp.*																																										
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																																									
SG	Chenopodiaceae		*Salsola australis*	-																																								0.1	1
SG	Chenopodiaceae		*Salsola kali*	-										0.1	10			0.6	300																										
SG	Chenopodiaceae		*Salsola spp.*																																										
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr		0.1	1	0.1	1	0.1	2																																		
SG	Chenopodiaceae		*Sclerolaena diacantha*																																										
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																																									
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly	10					1	20			0.3	20	0.3	15	0.2	5													0.1	1											0.1	2
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																																									
SG	Chenopodiaceae		*Sclerolaena tricuspis*																																										
FG	Commelinaceae		*Commelina cyanea*	-																				0.1	1			0.1	1																
FG	Commelinaceae		*Commelina spp.*																																										
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed		0.1	5											0.1	1																									0.1	1
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed	5																																			0.2	200			0.1	20
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																20	1000	40	1000																						
FG	Crassulaceae		*Crassula colorata*	-																																									
FG	Crassulaceae		*Crassula sieberiana*																																										
FG	Crassulaceae		*Crassula spp.*																																										
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon										0.1	5																	0.1	1							0.1	1				
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine																10	9			3	10	30	100	10	50	10	30									12	4				
GG	Cyperaceae		*Baumea spp.*																																										
GG	Cyperaceae		*Carex appressa*	Tall Sedge																																									
GG	Cyperaceae		*Carex inversa*	-	20																			0.5	100					0.1	10	0.1	2							0.2	100				

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Cyperaceae		*Carex spp.*									0.2	100																																		
GG	Cyperaceae		*Cyathochaeta diandra*	-																																										
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																																										
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																											
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																																										
GG	Cyperaceae		*Cyperus spp.*																	2	200																									
GG	Cyperaceae		*Eleocharis spp.*													0.2	300																													
GG	Cyperaceae		*Eleocharis spp.*													45	1000																													
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																										
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																																										
GG	Cyperaceae		*Gahnia spp.*																																											
GG	Cyperaceae		*Lepidosperma laterale*	-																						0.1	1	0.1	2	0.1	1																
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																																										
GG	Cyperaceae		*Schoenus kennyi*	-																																										
GG	Cyperaceae		*Schoenus spp.*																																											
SG	Dilleniaceae		*Hibbertia linearis*	-																																										
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower																																										
SG	Dilleniaceae		*Hibbertia riparia*																																											
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																																										
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																																										
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath																																										
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																																										
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																																										
FG	Euphorbiaceae		*Chamaesyce drummondii*																																											
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed		0.1	10	0.1	10					0.1	1																															
FG	Euphorbiaceae		*Euphorbia spp.*																			0.1	1																							
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																																										
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																																										
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																																										
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																																										
TG	Fabaceae		*Acacia cheelii*	Motherumbah																																										
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																																										
SG	Fabaceae		*Acacia deanei*	Deans Wattle																								0.1	1																	
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																																										
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																										
TG	Fabaceae		*Acacia decurrens*	Black Wattle																																										
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																																										
TG	Fabaceae		*Acacia harpophylla*	Brigalow																		15	30																							
TG	Fabaceae		*Acacia homalophylla*	Yarran																																										
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																																										
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle																																										
SG	Fabaceae		*Acacia montana*	Mallee Wattle																																										
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																																										
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																																										
TG	Fabaceae		*Acacia pendula*	Weeping Myall																																										
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																																										
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																								2	1																	
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																																										
SG	Fabaceae		*Acacia spp.*																																											
SG	Fabaceae		*Acacia spp.*																	0.2	10																									
SG	Fabaceae		*Acacia stenophylla*																																											
SG	Fabaceae		*Acacia subulata*																																											
SG	Fabaceae		*Acacia trineura*																																											
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																																										
SG	Fabaceae		*Bossiaea concolor*																																											
SG	Fabaceae		*Bossiaea spp.*																							0.1	2																			
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																																										
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																																										
OG	Fabaceae		*Desmodium spp.*																																											
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																						0.1	2	0.1	2			0.1	2													
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																																										
SG	Fabaceae		*Dillwynia sp.*																																											
OG	Fabaceae		*Glycine clandestina*	-																0.2	300					0.1	10			0.1	5									0.1	10					

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																																									
OG	Fabaceae		*Glycine tabacina*	-																0.1	10																			0.1	10	0.1	1		
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																																									
SG	Fabaceae		*Hovea apiculata*	-																																									
EX	Fabaceae	*	*Lotus spp.*																																										
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																									
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic																																									
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																																						0.2	200	0.2	100
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic	5			0.1	10	0.1	10																													0.1	30				
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic										0.2	300	0.2	50	0.1	100													0.1	10												
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																									
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant						0.1	30																																		
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea sp.*																																										
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																																									
FG	Fabaceae		*Senna barclayana*	Smooth Senna																																									
SG	Fabaceae		*Senna sp.*																																										
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																																									
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																									
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover		0.1	20	0.1	20																							0.1	2												
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																																									
EX	Fabaceae	*	*Trifolium sp.*																																										
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																																									
EX	Fabaceae	*	*Vicia spp.*																																										
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																										
SG	Fabaceae (Faboideae)		*Cullen tenax*																																										
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																										
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																										
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																										
EX	Gentianaceae	*	*Centaurium erythraea*																																										
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																																								0.2	200
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill		0.1	10																																						
FG	Goodeniaceae		*Brunonia australis*																																										
FG	Goodeniaceae		*Dampiera adpressa*																																										
FG	Goodeniaceae		*Goodenia cycloptera*	-																																									
FG	Goodeniaceae		*Goodenia fasicularis*	-														0.1	100	0.1	1																								
FG	Goodeniaceae		*Goodenia glabra*																																										
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																																									
FG	Goodeniaceae		*Goodenia rotundifolia*	-																																									
FG	Haloragaceae		*Gonocarpus elatus*																																										
GG	Juncaceae		*Juncus continuus*	-																																									
GG	Juncaceae		*Juncus spp.*																					0.1	1					1	30														
GG	Juncaceae		*Juncus subsecundus*	-	20			0.1	10																																				
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																																									
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound						0.1	10	2	30																																
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																																									
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed												0.1	10																												
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain				0.1	10																																				
FG	Lamiaceae		*Teucrium betchei*	-																																									
SG	Lamiaceae		*Westringia cheelii*	-																																									
SG	Lamiaceae		*Westringia spp.*																																										
OG	Lauraaceae		*Cassytha melantha*																																										
OG	Lauraaceae		*Cassytha pubescens*	-																																									
FG	Linaceae		*Linum marginale*																																										
FG	Lobeliaceae		*Lobelia concolor*																																										
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush																																									
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																									
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush																																									
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																																									
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush																								0.1	1																	
GG	Lomandraceae		*Lomandra spp.*																							0.1	2																		
OG	Loranthaceae		*Amyema miquelii*	-																																									

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Loranthaceae		*Amyema quandang*	-																																									
OG	Loranthaceae		*Amyema spp.*																																										
FG	Lythraceae		*Lythrum hyssopifolia*																																										
SG	Malvaceae		*Abutilon otocarpum*																																										
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush																																									
SG	Malvaceae		*Abutilon spp.*																																										
TG	Malvaceae		*Brachychiton populneus*	Kurrajong																																									
SG	Malvaceae		*Commersonia procumbens*																																										
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow						5	100			0.3	200																														
EX	Malvaceae	*	*Malva spp.*															0.1	1	0.1	2			0.1	1																				
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																																									
FG	Malvaceae		*Sida corrugata*	Corrugated Sida	5	0.1	10			0.1	10																	0.1	2															0.1	1
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida						0.1	10																																	0.1	2
FG	Malvaceae		*Sida hackettiana*	Golden Rod																																									
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne						0.1	1	35	100	0.1	5																														
EX	Malvaceae	*	*Sida spinosa*	-																																									
EX	Malvaceae	*	*Sida spp.*																																										
FG	Malvaceae		*Sida trichopoda*																																										
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo	20											0.1	500							0.1	50																				
TG	Meliaceae		*Melia azedarach*	White Cedar								1	2																																
SG	Myrtaceae		*Acacia sp*																																										
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple																						5	1			7	2														
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																									
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle																																									
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood																																									
SG	Myrtaceae		*Darwinia spp.*																																										
TG	Myrtaceae		*Eucalyptus albens*	White Box																																									
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum																																									
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum										10	4																														
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum																																									
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																				10	5	2	1	1	1	5	7														
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																								1	2																
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark																																									
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-								30	7																											8	1	3	1		
TG	Myrtaceae		*Eucalyptus dwyeri*	-																																									
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark																																									
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																																									
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																																									
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																																									
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box				0.1	3	5	1									3	2	2	1																					3	1
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box				0.1	1	5	1																																		
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																2	2																								
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark																																									
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																																									
SG	Myrtaceae		*Harmogia densifolia*	-																																									
SG	Myrtaceae		*Homoranthus flavescens*	-																																									
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																																									
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																									
SG	Myrtaceae		*Leptospermum spp.*																																										
SG	Myrtaceae		*Melaleuca erubescens*	-																																									
SG	Myrtaceae		*Melaleuca erubescens*																																										
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																																									
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle																																									
SG	Myrtaceae		*Micromyrtus sessilis*	-																																									
SG	Myrtaceae		*Micromyrtus spp.*																																										
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine		0.1	1	0.1	10					0.2	100																	0.1	1							0.1	50	0.3	300	0.2	200
FG	Nyctaginaceae		*Boerhavia dominii*																																										
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																																									
OG	Oleaceae		*Jasminum spp.*																																										
TG	Oleaceae		*Notelaea microcarpa*																																										
TG	Oleaceae		*Notelaea spp.*																																										

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
EX	Onagraceae	*	*Oenothera mollissima*	-																																									
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid																																									
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																									
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Oxalidaceae		*Oxalis chnoodes*																																										
EX	Oxalidaceae	*	*Oxalis corniculata*	-										0.1	3					0.1	2											0.1	1							0.1	5			0.1	2
FG	Oxalidaceae		*Oxalis exilis*	-		0.1	5																																						
FG	Oxalidaceae		*Oxalis perennans*	-																																									
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																									
FG	Oxalidaceae		*Oxalis spp.*																																										
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory								0.2	50																																
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																																									
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily																0.2	2																								
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily																																									
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																0.2	100																								
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																		0.1	50																						
SG	Phyllanthaceae		*Phyllanthus hirtellus*																																										
FG	Phyllanthaceae		*Phyllanthus spp.*																									0.1	10																
FG	Phyllanthaceae		*Phyllanthus virgatus*	-																				0.1	5	0.1	1					0.1	10												
FG	Plantaginaceae		*Plantago gaudichaudii*																																										
EX	Plantaginaceae	*	*Plantago sp.*																																										
FG	Plantaginaceae		*Plantago spp.*																																										
FG	Plantaginaceae		*Plantago turrifera*	-												0.1	10																							0.1	5				
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																									
GG	Poaceae		*Anthosachne scabra*	Wheatgrass						0.1	20																																		
GG	Poaceae		*Aristida acuta*																																										
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																																									
GG	Poaceae		*Aristida calycina*																																										
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass																																									
GG	Poaceae		*Aristida longicollis*	-																																									
GG	Poaceae		*Aristida muricata*	-																																									
GG	Poaceae		*Aristida personata*	Purple Wire-grass																																									
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass		40	200	5	200	0.1	50	0.1	10													0.1	10	28	1000	0.1	10	5	200												
GG	Poaceae		*Aristida spp.*																			0.1	50																						
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass																																				0.1	20	0.2	20		
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																								0.1	1																
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																																									
GG	Poaceae		*Austrostipa densiflora*																																										
GG	Poaceae		*Austrostipa falcata*																																										
GG	Poaceae		*Austrostipa nodosa*																																										
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass								0.1	20																											2	100	40	1000	20	500
GG	Poaceae		*Austrostipa scabra*	Speargrass		0.1	20	1	100																	0.1	5	0.1	10															0.1	5
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																																									
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																																									
GG	Poaceae		*Austrostipa setacea*																																										
GG	Poaceae		*Austrostipa sp.*																																										
GG	Poaceae		*Austrostipa spp.*																																										
GG	Poaceae		*Austrostipa variabilis*																																										
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass						0.5	100																																		
EX	Poaceae	*	*Avena barbata*	Bearded Oats		0.1	5					0.1	10																																
EX	Poaceae	*	*Avena fatua*	Wild Oats																																								0.1	1
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																																									
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																																										
GG	Poaceae		*Bothriochloa macra*	Red Grass														0.1	10	0.5	100											0.1	30												
GG	Poaceae		*Bothriochloa spp.*																																										
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass								0.1	10																																
GG	Poaceae		*Bromus diandrus*																																										
EX	Poaceae	*	*Bromus molliformis*	Soft Brome		0.1	5																																						
GG	Poaceae		*Bromus spp.*																																					0.1	10				
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																												0.1	10												
GG	Poaceae		*Chloris divaricata*	Slender Chloris																																									
GG	Poaceae		*Chloris divaricata var. divaricata*																																										

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																																									
GG	Poaceae		*Chloris spp.*																																										
GG	Poaceae		*Chloris truncata*	Windmill Grass										0.1	5	1	500	3	1000					0.1	5							0.4	100											0.1	10
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass																																									
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																																									
GG	Poaceae		*Cymbopogon refractus*																																										
GG	Poaceae		*Cynodon dactylon*	Couch		0.1	10			5	200			20	1000	0.5	300							0.1	10							0.2	10												
GG	Poaceae		*Dactyloctenium radulans*	Button Grass														0.1	3													0.4	100												
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																																									
GG	Poaceae		*Dichanthium sp.*																																										
GG	Poaceae		*Dichanthium spp.*																																										
GG	Poaceae		*Digitaria ammophila*																																										
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass		1	200	5	200	0.1	20																																		
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass														0.1	1																										
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass		0.1	10	15	500																																				
GG	Poaceae		*Digitaria ramularis*																																										
GG	Poaceae		*Digitaria spp.*																							0.1	1	0.1	1																
GG	Poaceae		*Echinochloa spp.*													0.1	100																												
GG	Poaceae		*Echinopogon spp.*																																										
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																																									
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																																									
GG	Poaceae		*Enneapogon spp.*																																										
GG	Poaceae		*Enteropogon acicularis*	-	50			15	500	1	100																																		
GG	Poaceae		*Eragrostis alveiformis*																																										
GG	Poaceae		*Eragrostis australasica*	-																						0.1	2			0.1	1														
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass																				0.1	50			0.1	1	0.1	50	0.2	50												
EX	Poaceae	*	*Eragrostis cilianensis*																																										
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																									
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																				0.1	10																				
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																									
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass		0.1	20																																						
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																																									
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																																									
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																									
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass												0.1	5																												
GG	Poaceae		*Eragrostis spp.*															0.1	10																										
GG	Poaceae		*Eriachne spp.*																																										
GG	Poaceae		*Eriochloa australiensis*	-												0.1	30	0.3	100																										
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																																									
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass						0.1	20			0.1	10																														
EX	Poaceae	*	*Hordeum spp.*																																										
GG	Poaceae		*Imperata cylindrica*	Blady Grass																																									
GG	Poaceae		*Lachnagrostis spp.*																																										
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass	20					0.1	50	0.2	100																																
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass																																				0.1	20				
GG	Poaceae		*Microlaena stipoides*																																										
GG	Poaceae		*Panicum decompositum*																																										
GG	Poaceae		*Panicum effusum*	Hairy Panic																																									
GG	Poaceae		*Panicum spp.*											0.1	2																														
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																																									
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass						0.1	20	0.1	20																																
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass	50																									0.1	10									8	300				
GG	Poaceae		*Paspalidium spp.*											0.1	1					3	500					0.1	1																		
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum								0.1	20																																
GG	Poaceae		*Phragmites australis*	Common Reed																																									
GG	Poaceae		*Poa sieberiana*	-																																									
GG	Poaceae		*Poa spp.*																																										
GG	Poaceae		*Poaceae sp.*																																										
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																									
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																																									
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																																									
GG	Poaceae		*Rytidosperma duttonianum*	-																																									
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass						0.1	20																																		

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Poaceae		*Rytidosperma racemosum*	-	20			0.5	100																																				
GG	Poaceae		*Rytidosperma racemosum*																																										
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																																									
GG	Poaceae		*Rytidosperma spp.*																							0.1	5																	0.1	1
GG	Poaceae		*Rytidosperma spp.*																																										
EX	Poaceae	*	*Setaria parviflora*	-																																									
GG	Poaceae		*Setaria spp.*	A Setaria species																																									
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																0.2	3																								
GG	Poaceae		*Sporobolus caroli*	Fairy Grass																0.1	2																								
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass																																									
GG	Poaceae		*Sporobolus spp.*																	1	100																								
GG	Poaceae		*Themeda spp.*																																										
GG	Poaceae		*Themeda triandra*	Kangaroo Grass																						0.2	5																		
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass																																									
GG	Poaceae		*Tragus australianus*	Small Burrgrass														2	500																										
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																																									
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																																									
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue								10	500																																
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																																									
GG	Poaceae spp.		*Poaceae spp.*																																										
SG	Polygonaceae		*Duma florulenta*	Lignum	50																																								
EX	Polygonaceae	*	*Emex spinosa*	-																																						0.1	10		
EX	Polygonaceae	*	*Emex spp.*													0.1	1																												
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																				0.1	10																				
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed												0.1	5																												
FG	Polygonaceae		*Rumex brownii*	Swamp Dock						0.1	1	0.1	10																	0.1	1									0.1	1				
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock												0.1	70																												
FG	Portulacaceae		*Calandrinia eremaea*	-																																									
FG	Portulacaceae		*Portulaca oleracea*	Pigweed										0.1	10	0.1	10	0.2	500	0.1	10																							0.1	1
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																																									
FG	Portulacaceae		*Portulaca spp.*																	0.1	2											0.1	2												
FG	Portulacaceae		*Portulaca spp.*															0.1	20																										
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea																																									
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																									
SG	Proteaceae		*Persoonia sericea*	-																																									
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																																									
EG	Pteridaceae		*Cheilanthes sieberi*	-																		0.1	20					0.3	200													0.1	1		
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																									
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																																									
SG	Rhamnaceae		*Cryptandra spp.*																																										
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																						0.1	1																		
EX	Rubiaceae	*	*Galium aparine*	Goosegrass								0.2	50																																
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																																									
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																									
SG	Rutaceae		*Boronia occidentalis*	-																																									
SG	Rutaceae		*Geijera parviflora*	Wilga																0.5	5	20	10																	0.1	1				
SG	Rutaceae		*Philotheca brevifolia*	-																																									
SG	Rutaceae		*Philotheca ciliata*	-																																									
SG	Rutaceae		*Philotheca spp.*																																										
SG	Santalaceae		*Exocarpos spp.*																																										
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood																																									
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																																									
SG	Sapindaceae		*Dodonaea boronifolia*																																										
SG	Sapindaceae		*Dodonaea hetromorpha*																																										
SG	Sapindaceae		*Dodonaea spp.*																																										
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																0.1	1					0.2	1																		
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple																																									
SG	Scrophulariaceae		*Eremophila deserti*																																										
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																																									

GF	Family	Exotic	Scientific name	Common Name	P21	T1-P22		T1-P23		T1-P24		T1-P25		T2-P1		T2-P2		T2-P3		T2-P4		T2-P5		T2-P6		T2-P7		T2-P8		T2-P9		T2-P10		T2-P11		T2-P12		T2-P13		T2-P14		T2-P15		T2-P16	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																																								0.2	4
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda																																								0.5	3
SG	Scrophulariaceae		*Eremophila spp.*																																										
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																								0.1	2	0.1	1														
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum								0.1	1																																
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn	2									0.1	1																														
SG	Solanaceae		*Lycium spp.*																																										
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																																									
FG	Solanaceae		*Solanum cleistogamum*																																										
FG	Solanaceae		*Solanum ellipticum*																																										
SG	Solanaceae		*Solanum erianthum*	Potato Tree																																									
FG	Solanaceae		*Solanum esuriale*	Quena	20	0.1	50							0.1	10																													0.2	100
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush																																									
SG	Solanaceae		*Solanum jucundum*																																										
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																																									
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																																									
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																				0.1	1																				
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																																									
SG	Thymelaeaceae		*Pimelea spp.*																			0.1	1																						
EX	Urticaceae	*	*Urtica urens*	Small Nettle																																						0.1	1		
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest																0.2	100			0.1	10					0.1	3	0.2	50												
HT	Verbenaceae	*	*Phyla canescens*	-										5	1000																														
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																																									
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop						0.1	3			0.1	1																														
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																																									
FG	Violaceae		*Hybanthus spp.*																																										
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-																																									
OG	Zamiaceae		*Macrozamia glaucophylla*	-																																									
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																																									
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop										0.2	20																									0.1	20	0.1	20	0.1	50

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																					0.1	150																			
FG	Acanthaceae		*Brunoniella spp.*																														0.2	100			0.1	1							
FG	Acanthaceae		*Rostellularia adscendens*	-																																									
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																																									
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																					0.1	100													0.1	4	0.1	50			
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																									
FG	Aizoaceae		*Trianthema triquetra*																																										
FG	Aizoaceae		*Zaleya galericulata*	Hogweed	0.3	100	0.2	50			0.1	1																																	
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed			0.1	2					0.1	2	0.1	5							0.1	1							0.1	2			0.1	20	0.1	5					0.1	2	0.1
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																																									
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed																																									
FG	Amaranthaceae		*Alternanthera spp.*																																										
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																																									
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																																										
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																																									
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																																									
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																									
FG	Anthericaceae		*Arthropodium minus*	-																					0.1	3																			
FG	Anthericaceae		*Arthropodium spp.*																																								0.1	1	
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily							0.1	1																							0.1	1									
FG	Anthericaceae		*Thysanotus spp.*																																										
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																			0.1	1																					
FG	Anthericaceae		*Tricoryne elatior*																																										
FG	Apiaceae		*Actinotus gibbonsii*																																										
SG	Apiaceae	*	*Apiaceae sp.*																																										
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																																									
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																																									
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																																									
FG	Apiaceae		*Eryngium spp.*																																						0.1	2			
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																																									
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																																									
OG	Apocynaceae		*Tylophora linearis*	-																																									
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																																									
FG	Asphodelaceae		*Bulbine semibarbata*																																										
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																																									
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed									0.1	10	0.2	100							0.1	20			0.3	1000	0.2	400					0.1	1							0.1	5	
FG	Asteraceae		*Asteraceae sp.*																																										
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks			0.1	3																																					
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																					0.2	150																			
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																																									
FG	Asteraceae		*Brachyscome spp.*																																										
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																																							0.1	2	0.1
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy																					0.1	2			0.1	1			0.1	1											
FG	Asteraceae		*Calotis hispidula*	Bogan Flea									0.1	200	0.3	1000											0.1	1																	
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy			0.1	1																	0.1	100	0.1	100	0.2	30									0.1	2	0.1	2	0.1	2	0.1
FG	Asteraceae		*Calotis scapigera*																																										
FG	Asteraceae		*Calotis spp.*																																										
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle							0.1	1			0.1	1							0.1	1			0.3	300	2	1000															
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush																																									
SG	Asteraceae		*Cassinia spp.*																																										
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																																									
FG	Asteraceae		*Centipeda cunninghamii*																																										
FG	Asteraceae		*Centipeda thespidioides*																																										
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																									
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting																																									
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																									
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																																									
FG	Asteraceae		*Conyza spp.*																																										
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																									
FG	Asteraceae		*Cotula australis*																																										
FG	Asteraceae		*Cotula spp.*																																										
EX	Asteraceae	*	*Cotula spp.*																																										
FG	Asteraceae		*Eclipta platyglossa*	-																																									

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
FG	Asteraceae		*Euchiton involucratus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																																									
FG	Asteraceae	*	*Gnaphalium spp.*	-																															0.1	1									
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Hyalosperma spp.*												0.2	300																													
FG	Asteraceae		*Hyalosperma spp.*																																										
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear									0.1	2	0.2	200			0.1	10																									
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear																			0.1	5					0.1	1	0.1	10													
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions											0.1	100																													
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																																					0.2	20	0.1	2	0.1
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																																									
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy			0.1	1																																					
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Leptorhynchos spp.*																																										
FG	Asteraceae		*Myriocephalus pluriflorus*																																										
SG	Asteraceae		*Olearia pimeleoides*	-																																									
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																																									
SG	Asteraceae		*Ozothamnus diosmifolius*																																										
FG	Asteraceae		*Picris spp.*																																										
FG	Asteraceae		*Podolepis spp.*																																										
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																										
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																																									
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle																			0.1	1			0.1	10													0.1	1	0.1	1	
EX	Asteraceae	*	*Stuartina meulleri*																																										
FG	Asteraceae		*Stuartina spp.*																																										
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion																																									
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																							0.1	10																	
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed			0.1	3																			0.2	300	0.1	40					0.1	20					0.1	30	0.2	100	0.1
FG	Asteraceae		*Vittadinia triloba*																																										
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr																																									
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																							0.1	1																	
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse			0.1	2			0.1	3															0.1	5																	
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																					0.1	2	0.1	2	
FG	Boraginaceae		*Hackelia suaveolens*	-																																									
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																																									
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed			0.1	1																																					
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																									
EX	Brassicaceae	*	*Brassica spp.*																																										
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																									
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																																									
FG	Brassicaceae		*Harmsiodoxa spp.*																																										
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																															0.1	5									
EX	Brassicaceae	*	*Lepidium africanum*																																										
EX	Brassicaceae	*	*Lepidium bonariense*	-									0.1	2	0.1	1																													
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																																									
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress			0.1	5			0.1	3																													0.1	2			0.1
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																																									
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed	1	100	0.1	30			0.1	10																																	
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																							0.1	2	
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																																									
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear																																									
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear																																	0.1	1							
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia																															0.1	4									
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																									
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell							0.1	10	0.1	1											0.1	2			0.1	10			0.1	1							0.1	5			
FG	Campanulaceae		*Wahlenbergia gracilenta*																																										
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell																									0.1	30															
FG	Campanulaceae		*Wahlenbergia luteola*																																										
FG	Campanulaceae		*Wahlenbergia planiflora*																																										

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species																																									
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell			0.1	2																			1	1000	0.2	500											0.1	30	0.1	3	0.1
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																																									
SG	Capparaceae		*Capparis mitchelli*	Wild Orange																																									
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																									
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																																									
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																																									
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																																									
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																										
EX	Caryophyllaceae	*	*Spergularia spp.*																																										
SG	Casuarinaceae		*Allocasuarina diminuta*	-																																									
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak																			2	2							0.1	2			1	1	10	30	10	20					
SG	Casuarinaceae		*Allocasuarina spp.*																																										
TG	Casuarinaceae		*Casuarina cristata*	Belah															0.5	1																									
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																																									
SG	Celastraceae		*Denhamia cunninghamii*	-																																									
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																										
SG	Chenopodiaceae		*Atriplex leptocarpa*																																										
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																																									
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																																									
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush			0.1	3																											0.1	10									
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen	0.1	20																																							
SG	Chenopodiaceae		*Chenopodium desertorum*																																										
FG	Chenopodiaceae		*Chenopodium melanocarpum*																																										
EX	Chenopodiaceae	*	*Chenopodium spp.*																																										
FG	Chenopodiaceae		*Chenopodium spp.*																																										
SG	Chenopodiaceae		*Dissocarpus paradoxus*																																										
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																									0.1	2															
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																																									
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed																																									
FG	Chenopodiaceae		*Dysphania spp.*																																										
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush																																									
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush	0.1	3			0.1	20	0.4	100	0.1	2	0.1	1			0.1	1	0.1	2	0.1	20	0.1	10	0.1	5	0.1	2			0.1	10	0.1	7	0.1	1			0.2	20	0.3	50	0.2
FG	Chenopodiaceae		*Einadia polygonoides*	-																																									
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed																																									
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush																																	0.1	3							
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																																									
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush					0.1	100	0.1	5	0.1	3									0.1	20	0.1	100							0.1	2	0.1	10			0.1	3	0.1	2	0.1	1	
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush									0.1	1											0.1	1									0.1	2					0.1	1			
SG	Chenopodiaceae		*Maireana spp.*																																										
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																																									
SG	Chenopodiaceae		*Salsola australis*	-	0.1	1							0.1	1																					0.1	4									
SG	Chenopodiaceae		*Salsola kali*	-																																									
SG	Chenopodiaceae		*Salsola spp.*																																										
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr									0.2	5	0.1	2																	0.1	1	0.2	15									0.1
SG	Chenopodiaceae		*Sclerolaena diacantha*																																										
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																																			0.1	6					
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly	0.3	20	5	30					0.5	100																					0.1	15					0.2	5	0.1	3	
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																																									
SG	Chenopodiaceae		*Sclerolaena tricuspis*																																										
FG	Commelinaceae		*Commelina cyanea*	-																																									
FG	Commelinaceae		*Commelina spp.*						0.1	3																																			
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed					0.1	1	0.1	2	0.1	1									0.1	2			0.1	200	0.2	100							0.1	1			0.1	10	0.1	2	0.1
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed							0.1	100							0.1	20							0.1	50			0.1	50			0.1	50	0.1	20			0.1	20	0.1	100	0.1
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																																									
FG	Crassulaceae		*Crassula colorata*	-																									0.1	2															
FG	Crassulaceae		*Crassula sieberiana*																																										
FG	Crassulaceae		*Crassula spp.*																																										
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon			0.1	1																																					
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine					1	4	0.2	1					30	70			8	15			0.1	1					0.1	1	6	7			4	10							10
GG	Cyperaceae		*Baumea spp.*																																										
GG	Cyperaceae		*Carex appressa*	Tall Sedge																																									
GG	Cyperaceae		*Carex inversa*	-							0.1	20																			0.3	300	0.1	1							0.1	1			2

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
GG	Cyperaceae		*Carex spp.*																																										
GG	Cyperaceae		*Cyathochaeta diandra*	-																																									
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																																									
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																										
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																																									
GG	Cyperaceae		*Cyperus spp.*												0.1	10																													
GG	Cyperaceae		*Eleocharis spp.*																																										
GG	Cyperaceae		*Eleocharis spp.*																																										
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																									
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																																									
GG	Cyperaceae		*Gahnia spp.*																																										
GG	Cyperaceae		*Lepidosperma laterale*	-																																									
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																							0.1	1																	
GG	Cyperaceae		*Schoenus kennyi*	-																																									
GG	Cyperaceae		*Schoenus spp.*														0.1	2																											
SG	Dilleniaceae		*Hibbertia linearis*	-																																									
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower																																									
SG	Dilleniaceae		*Hibbertia riparia*																																										
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																																									
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																																									
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath																																									
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																																									
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																																									
FG	Euphorbiaceae		*Chamaesyce drummondii*																																										
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed			0.1	2					0.1	1	0.1	1									0.1	1																			0.1
FG	Euphorbiaceae		*Euphorbia spp.*																																										
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																																									
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																																									
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																																									
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																																									
TG	Fabaceae		*Acacia cheelii*	Motherumbah																																									
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																																									
SG	Fabaceae		*Acacia deanei*	Deans Wattle																																			0.2	1					
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																																									
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																									
TG	Fabaceae		*Acacia decurrens*	Black Wattle																																									
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																																									
TG	Fabaceae		*Acacia harpophylla*	Brigalow																																									
TG	Fabaceae		*Acacia homalophylla*	Yarran																															5	9									
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																																									
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle																																									
SG	Fabaceae		*Acacia montana*	Mallee Wattle																																									
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																																									
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																																									
TG	Fabaceae		*Acacia pendula*	Weeping Myall																																									
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																																									
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																																									
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																																									
SG	Fabaceae		*Acacia spp.*																																		0.8	20							
SG	Fabaceae		*Acacia spp.*																																										
SG	Fabaceae		*Acacia stenophylla*																																										
SG	Fabaceae		*Acacia subulata*																																										
SG	Fabaceae		*Acacia trineura*																																										
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																																									
SG	Fabaceae		*Bossiaea concolor*																																										
SG	Fabaceae		*Bossiaea spp.*																																										
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																																									
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																																									
OG	Fabaceae		*Desmodium spp.*																																										
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																																									
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																																									
SG	Fabaceae		*Dillwynia sp.*																																										
OG	Fabaceae		*Glycine clandestina*	-							0.1	5							0.1	5			0.1	2									0.1	2							0.3	50	0.1	2	

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																																									
OG	Fabaceae		*Glycine tabacina*	-																											0.1	2											0.1	30	
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																																									
SG	Fabaceae		*Hovea apiculata*	-																																									
EX	Fabaceae	*	*Lotus spp.*																																										
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																									
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic									0.1	10																															
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic			0.1	10			0.1	20							0.1	10							0.1	100																	
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic									0.2	50	0.1	2													0.1	200											0.1	1	0.1	3	
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																																									
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																									
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant																																									
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea sp.*																																										
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																													0.2	1											
FG	Fabaceae		*Senna barclayana*	Smooth Senna																																									
SG	Fabaceae		*Senna sp.*																																										
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																																									
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																									
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover																							0.1	5	0.1	20															
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																							0.1	2	3	500															
EX	Fabaceae	*	*Trifolium sp.*																																										
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover									0.1	1	0.1	2											0.1	5																	
EX	Fabaceae	*	*Vicia spp.*																																										
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																										
SG	Fabaceae (Faboideae)		*Cullen tenax*																																										
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																										
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																										
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																										
EX	Gentianaceae	*	*Centaurium erythraea*																																										
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																			0.1	1																					
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill																																									
FG	Goodeniaceae		*Brunonia australis*																																										
FG	Goodeniaceae		*Dampiera adpressa*																																										
FG	Goodeniaceae		*Goodenia cycloptera*	-																																									
FG	Goodeniaceae		*Goodenia fasicularis*	-											0.1	50									0.1	20															0.1	5			
FG	Goodeniaceae		*Goodenia glabra*																																										
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																																									
FG	Goodeniaceae		*Goodenia rotundifolia*	-																																									
FG	Haloragaceae		*Gonocarpus elatus*																																										
GG	Juncaceae		*Juncus continuus*	-																																									
GG	Juncaceae		*Juncus spp.*																								0.1	2	0.1	2	0.1	2			0.2	10									0.1
GG	Juncaceae		*Juncus subsecundus*	-																																									
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																																									
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																																					0.3	30	0.2	10	
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																																									
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed																																									
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																																									
FG	Lamiaceae		*Teucrium betchei*	-																																									
SG	Lamiaceae		*Westringia cheelii*	-																																									
SG	Lamiaceae		*Westringia spp.*																																										
OG	Lauraaceae		*Cassytha melantha*																																										
OG	Lauraaceae		*Cassytha pubescens*	-																																									
FG	Linaceae		*Linum marginale*																																										
FG	Lobeliaceae		*Lobelia concolor*																																										
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush																			0.3	50															0.1	2					
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																									
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush																																									
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																																									
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush													0.1	1													0.2	10													
GG	Lomandraceae		*Lomandra spp.*																																										
OG	Loranthaceae		*Amyema miquelii*	-																																									

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
OG	Loranthaceae		*Amyema quandang*	-																																									
OG	Loranthaceae		*Amyema spp.*																																										
FG	Lythraceae		*Lythrum hyssopifolia*																																										
SG	Malvaceae		*Abutilon otocarpum*																																										
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush									0.1	10																															
SG	Malvaceae		*Abutilon spp.*																						0.1	4																			
TG	Malvaceae		*Brachychiton populneus*	Kurrajong							0.2	1							2	1			0.1	3																					
SG	Malvaceae		*Commersonia procumbens*																																										
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow	0.1	10																																							
EX	Malvaceae	*	*Malva spp.*																																										
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																																									
FG	Malvaceae		*Sida corrugata*	Corrugated Sida											0.1	50									0.2	200							0.1	10	0.1	4			0.1	2	0.1	10	0.2	20	0.1
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida	0.1	2	0.1	2																																			0.2	30	
FG	Malvaceae		*Sida hackettiana*	Golden Rod																																									
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne							0.1	1																																	
EX	Malvaceae	*	*Sida spinosa*	-																																									
EX	Malvaceae	*	*Sida spp.*																																										
FG	Malvaceae		*Sida trichopoda*																																										
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																																									
TG	Meliaceae		*Melia azedarach*	White Cedar																																									
SG	Myrtaceae		*Acacia sp*																																										
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple																																									
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																									
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle																																									
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood																																									
SG	Myrtaceae		*Darwinia spp.*																																										
TG	Myrtaceae		*Eucalyptus albens*	White Box																																									
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum																																							12	3	
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum																															3	2									
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum																	0.2	1																							
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																																									
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																			3	1																					5
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark																																									
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																											8	5													
TG	Myrtaceae		*Eucalyptus dwyeri*	-													3	2																											
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark																																									
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark							15	6																																	
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																																					12	2	10	3	
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																																					12	2			
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box																			15	3											1	1			6	2					
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box	2	1			8	3	0.5	1							20	9					25	3					4	6													2
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																																									
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark																																	5	1							
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																																									
SG	Myrtaceae		*Harmogia densifolia*	-																																									
SG	Myrtaceae		*Homoranthus flavescens*	-																																									
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																																									
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																									
SG	Myrtaceae		*Leptospermum spp.*																																										
SG	Myrtaceae		*Melaleuca erubescens*	-																																									
SG	Myrtaceae		*Melaleuca erubescens*																																										
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																																									
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle																																									
SG	Myrtaceae		*Micromyrtus sessilis*	-																																									
SG	Myrtaceae		*Micromyrtus spp.*																																										
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine			0.1	5					0.1	2									0.1	1	0.1	1							0.1	2	0.1	4									
FG	Nyctaginaceae		*Boerhavia dominii*																																										
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																																									
OG	Oleaceae		*Jasminum spp.*																																										
TG	Oleaceae		*Notelaea microcarpa*																																										
TG	Oleaceae		*Notelaea spp.*																																										

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
EX	Onagraceae	*	*Oenothera mollissima*	-																																									
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid																																									
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																									
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Oxalidaceae		*Oxalis chnoodes*																																										
EX	Oxalidaceae	*	*Oxalis corniculata*	-			0.1	2											0.1	1			0.1	1																					
FG	Oxalidaceae		*Oxalis exilis*	-																																									
FG	Oxalidaceae		*Oxalis perennans*	-																											0.1	5			0.1	2					0.1	10			0.1
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																							0.1	2	
FG	Oxalidaceae		*Oxalis spp.*																								0.1	2																	
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																																									
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																																									
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily																																					0.1	2			0.1
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily																																									
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																																									
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																																									
SG	Phyllanthaceae		*Phyllanthus hirtellus*																																										
FG	Phyllanthaceae		*Phyllanthus spp.*																																										
FG	Phyllanthaceae		*Phyllanthus virgatus*	-							0.1	1							0.1	1											0.1	1											0.1	1	
FG	Plantaginaceae		*Plantago gaudichaudii*																																										
EX	Plantaginaceae	*	*Plantago sp.*																																										
FG	Plantaginaceae		*Plantago spp.*																																										
FG	Plantaginaceae		*Plantago turrifera*	-									0.1	10																															
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																									
GG	Poaceae		*Anthosachne scabra*	Wheatgrass			0.1	1																									0.1	1							0.1	10			
GG	Poaceae		*Aristida acuta*																																										
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																					0.2	100	0.1	10																	
GG	Poaceae		*Aristida calycina*																																										
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass																											60	1000	0.1	20	0.3	200									
GG	Poaceae		*Aristida longicollis*	-							1	200																																	
GG	Poaceae		*Aristida muricata*	-									0.1	10	5	200							0.5	30																					
GG	Poaceae		*Aristida personata*	Purple Wire-grass																							0.3	20	0.1	20															
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass			0.1	10											0.1	10	0.2	40			0.1	10																			
GG	Poaceae		*Aristida spp.*																																										
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass													0.1	50																											
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																																									
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass			0.1	3																																	2	100			
GG	Poaceae		*Austrostipa densiflora*																																										
GG	Poaceae		*Austrostipa falcata*																																										
GG	Poaceae		*Austrostipa nodosa*																																										
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass	0.5	50			1	100									0.1	3	0.1	1					0.1	1																	
GG	Poaceae		*Austrostipa scabra*	Speargrass							0.1	5	0.1	10	0.1	20					0.1	10	0.1	20	0.1	20							0.1	10					0.1	50	0.1	30			0.1
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																																									
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																																									
GG	Poaceae		*Austrostipa setacea*																																										
GG	Poaceae		*Austrostipa sp.*																																										
GG	Poaceae		*Austrostipa spp.*																																		0.1	1							
GG	Poaceae		*Austrostipa variabilis*																																										
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass							8	500											0.3	50	0.1	10					0.1	20	0.1	2	0.8	200	0.1	10	0.1	5	0.5	100	0.2	50	0.1
EX	Poaceae	*	*Avena barbata*	Bearded Oats																																									
EX	Poaceae	*	*Avena fatua*	Wild Oats							0.1	2															0.5	1000	0.2	100															
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																																									
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																																										
GG	Poaceae		*Bothriochloa macra*	Red Grass							0.1	1															0.1	10			0.3	300									0.2	50			
GG	Poaceae		*Bothriochloa spp.*																																										
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass																																									
GG	Poaceae		*Bromus diandrus*																																										
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																							0.1	5	0.1	1															
GG	Poaceae		*Bromus spp.*																																								0.1	20	
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																																									
GG	Poaceae		*Chloris divaricata*	Slender Chloris									0.2	100									0.5	100	0.3	200					0.2	50													
GG	Poaceae		*Chloris divaricata var. divaricata*																																										

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																																									
GG	Poaceae		*Chloris spp.*																																										
GG	Poaceae		*Chloris truncata*	Windmill Grass	0.2	50	5	400	1	100	0.2	50	0.5	200	1	100			0.2	100							0.4	300					2	500	0.4	200					0.1	3	5	300	8
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass			0.3	100			0.1	20																					0.2	100	0.5	200					0.2	15	0.2	50	
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																																									
GG	Poaceae		*Cymbopogon refractus*																																										
GG	Poaceae		*Cynodon dactylon*	Couch	0.1	2									0.1	10															0.2	100			0.2	100					0.3	100			
GG	Poaceae		*Dactyloctenium radulans*	Button Grass											0.2	100																													
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																																									
GG	Poaceae		*Dichanthium sp.*																																										
GG	Poaceae		*Dichanthium spp.*																																										
GG	Poaceae		*Digitaria ammophila*																																										
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass															0.5	100					0.1	1	0.1	20	0.2	500															
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																																									
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass																																									
GG	Poaceae		*Digitaria ramularis*																																										
GG	Poaceae		*Digitaria spp.*																																										
GG	Poaceae		*Echinochloa spp.*																																										
GG	Poaceae		*Echinopogon spp.*																																										
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																									0.1	2															
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																																									
GG	Poaceae		*Enneapogon spp.*																																										
GG	Poaceae		*Enteropogon acicularis*	-					0.1	5	0.2	50																	0.1	5							1	200	0.2	50					
GG	Poaceae		*Eragrostis alveiformis*																																										
GG	Poaceae		*Eragrostis australasica*	-																																									
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass																																									
EX	Poaceae	*	*Eragrostis cilianensis*																																										
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																									
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																																									
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																									
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																			0.1	2	0.1	2							0.1	100											
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																																									
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																																									
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																									
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																																									
GG	Poaceae		*Eragrostis spp.*														0.1	1			0.1	50																							0.1
GG	Poaceae		*Eriachne spp.*																																										
GG	Poaceae		*Eriochloa australiensis*	-																																									
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																																									
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass	0.1	50							0.2	100									0.1	2					0.1	10													0.1	10	0.1
EX	Poaceae	*	*Hordeum spp.*																																										
GG	Poaceae		*Imperata cylindrica*	Blady Grass																																									
GG	Poaceae		*Lachnagrostis spp.*																																										
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass																																									
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass			0.1	5			0.1	20	0.1	100									0.1	50	0.1	5	0.3	1000	0.2	300											0.1	100	0.1	50	
GG	Poaceae		*Microlaena stipoides*																																										
GG	Poaceae		*Panicum decompositum*																																										
GG	Poaceae		*Panicum effusum*	Hairy Panic																																									
GG	Poaceae		*Panicum spp.*																																										
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																																									
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass							0.1	30	0.1	3	0.1	1							0.5	50	0.1	10									0.1	20					0.1	20	0.2	100	0.2
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass	0.1	5	0.1	10			0.1	3																																	
GG	Poaceae		*Paspalidium spp.*																																										
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																																					0.1	1	0.1	1	
GG	Poaceae		*Phragmites australis*	Common Reed																																									
GG	Poaceae		*Poa sieberiana*	-																																									
GG	Poaceae		*Poa spp.*																																										
GG	Poaceae		*Poaceae sp.*																																										
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																									
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass							5	500																																	
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass													0.1	1			0.1	5																							
GG	Poaceae		*Rytidosperma duttonianum*	-									0.2	100	0.1	20																													
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass																																									

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
GG	Poaceae		*Rytidosperma racemosum*	-																					0.2	200																			
GG	Poaceae		*Rytidosperma racemosum*																																										
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																							0.1	10			0.1	10	0.1	10			0.1	10			0.2	30	0.1	20	0.2
GG	Poaceae		*Rytidosperma spp.*																										0.1	20															
GG	Poaceae		*Rytidosperma spp.*																																										
EX	Poaceae	*	*Setaria parviflora*	-	0.1	3			1	20	0.1	10																																	
GG	Poaceae		*Setaria spp.*	A Setaria species																																							0.1	1	
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																																									
GG	Poaceae		*Sporobolus caroli*	Fairy Grass									0.1	10																															
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass																																									
GG	Poaceae		*Sporobolus spp.*																																										
GG	Poaceae		*Themeda spp.*																																										
GG	Poaceae		*Themeda triandra*	Kangaroo Grass																																									
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass													1	200	0.1	5	0.1	50																							
GG	Poaceae		*Tragus australianus*	Small Burrgrass					0.1	2																	0.1	10																	
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																																									
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																									0.1	50															
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																																									
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																																									
GG	Poaceae spp.		*Poaceae spp.*																																										
SG	Polygonaceae		*Duma florulenta*	Lignum																																									
EX	Polygonaceae	*	*Emex spinosa*	-																																									
EX	Polygonaceae	*	*Emex spp.*																																										
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																																									
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed																							0.1	3	0.1	20															
FG	Polygonaceae		*Rumex brownii*	Swamp Dock																			0.1	1											0.1	1							0.1	1	
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																																									
FG	Portulacaceae		*Calandrinia eremaea*	-																																									
FG	Portulacaceae		*Portulaca oleracea*	Pigweed			0.1	2					0.1	2																					0.1	1									
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																																									
FG	Portulacaceae		*Portulaca spp.*																																										
FG	Portulacaceae		*Portulaca spp.*																																										
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea																																									
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																									
SG	Proteaceae		*Persoonia sericea*	-																																									
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																																									
EG	Pteridaceae		*Cheilanthes sieberi*	-													0.1	5			0.1	50	0.1	5	0.1	20			0.1	2			0.2	200											
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																			5	80					
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																																									
SG	Rhamnaceae		*Cryptandra spp.*																																										
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																																									
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																			0.1	20																					
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																					0.1	2									0.1	2					0.1	30			
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																									
SG	Rutaceae		*Boronia occidentalis*	-																																									
SG	Rutaceae		*Geijera parviflora*	Wilga					5	3													6	5	10	20							0.3	4					2	3	1	1			0.1
SG	Rutaceae		*Philotheca brevifolia*	-																																									
SG	Rutaceae		*Philotheca ciliata*	-																																									
SG	Rutaceae		*Philotheca spp.*																																										
SG	Santalaceae		*Exocarpos spp.*																																										
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood	3	1							1	1																															
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																																									
SG	Sapindaceae		*Dodonaea boronifolia*																																										
SG	Sapindaceae		*Dodonaea hetromorpha*																																										
SG	Sapindaceae		*Dodonaea spp.*																																										
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																													0.1	1			1	70	8	20					
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple																													0.1	1							0.3	30	1	70	0.1
SG	Scrophulariaceae		*Eremophila deserti*																																										
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush															0.2	2																									

GF	Family	Exotic	Scientific name	Common Name	T2-P17		T2-P18		T2-P19		T2-P20		T2-P21		T2-P22		T2-P23		T2-P24		T2-P25		T2-P26		T2-P27		T2-P28		T2-P29		T2-P30		T2-P31		T2-P32		T2-P33		T2-P34		T2-P35		T2-P36		T2-
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan					0.1	1																																			
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda															1	3																			0.3	1					
SG	Scrophulariaceae		*Eremophila spp.*																																										
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																																									
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																																									
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn									0.1	1					0.5	1			0.3	2	0.2	1															0.3	5	0.2	7	
SG	Solanaceae		*Lycium spp.*																																										
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																																									
FG	Solanaceae		*Solanum cleistogamum*																																										
FG	Solanaceae		*Solanum ellipticum*																																										
SG	Solanaceae		*Solanum erianthum*	Potato Tree																																									
FG	Solanaceae		*Solanum esuriale*	Quena	0.1	2	0.1	30					0.3	200					0.1	20													0.1	10							0.1	100			
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush													0.1	4	0.1	2	0.1	10	0.1	15	0.1	10											0.1	5	0.1	5					
SG	Solanaceae		*Solanum jucundum*																																										
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																			0.1	5																					
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																			0.1	2																					
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																																									
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																																									
SG	Thymelaeaceae		*Pimelea spp.*																																										
EX	Urticaceae	*	*Urtica urens*	Small Nettle																			0.1	30																					
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest			0.1	100																																					
HT	Verbenaceae	*	*Phyla canescens*	-																																									
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																																									
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop																																									
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																																									
FG	Violaceae		*Hybanthus spp.*																																										
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-																																									
OG	Zamiaceae		*Macrozamia glaucophylla*	-																																									
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																																									
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop	25	1000	0.2	200			0.1	5																																	

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																																									
FG	Acanthaceae		*Brunoniella spp.*																																										
FG	Acanthaceae		*Rostellularia adscendens*	-																																									
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																																									
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																																									
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																									
FG	Aizoaceae		*Trianthema triquetra*																																										
FG	Aizoaceae		*Zaleya galericulata*	Hogweed								0.1	5	0.1	10	0.1	10					0.1	10					0.1	10																
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed	1																																								
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																																									
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed																																									
FG	Amaranthaceae		*Alternanthera spp.*																																										
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																																									
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																																										
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																																									
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																																									
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																									
FG	Anthericaceae		*Arthropodium minus*	-																																									
FG	Anthericaceae		*Arthropodium spp.*																																										
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																																									
FG	Anthericaceae		*Thysanotus spp.*																																										
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																																									
FG	Anthericaceae		*Tricoryne elatior*																																										
FG	Apiaceae		*Actinotus gibbonsii*																																										
SG	Apiaceae	*	*Apiaceae sp.*																																										
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																																									
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																																									
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																																									
FG	Apiaceae		*Eryngium spp.*																																										
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																																									
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																																									
OG	Apocynaceae		*Tylophora linearis*	-																																									
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																																									
FG	Asphodelaceae		*Bulbine semibarbata*																																										
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																																									
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed																																									
FG	Asteraceae		*Asteraceae sp.*																	0.1	10																								
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																																									
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																																									
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy		0.1	50	0.1	5																																				
FG	Asteraceae		*Brachyscome spp.*																																										
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy	1																																								
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy								0.1	1									0.1	1																						
FG	Asteraceae		*Calotis hispidula*	Bogan Flea		0.1	8																																						
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy	5																																								
FG	Asteraceae		*Calotis scapigera*																																										
FG	Asteraceae		*Calotis spp.*																																										
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle																																									
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush																																									
SG	Asteraceae		*Cassinia spp.*																																										
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																																									
FG	Asteraceae		*Centipeda cunninghamii*																																										
FG	Asteraceae		*Centipeda thespidioides*																																										
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																									
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting																																									
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																									
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																																									
FG	Asteraceae		*Conyza spp.*																																										
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																									
FG	Asteraceae		*Cotula australis*																																										
FG	Asteraceae		*Cotula spp.*																																										
EX	Asteraceae	*	*Cotula spp.*																																										
FG	Asteraceae		*Eclipta platyglossa*	-																																									

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Asteraceae		*Euchiton involucratus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Euchiton sphaericus*																																										
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																																									
FG	Asteraceae	*	*Gnaphalium spp.*	-																																									
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Hyalosperma spp.*																																										
FG	Asteraceae		*Hyalosperma spp.*																																										
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																																									
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear																																									
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions																																									
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce	2																																								
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																																									
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																																									
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																									
FG	Asteraceae		*Leptorhynchos spp.*																																										
FG	Asteraceae		*Myriocephalus pluriflorus*																																										
SG	Asteraceae		*Olearia pimeleoides*	-														0.1	1																										
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																		0.3	30																						
SG	Asteraceae		*Ozothamnus diosmifolius*																																										
FG	Asteraceae		*Picris spp.*																																										
FG	Asteraceae		*Podolepis spp.*																																										
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																										
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																																									
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle																																									
EX	Asteraceae	*	*Stuartina meulleri*																																										
FG	Asteraceae		*Stuartina spp.*																																										
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion																																									
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																																									
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed	10									0.1	1	0.1	1																												
FG	Asteraceae		*Vittadinia triloba*																																										
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr																																									
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																								0.1	1																
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse																																									
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																									
FG	Boraginaceae		*Hackelia suaveolens*	-																																									
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																																									
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																																									
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																									
EX	Brassicaceae	*	*Brassica spp.*																																										
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																									
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																																									
FG	Brassicaceae		*Harmsiodoxa spp.*																																										
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																																									
EX	Brassicaceae	*	*Lepidium africanum*																																										
EX	Brassicaceae	*	*Lepidium bonariense*	-																																									
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																																									
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress	2																																								
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																																									
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Lepidium spp.*																																										
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed																																									
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																									
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																																									
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear																																									
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear																																									
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia																																									
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																									
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell																																									
FG	Campanulaceae		*Wahlenbergia gracilenta*																																										
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell																																									
FG	Campanulaceae		*Wahlenbergia luteola*																																										
FG	Campanulaceae		*Wahlenbergia planiflora*																																										

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species																																									
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell	5																																								
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																																									
SG	Capparaceae		*Capparis mitchelli*	Wild Orange																																									
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																									
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																																									
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																																									
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																																									
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																										
EX	Caryophyllaceae	*	*Spergularia spp.*																																										
SG	Casuarinaceae		*Allocasuarina diminuta*	-																0.1	1																								
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak		10	12	1	30	20	50	25	100			3	15	25	100	2	3	10	35					8	30							0.1	1								
SG	Casuarinaceae		*Allocasuarina spp.*																																										
TG	Casuarinaceae		*Casuarina cristata*	Belah																																									
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																																									
SG	Celastraceae		*Denhamia cunninghamii*	-																																									
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																										
SG	Chenopodiaceae		*Atriplex leptocarpa*																																										
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																																									
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																																									
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush																																									
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																																									
SG	Chenopodiaceae		*Chenopodium desertorum*																																										
FG	Chenopodiaceae		*Chenopodium melanocarpum*																																										
EX	Chenopodiaceae	*	*Chenopodium spp.*																																										
FG	Chenopodiaceae		*Chenopodium spp.*																																										
SG	Chenopodiaceae		*Dissocarpus paradoxus*																																										
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																																									
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																																									
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed																																									
FG	Chenopodiaceae		*Dysphania spp.*																																										
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush																																									
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush	20																	0.1	1													0.1	1								
FG	Chenopodiaceae		*Einadia polygonoides*	-																																									
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed																																									
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush																																									
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																																									
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush																																									
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush																																									
SG	Chenopodiaceae		*Maireana spp.*																																										
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																																									
SG	Chenopodiaceae		*Salsola australis*	-																																									
SG	Chenopodiaceae		*Salsola kali*	-																																									
SG	Chenopodiaceae		*Salsola spp.*																																										
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr	2																																								
SG	Chenopodiaceae		*Sclerolaena diacantha*																																										
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																																									
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly																																									
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																																									
SG	Chenopodiaceae		*Sclerolaena tricuspis*																																										
FG	Commelinaceae		*Commelina cyanea*	-																																									
FG	Commelinaceae		*Commelina spp.*																																										
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed	1																																								
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed	10																																								
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																																									
FG	Crassulaceae		*Crassula colorata*	-																																									
FG	Crassulaceae		*Crassula sieberiana*																																										
FG	Crassulaceae		*Crassula spp.*																																										
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon																																									
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine	8	3	7	2	8	30	60	25	150			10	25	10	40	10	30	8	30	1	2			20	50	2	2					8	50	0.1	1			0.1	1	6	10
GG	Cyperaceae		*Baumea spp.*																																										
GG	Cyperaceae		*Carex appressa*	Tall Sedge																																									
GG	Cyperaceae		*Carex inversa*	-	400																																								

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Cyperaceae		*Carex spp.*																																										
GG	Cyperaceae		*Cyathochaeta diandra*	-																																									
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																																									
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																										
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																																		10	50						
GG	Cyperaceae		*Cyperus spp.*																																										
GG	Cyperaceae		*Eleocharis spp.*																																										
GG	Cyperaceae		*Eleocharis spp.*																																										
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																									
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																																									
GG	Cyperaceae		*Gahnia spp.*																																										
GG	Cyperaceae		*Lepidosperma laterale*	-																																									
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																																									
GG	Cyperaceae		*Schoenus kennyi*	-																																									
GG	Cyperaceae		*Schoenus spp.*																																										
SG	Dilleniaceae		*Hibbertia linearis*	-																																									
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower																																									
SG	Dilleniaceae		*Hibbertia riparia*																																										
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																																									
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																		0.1	1																						
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath		0.1	2	3	70							0.3	15			0.2	10	0.2	3	0.2	2			0.5	5															0.1	1
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																																									
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																																									
FG	Euphorbiaceae		*Chamaesyce drummondii*																																										
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed	1																																								
FG	Euphorbiaceae		*Euphorbia spp.*																																										
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush										5	80	10	120			0.1	2																								
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																																									
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																														50	200										
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																																									
TG	Fabaceae		*Acacia cheelii*	Motherumbah																																25	100							1	5
TG	Fabaceae		*Acacia dealbata*	Silver Wattle				4	10	1	4																																		
SG	Fabaceae		*Acacia deanei*	Deans Wattle										6	12	1	4	0.3	3									1	2									0.1	1						
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																																									
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																									
TG	Fabaceae		*Acacia decurrens*	Black Wattle																																									
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																																									
TG	Fabaceae		*Acacia harpophylla*	Brigalow																																									
TG	Fabaceae		*Acacia homalophylla*	Yarran																																									
SG	Fabaceae		*Acacia lineata*	Streaked Wattle								0.1	1	0.2	1																														
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle																																									
SG	Fabaceae		*Acacia montana*	Mallee Wattle																																									
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																				10	50	1	10			0.5	5	2	50									1	10		
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																																									
TG	Fabaceae		*Acacia pendula*	Weeping Myall																																									
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																																									
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																																									
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle		0.4	8	1	10																																				
SG	Fabaceae		*Acacia spp.*																			10	15																						
SG	Fabaceae		*Acacia spp.*																																									0.2	10
SG	Fabaceae		*Acacia stenophylla*																																										
SG	Fabaceae		*Acacia subulata*																																										
SG	Fabaceae		*Acacia trineura*																																										
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																				35	200					10	50	30	100									18	50		
SG	Fabaceae		*Bossiaea concolor*																																										
SG	Fabaceae		*Bossiaea spp.*																																										
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																																									
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																																									
OG	Fabaceae		*Desmodium spp.*																																										
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																																									
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea		0.1	1	0.5	10											0.1	1																								
SG	Fabaceae		*Dillwynia sp.*																																										
OG	Fabaceae		*Glycine clandestina*	-																																									

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																																									
OG	Fabaceae		*Glycine tabacina*	-																																									
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																																									
SG	Fabaceae		*Hovea apiculata*	-																																									
EX	Fabaceae	*	*Lotus spp.*																																										
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																									
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic																																									
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																																									
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic																																									
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																																									
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																									
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant																																									
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea microphylla*	-																																									
SG	Fabaceae		*Pultenaea sp.*																																								0.1	1
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																																									
FG	Fabaceae		*Senna barclayana*	Smooth Senna																																									
SG	Fabaceae		*Senna sp.*																															0.8	10										
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																																									
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																									
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover																																									
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																																									
EX	Fabaceae	*	*Trifolium sp.*																																										
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																																									
EX	Fabaceae	*	*Vicia spp.*																																										
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																										
SG	Fabaceae (Faboideae)		*Cullen tenax*																																										
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																										
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																										
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																										
EX	Gentianaceae	*	*Centaurium erythraea*																																										
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																																									
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill																																									
FG	Goodeniaceae		*Brunonia australis*																																										
FG	Goodeniaceae		*Dampiera adpressa*																																										
FG	Goodeniaceae		*Goodenia cycloptera*	-																																									
FG	Goodeniaceae		*Goodenia fasicularis*	-																																									
FG	Goodeniaceae		*Goodenia glabra*																																										
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																																		0.1	1						
FG	Goodeniaceae		*Goodenia rotundifolia*	-		0.1	5			0.1	1																																		
FG	Haloragaceae		*Gonocarpus elatus*																																										
GG	Juncaceae		*Juncus continuus*	-																																		5	20						
GG	Juncaceae		*Juncus spp.*		1																																								
GG	Juncaceae		*Juncus subsecundus*	-																																									
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																																									
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																																									
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																																									
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed																																									
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																																									
FG	Lamiaceae		*Teucrium betchei*	-																																									
SG	Lamiaceae		*Westringia cheelii*	-				10	150	0.2	10													10	100	30	150			5	50	3	30	0.1	2							5	60	1	10
SG	Lamiaceae		*Westringia spp.*																																										
OG	Lauraaceae		*Cassytha melantha*																																										
OG	Lauraaceae		*Cassytha pubescens*	-																				0.5	200					0.1	3	0.3	100												
FG	Linaceae		*Linum marginale*																																										
FG	Lobeliaceae		*Lobelia concolor*																																										
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush																														0.1	1										
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																									
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush				0.3	40	0.2	40	0.1	4	0.1	2	1	100	0.8	50	0.1	10	0.1	5	0.1	1	0.1	2	2	40	3	50	10	200												
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush														0.1	4																										
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush		0.3	20									0.1	1																											0.1	1
GG	Lomandraceae		*Lomandra spp.*																																										
OG	Loranthaceae		*Amyema miquelii*	-																																								0.1	1

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Loranthaceae		*Amyema quandang*	-																																									
OG	Loranthaceae		*Amyema spp.*																																										
FG	Lythraceae		*Lythrum hyssopifolia*																																										
SG	Malvaceae		*Abutilon otocarpum*																																										
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush																																									
SG	Malvaceae		*Abutilon spp.*																																										
TG	Malvaceae		*Brachychiton populneus*	Kurrajong																																									
SG	Malvaceae		*Commersonia procumbens*																																										
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow																																									
EX	Malvaceae	*	*Malva spp.*																																										
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																																									
FG	Malvaceae		*Sida corrugata*	Corrugated Sida	2																																								
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida																																									
FG	Malvaceae		*Sida hackettiana*	Golden Rod																																									
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne																																									
EX	Malvaceae	*	*Sida spinosa*	-																																									
EX	Malvaceae	*	*Sida spp.*																																										
FG	Malvaceae		*Sida trichopoda*																																										
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																																									
TG	Meliaceae		*Melia azedarach*	White Cedar																																									
SG	Myrtaceae		*Acacia sp*																																										
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple																								12	4									1	2							
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																									
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle				0.1	1											1	30							1	7	10	50	1	10	2	20	0.5	3					3	25	10	40
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood																10	6													1	1	10	2									
SG	Myrtaceae		*Darwinia spp.*																																										
TG	Myrtaceae		*Eucalyptus albens*	White Box																																									
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum																																		30	6						
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum																																									
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum																																									
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																																									
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box	1																																								
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark		5	8	12	5	8	6	5	3			12	15	4	3					0.5	1	3	5	2	1	5	3	2	1											25	15
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																																									
TG	Myrtaceae		*Eucalyptus dwyeri*	-																																									
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark																														10	5	5	1								
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																																									
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																																									
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																																									
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box								2	1	8	4							15	5																						
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box	1																																								
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																																									
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark										2	1																														
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus spp.*																																										
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																																									
SG	Myrtaceae		*Harmogia densifolia*	-																																									
SG	Myrtaceae		*Homoranthus flavescens*	-																																									
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea				0.1	1																																				
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																		0.1	1						
SG	Myrtaceae		*Leptospermum spp.*																																										
SG	Myrtaceae		*Melaleuca erubescens*	-																						1	10															5	30		
SG	Myrtaceae		*Melaleuca erubescens*																																										
SG	Myrtaceae		*Melaleuca uncinata*	Broombush				0.2	3															25	50	50	100			40	200	40	200									2	15	0.2	1
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle																				3	30	0.5	10			10	80	5	50			35	200					25	150		
SG	Myrtaceae		*Micromyrtus sessilis*	-																																									
SG	Myrtaceae		*Micromyrtus spp.*																																										
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine																																									
FG	Nyctaginaceae		*Boerhavia dominii*																																										
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																																									
OG	Oleaceae		*Jasminum spp.*																																										
TG	Oleaceae		*Notelaea microcarpa*																																										
TG	Oleaceae		*Notelaea spp.*																																										

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
EX	Onagraceae	*	*Oenothera mollissima*	-																																									
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid																																									
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																									
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Orchidaceae		*Orchidaceae spp.*																																										
FG	Oxalidaceae		*Oxalis chnoodes*																																										
EX	Oxalidaceae	*	*Oxalis corniculata*	-																																									
FG	Oxalidaceae		*Oxalis exilis*	-																																									
FG	Oxalidaceae		*Oxalis perennans*	-	2																																								
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																									
FG	Oxalidaceae		*Oxalis spp.*																																										
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																																									
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																																									
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily	2																																								
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily		0.1	5											0.1	1									0.1	10	0.2	5	0.5	50											0.3	30
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																																									
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																																									
SG	Phyllanthaceae		*Phyllanthus hirtellus*																																										
FG	Phyllanthaceae		*Phyllanthus spp.*																																										
FG	Phyllanthaceae		*Phyllanthus virgatus*	-																																									
FG	Plantaginaceae		*Plantago gaudichaudii*																																										
EX	Plantaginaceae	*	*Plantago sp.*																																										
FG	Plantaginaceae		*Plantago spp.*																																										
FG	Plantaginaceae		*Plantago turrifera*	-																																									
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																									
GG	Poaceae		*Anthosachne scabra*	Wheatgrass																				0.1	1																					
GG	Poaceae		*Aristida acuta*																																										
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																																									
GG	Poaceae		*Aristida calycina*																																										
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass		0.2	10			0.1	2	0.2	50			3	100	0.1	4	0.2	10	0.3	30	1	70	0.5	10			0.2	10	0.1	2			0.1	2					0.1	10		
GG	Poaceae		*Aristida longicollis*	-																																									
GG	Poaceae		*Aristida muricata*	-																																									
GG	Poaceae		*Aristida personata*	Purple Wire-grass																																									
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass								0.1	2	4	400					0.5	20																								
GG	Poaceae		*Aristida spp.*					0.3	50																									0.2	30									0.2	10
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass																																									
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																																									
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																																									
GG	Poaceae		*Austrostipa densiflora*																																										
GG	Poaceae		*Austrostipa falcata*																																										
GG	Poaceae		*Austrostipa nodosa*																																										
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass																																									
GG	Poaceae		*Austrostipa scabra*	Speargrass	20					0.1	1																																		
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																		0.1	3																						
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																																									
GG	Poaceae		*Austrostipa setacea*																																										
GG	Poaceae		*Austrostipa sp.*																																										
GG	Poaceae		*Austrostipa spp.*																																										
GG	Poaceae		*Austrostipa variabilis*																																										
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass	10																																								
EX	Poaceae	*	*Avena barbata*	Bearded Oats																																									
EX	Poaceae	*	*Avena fatua*	Wild Oats																																									
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																																									
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																																										
GG	Poaceae		*Bothriochloa macra*	Red Grass																																									
GG	Poaceae		*Bothriochloa spp.*																																										
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass																																									
GG	Poaceae		*Bromus diandrus*																																										
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																																									
GG	Poaceae		*Bromus spp.*																																										
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																																									
GG	Poaceae		*Chloris divaricata*	Slender Chloris																																									
GG	Poaceae		*Chloris divaricata var. divaricata*																																										

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																																									
GG	Poaceae		*Chloris spp.*																			0.1	3							0.1	2														
GG	Poaceae		*Chloris truncata*	Windmill Grass	500																																								
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass																																									
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																																									
GG	Poaceae		*Cymbopogon refractus*																																										
GG	Poaceae		*Cynodon dactylon*	Couch																																		0.1	1						
GG	Poaceae		*Dactyloctenium radulans*	Button Grass																																									
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																																									
GG	Poaceae		*Dichanthium sp.*																																										
GG	Poaceae		*Dichanthium spp.*																																										
GG	Poaceae		*Digitaria ammophila*																																										
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass																																									
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																																									
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass																																									
GG	Poaceae		*Digitaria ramularis*																																										
GG	Poaceae		*Digitaria spp.*																																										
GG	Poaceae		*Echinochloa spp.*																																										
GG	Poaceae		*Echinopogon spp.*																																										
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																																									
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																																									
GG	Poaceae		*Enneapogon spp.*																																										
GG	Poaceae		*Enteropogon acicularis*	-										1	20																														
GG	Poaceae		*Eragrostis alveiformis*																																										
GG	Poaceae		*Eragrostis australasica*	-																																									
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass																																									
EX	Poaceae	*	*Eragrostis cilianensis*																																										
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																									
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																																									
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																									
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																																									
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																																									
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																																									
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																									
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																																									
GG	Poaceae		*Eragrostis spp.*		2							0.2	50	0.1	5			0.1	1			0.1	5															0.1	4						
GG	Poaceae		*Eriachne spp.*																																										
GG	Poaceae		*Eriochloa australiensis*	-																																									
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																																									
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass	5																																								
EX	Poaceae	*	*Hordeum spp.*																																										
GG	Poaceae		*Imperata cylindrica*	Blady Grass																																									
GG	Poaceae		*Lachnagrostis spp.*																																										
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass																																									
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass																																									
GG	Poaceae		*Microlaena stipoides*																																										
GG	Poaceae		*Panicum decompositum*																																										
GG	Poaceae		*Panicum effusum*	Hairy Panic																																									
GG	Poaceae		*Panicum spp.*																																										
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																																									
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass	50																																								
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass																																									
GG	Poaceae		*Paspalidium spp.*																																										
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																																									
GG	Poaceae		*Phragmites australis*	Common Reed																																									
GG	Poaceae		*Poa sieberiana*	-																																									
GG	Poaceae		*Poa spp.*																																										
GG	Poaceae		*Poaceae sp.*																																										
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																									
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																																									
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																																									
GG	Poaceae		*Rytidosperma duttonianum*	-																																									
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass																																									

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Poaceae		*Rytidosperma racemosum*	-																																									
GG	Poaceae		*Rytidosperma racemosum*																																										
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass	100																																								
GG	Poaceae		*Rytidosperma spp.*			0.1	1																					0.1	1																
GG	Poaceae		*Rytidosperma spp.*																																									0.1	1
EX	Poaceae	*	*Setaria parviflora*	-																																									
GG	Poaceae		*Setaria spp.*	A Setaria species																																									
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																																									
GG	Poaceae		*Sporobolus caroli*	Fairy Grass																																									
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass																																									
GG	Poaceae		*Sporobolus spp.*																																										
GG	Poaceae		*Themeda spp.*																																										
GG	Poaceae		*Themeda triandra*	Kangaroo Grass																																									
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass																																									
GG	Poaceae		*Tragus australianus*	Small Burrgrass																																									
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																																									
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																																									
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																																									
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																																									
GG	Poaceae spp.		*Poaceae spp.*																																										
SG	Polygonaceae		*Duma florulenta*	Lignum																																									
EX	Polygonaceae	*	*Emex spinosa*	-																																									
EX	Polygonaceae	*	*Emex spp.*																																										
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																																									
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed																																									
FG	Polygonaceae		*Rumex brownii*	Swamp Dock																																									
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																																									
FG	Portulacaceae		*Calandrinia eremaea*	-																																									
FG	Portulacaceae		*Portulaca oleracea*	Pigweed																																									
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																																									
FG	Portulacaceae		*Portulaca spp.*																																										
FG	Portulacaceae		*Portulaca spp.*																																										
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea				0.1	2											0.1	2																					0.1	1		
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																									
SG	Proteaceae		*Persoonia sericea*	-																																									
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																																									
EG	Pteridaceae		*Cheilanthes sieberi*	-		0.1	3			0.1	2	0.1	1	0.1	10	0.1	20	0.1	2			0.1	10	0.1	1			0.1	1							0.1	5					0.1	10	0.1	1
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																									
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																0.1	2											0.2	0.3												
SG	Rhamnaceae		*Cryptandra spp.*																																										
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																																									
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																																									
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																																									
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																									
SG	Rutaceae		*Boronia occidentalis*	-																																									
SG	Rutaceae		*Geijera parviflora*	Wilga	2									1	1																														
SG	Rutaceae		*Philotheca brevifolia*	-																																									
SG	Rutaceae		*Philotheca ciliata*	-						0.1	1													5	70	0.1	1																		
SG	Rutaceae		*Philotheca spp.*																																										
SG	Santalaceae		*Exocarpos spp.*																																									0.2	2
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood																																									
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																																									
SG	Sapindaceae		*Dodonaea boronifolia*																					1	10					0.2	5														
SG	Sapindaceae		*Dodonaea hetromorpha*							0.1	1																																		
SG	Sapindaceae		*Dodonaea spp.*																																										
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																																								30	50
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush		0.1	2	0.1	1	0.1	2	0.1	1															0.1	1					2	15									
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																																									
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-										25	100							0.8	10															0.8	5						
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																																									
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple	10																																								
SG	Scrophulariaceae		*Eremophila deserti*																																										
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																																									

GF	Family	Exotic	Scientific name	Common Name	P37	T1-MP1		T1-MP2		T1-MP3		T1-MP4		T1-MP5		T1-MP6		T1-MP7		T1-MP8		T1-MP9		T1-MP10		T1-MP11		T1-MP12		T1-MP13		T1-MP14		T1-MP15		T1-MP16		T1-MP17		T1-MP18		T1-MP19		T1-MP20	
					Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																																										
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda																																										
SG	Scrophulariaceae		*Eremophila spp.*																																											
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																																										
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																																										
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn																																										
SG	Solanaceae		*Lycium spp.*													0.1	1																														
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																																										
FG	Solanaceae		*Solanum cleistogamum*																																											
FG	Solanaceae		*Solanum ellipticum*																																											
SG	Solanaceae		*Solanum erianthum*	Potato Tree																																										
FG	Solanaceae		*Solanum esuriale*	Quena																																										
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush																																										
SG	Solanaceae		*Solanum jucundum*																																											
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																																										
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																																										
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																																										
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																																										
SG	Thymelaeaceae		*Pimelea spp.*																																											
EX	Urticaceae	*	*Urtica urens*	Small Nettle																																										
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest																																										
HT	Verbenaceae	*	*Phyla canescens*	-																																										
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																																										
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop																																										
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																																										
FG	Violaceae		*Hybanthus spp.*																																											
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-																																										
OG	Zamiaceae		*Macrozamia glaucophylla*	-																																										
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																																										
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop																																										

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																																								
FG	Acanthaceae		*Brunoniella spp.*																																									
FG	Acanthaceae		*Rostellularia adscendens*	-																																								
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																																								
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																																								
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																								
FG	Aizoaceae		*Trianthema triquetra*																																									
FG	Aizoaceae		*Zaleya galericulata*	Hogweed	0.1	1			0.1	2	0.1	1											0.1	10																				
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed																																								
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																																								
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed																																								
FG	Amaranthaceae		*Alternanthera spp.*																																									
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																																								
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																																									
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																																								
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																																								
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																								
FG	Anthericaceae		*Arthropodium minus*	-																																								
FG	Anthericaceae		*Arthropodium spp.*																																									
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																																								
FG	Anthericaceae		*Thysanotus spp.*																																									
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																																								
FG	Anthericaceae		*Tricoryne elatior*																																									
FG	Apiaceae		*Actinotus gibbonsii*																																									
SG	Apiaceae	*	*Apiaceae sp.*																																									
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																																								
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																																								
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																																								
FG	Apiaceae		*Eryngium spp.*																																									
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																																								
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo									0.1	30									0.1	3																			0.1	1
OG	Apocynaceae		*Tylophora linearis*	-																																								
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																																								
FG	Asphodelaceae		*Bulbine semibarbata*																																									
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																																								
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed																																								
FG	Asteraceae		*Asteraceae sp.*																																									
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																																								
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																																								
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																																								
FG	Asteraceae		*Brachyscome spp.*																																									
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																																								
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy																			0.2	50																				
FG	Asteraceae		*Calotis hispidula*	Bogan Flea					0.1	1																													0.1	2				
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy																																								
FG	Asteraceae		*Calotis scapigera*																																									
FG	Asteraceae		*Calotis spp.*																																									
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle																																			0.1	1				
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush											0.2	5	0.5	5																	0.5	4								
SG	Asteraceae		*Cassinia spp.*		0.1	1																																						
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																																								
FG	Asteraceae		*Centipeda cunninghamii*																																									
FG	Asteraceae		*Centipeda thespidioides*																																									
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																					0.1	1		
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting																																								
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																								
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																																								
FG	Asteraceae		*Conyza spp.*																																									
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																								
FG	Asteraceae		*Cotula australis*																																									
FG	Asteraceae		*Cotula spp.*																																									
EX	Asteraceae	*	*Cotula spp.*																																									
FG	Asteraceae		*Eclipta platyglossa*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Asteraceae		*Euchiton involucratus*																																									
FG	Asteraceae		*Euchiton sphaericus*																																									
FG	Asteraceae		*Euchiton sphaericus*																																									
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																																								
FG	Asteraceae	*	*Gnaphalium spp.*	-																																								
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																																								
FG	Asteraceae		*Hyalosperma spp.*																																									
FG	Asteraceae		*Hyalosperma spp.*																																									
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																																								
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear																																								
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions																																								
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																																								
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																																								
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																																								
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																								
FG	Asteraceae		*Leptorhynchos spp.*																																									
FG	Asteraceae		*Myriocephalus pluriflorus*																																									
SG	Asteraceae		*Olearia pimeleoides*	-																																								
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																																								
SG	Asteraceae		*Ozothamnus diosmifolius*																																									
FG	Asteraceae		*Picris spp.*																																									
FG	Asteraceae		*Podolepis spp.*																																									
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																									
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																																								
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle																																								
EX	Asteraceae	*	*Stuartina meulleri*																																									
FG	Asteraceae		*Stuartina spp.*																																									
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion																																								
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																																								
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed																			0.1	1													0.1	2	0.1	1				
FG	Asteraceae		*Vittadinia triloba*																																									
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr																																								
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																							0.1	2																
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse																																								
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																								
FG	Boraginaceae		*Hackelia suaveolens*	-																																								
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																																								
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																																								
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																								
EX	Brassicaceae	*	*Brassica spp.*																																									
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																								
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																																								
FG	Brassicaceae		*Harmsiodoxa spp.*																																									
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																																								
EX	Brassicaceae	*	*Lepidium africanum*																																									
EX	Brassicaceae	*	*Lepidium bonariense*	-																																								
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																																								
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress																																								
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																																								
EX	Brassicaceae	*	*Lepidium spp.*																																									
EX	Brassicaceae	*	*Lepidium spp.*																																									
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed																																								
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																								
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																																								
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear																	0.1	2	0.1	1			0.1	1																
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear							0.1	2																																
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia																																								
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																								
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell																																								
FG	Campanulaceae		*Wahlenbergia gracilenta*																																									
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell																																								
FG	Campanulaceae		*Wahlenbergia luteola*																																									
FG	Campanulaceae		*Wahlenbergia planiflora*																																									

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species																																								
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell																																								
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																																								
SG	Capparaceae		*Capparis mitchelli*	Wild Orange																																								
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																								
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																																								
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																																								
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																																								
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																									
EX	Caryophyllaceae	*	*Spergularia spp.*																																									
SG	Casuarinaceae		*Allocasuarina diminuta*	-											5	10	1	10																										
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak	1.5	2			0.3	2													0.2	1	0.2	1					50	200	0.1	1	20	30							0.5	2
SG	Casuarinaceae		*Allocasuarina spp.*		0.2	2																																						
TG	Casuarinaceae		*Casuarina cristata*	Belah																																								
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																																								
SG	Celastraceae		*Denhamia cunninghamii*	-																																								
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																									
SG	Chenopodiaceae		*Atriplex leptocarpa*																																									
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																																								
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																																								
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush																																								
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																																								
SG	Chenopodiaceae		*Chenopodium desertorum*																																									
FG	Chenopodiaceae		*Chenopodium melanocarpum*																																									
EX	Chenopodiaceae	*	*Chenopodium spp.*																																									
FG	Chenopodiaceae		*Chenopodium spp.*																																									
SG	Chenopodiaceae		*Dissocarpus paradoxus*																																									
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																																								
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																																								
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed																																								
FG	Chenopodiaceae		*Dysphania spp.*																																									
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush	0.1	1					0.1	1									0.1	15	0.1	10	0.1	5											0.1	4						
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush															0.1	1	0.1	10	0.1	1			0.1	2	0.1	1							0.1	5	0.1	2	0.1	10		
FG	Chenopodiaceae		*Einadia polygonoides*	-																																								
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed																																								
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush																																								
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																																								
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush																			0.1	1																				
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush																																							0.2	5
SG	Chenopodiaceae		*Maireana spp.*																																									
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																																								
SG	Chenopodiaceae		*Salsola australis*	-																																			0.1	3				
SG	Chenopodiaceae		*Salsola kali*	-																																								
SG	Chenopodiaceae		*Salsola spp.*																																									
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr																																			0.1	4	0.1	1		
SG	Chenopodiaceae		*Sclerolaena diacantha*																																									
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																																								
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly																																			0.1	3				
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																																								
SG	Chenopodiaceae		*Sclerolaena tricuspis*																																									
FG	Commelinaceae		*Commelina cyanea*	-																																								
FG	Commelinaceae		*Commelina spp.*																																									
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed																															0.1	1			0.1	1				
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed																																								
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																																								
FG	Crassulaceae		*Crassula colorata*	-																																								
FG	Crassulaceae		*Crassula sieberiana*																																									
FG	Crassulaceae		*Crassula spp.*																																									
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon																																								
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine	8	10					3	5							3	5			25	50	5	15	25	50	35	80	1	3	30	80	3	10	15	50			10	6	1	4
GG	Cyperaceae		*Baumea spp.*																																									
GG	Cyperaceae		*Carex appressa*	Tall Sedge																																								
GG	Cyperaceae		*Carex inversa*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Cyperaceae		*Carex spp.*																																									
GG	Cyperaceae		*Cyathochaeta diandra*	-																																								
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																																								
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																									
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																	15	50																						
GG	Cyperaceae		*Cyperus spp.*																																									
GG	Cyperaceae		*Eleocharis spp.*																																									
GG	Cyperaceae		*Eleocharis spp.*																																									
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																								
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																																								
GG	Cyperaceae		*Gahnia spp.*																																									
GG	Cyperaceae		*Lepidosperma laterale*	-																					0.1	1					0.3	2			0.1	1								
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																																								
GG	Cyperaceae		*Schoenus kennyi*	-																																								
GG	Cyperaceae		*Schoenus spp.*																																									
SG	Dilleniaceae		*Hibbertia linearis*	-																																								
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower																																								
SG	Dilleniaceae		*Hibbertia riparia*																																									
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath															0.2	5							5	50							0.1	1								
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																																								
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath					0.2	3					0.2	2	0.1	2	0.2	3							0.1	1			0.1	1												
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																																								
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																																								
FG	Euphorbiaceae		*Chamaesyce drummondii*																																									
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed																																								
FG	Euphorbiaceae		*Euphorbia spp.*																																									
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																																								
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																													4	30										
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle											0.3	3	1	2																										
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																																								
TG	Fabaceae		*Acacia cheelii*	Motherumbah																																								
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																																								
SG	Fabaceae		*Acacia deanei*	Deans Wattle	0.5	4							0.5	1					10	50	2	2	5	40	2	10	0.1	1	1	5	5	10			0.5	2							3	15
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																																								
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																								
TG	Fabaceae		*Acacia decurrens*	Black Wattle							0.1	2																																
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																																								
TG	Fabaceae		*Acacia harpophylla*	Brigalow																																								
TG	Fabaceae		*Acacia homalophylla*	Yarran																																								
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																																								
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle	1	10	50	200	93	500					1	5	20	50	3	15	0.5	5			15	35																		
SG	Fabaceae		*Acacia montana*	Mallee Wattle																																								
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																																								
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																																								
TG	Fabaceae		*Acacia pendula*	Weeping Myall																																								
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																																								
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																																								
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																																								
SG	Fabaceae		*Acacia spp.*																																									
SG	Fabaceae		*Acacia spp.*																																									
SG	Fabaceae		*Acacia stenophylla*		0.1	1																																						
SG	Fabaceae		*Acacia subulata*																																									
SG	Fabaceae		*Acacia trineura*																																									
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle	0.2	1	40	100																									0.3	2										
SG	Fabaceae		*Bossiaea concolor*																																									
SG	Fabaceae		*Bossiaea spp.*																																									
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																																								
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																																								
OG	Fabaceae		*Desmodium spp.*																																									
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																																								
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																							0.5	20																
SG	Fabaceae		*Dillwynia sp.*																																0.1	1								
OG	Fabaceae		*Glycine clandestina*	-																	0.1	1					0.1	1	0.1	1														

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																																								
OG	Fabaceae		*Glycine tabacina*	-																																								
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																									0.1	3														
SG	Fabaceae		*Hovea apiculata*	-																																								
EX	Fabaceae	*	*Lotus spp.*																																									
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																								
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic																																								
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																																								
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic																																								
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																																								
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																								
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant																																								
SG	Fabaceae		*Pultenaea microphylla*	-																																								
SG	Fabaceae		*Pultenaea microphylla*	-																																								
SG	Fabaceae		*Pultenaea sp.*																																									
SG	Fabaceae		*Senna artemisioides*	Silver Cassia							0.1	1			0.3	10	0.2	4																										
FG	Fabaceae		*Senna barclayana*	Smooth Senna																																								
SG	Fabaceae		*Senna sp.*																																									
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																																								
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																								
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover																																								
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																																								
EX	Fabaceae	*	*Trifolium sp.*																																									
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																																								
EX	Fabaceae	*	*Vicia spp.*																																									
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																									
SG	Fabaceae (Faboideae)		*Cullen tenax*																																									
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																									
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																									
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																									
EX	Gentianaceae	*	*Centaurium erythraea*																																									
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																																								
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill																																								
FG	Goodeniaceae		*Brunonia australis*																																									
FG	Goodeniaceae		*Dampiera adpressa*																																									
FG	Goodeniaceae		*Goodenia cycloptera*	-																																								
FG	Goodeniaceae		*Goodenia fasicularis*	-																																								
FG	Goodeniaceae		*Goodenia glabra*																																									
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																									0.1	1														
FG	Goodeniaceae		*Goodenia rotundifolia*	-																																								
FG	Haloragaceae		*Gonocarpus elatus*																																									
GG	Juncaceae		*Juncus continuus*	-																																								
GG	Juncaceae		*Juncus spp.*		0.1	2															0.1	1																						
GG	Juncaceae		*Juncus subsecundus*	-																																								
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																																								
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																																								
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																																								
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed																																								
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																																								
FG	Lamiaceae		*Teucrium betchei*	-																																								
SG	Lamiaceae		*Westringia cheelii*	-			5	20																																				
SG	Lamiaceae		*Westringia spp.*																																									
OG	Lauraaceae		*Cassytha melantha*																																									
OG	Lauraaceae		*Cassytha pubescens*	-													1	5																										
FG	Linaceae		*Linum marginale*																																									
FG	Lobeliaceae		*Lobelia concolor*																																									
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush							0.1	2											0.1	1											0.1	5								
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																								
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush	0.2	5											0.1	1	0.1	1	1	10			0.1	1	0.1	1	0.1	1	0.1	2			0.1	1	0.1	1						
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																																								
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush															0.3	30									0.1	3	0.1	2	0.1	1			0.1	2						
GG	Lomandraceae		*Lomandra spp.*																																									
OG	Loranthaceae		*Amyema miquelii*	-																											0.5	4												

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Loranthaceae		*Amyema quandang*	-																																								
OG	Loranthaceae		*Amyema spp.*										0.4	4																														
FG	Lythraceae		*Lythrum hyssopifolia*																																									
SG	Malvaceae		*Abutilon otocarpum*																																									
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush																																								
SG	Malvaceae		*Abutilon spp.*																																									
TG	Malvaceae		*Brachychiton populneus*	Kurrajong																			0.1	1																				
SG	Malvaceae		*Commersonia procumbens*																																									
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow																																								
EX	Malvaceae	*	*Malva spp.*																																									
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																																								
FG	Malvaceae		*Sida corrugata*	Corrugated Sida																																								
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida																																								
FG	Malvaceae		*Sida hackettiana*	Golden Rod																																								
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne																																								
EX	Malvaceae	*	*Sida spinosa*	-																																								
EX	Malvaceae	*	*Sida spp.*																																									
FG	Malvaceae		*Sida trichopoda*																																									
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																																								
TG	Meliaceae		*Melia azedarach*	White Cedar																																								
SG	Myrtaceae		*Acacia sp*																																1	5								
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple	7	2															3	1					7	3																
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																								
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle																																								
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood													0.2	1	1	1																								
SG	Myrtaceae		*Darwinia spp.*		0.1	1									0.1	1	0.5	3							0.5	20																		
TG	Myrtaceae		*Eucalyptus albens*	White Box																																	20	3						
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum	3	1															20	5																						
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum																																								
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum															15	4																			30	10				
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																																								
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																																								
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark			3	3	1	2													15	6	25	8					8	2	5	2	8	3							35	11
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																																								
TG	Myrtaceae		*Eucalyptus dwyeri*	-											0.5	1	1	3																										
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark																																								
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																																								
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																																								
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																																								
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box							30	10																																
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box																					0.3	1			25	6														
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																																								
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark																																								
TG	Myrtaceae		*Eucalyptus spp.*																																									
TG	Myrtaceae		*Eucalyptus spp.*																																									
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee									35	40																														
SG	Myrtaceae		*Harmogia densifolia*	-											0.1	1																												
SG	Myrtaceae		*Homoranthus flavescens*	-																																								
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																																								
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																								
SG	Myrtaceae		*Leptospermum spp.*																		15	20																						
SG	Myrtaceae		*Melaleuca erubescens*	-											0.2	1	0.5	3																										
SG	Myrtaceae		*Melaleuca erubescens*																																									
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																																								
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle	0.2	2	0.1	1							30	150	35	100									0.2	5					4	30	0.2	2								
SG	Myrtaceae		*Micromyrtus sessilis*	-																																								
SG	Myrtaceae		*Micromyrtus spp.*																																									
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine																																	0.1	1						
FG	Nyctaginaceae		*Boerhavia dominii*																																									
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																																								
OG	Oleaceae		*Jasminum spp.*																																									
TG	Oleaceae		*Notelaea microcarpa*																																									
TG	Oleaceae		*Notelaea spp.*																																									

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
EX	Onagraceae	*	*Oenothera mollissima*	-																																								
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid																																								
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																								
FG	Orchidaceae		*Orchidaceae spp.*																																									
FG	Orchidaceae		*Orchidaceae spp.*																																									
FG	Oxalidaceae		*Oxalis chnoodes*																																									
EX	Oxalidaceae	*	*Oxalis corniculata*	-																	0.1	1																			0.1	1		
FG	Oxalidaceae		*Oxalis exilis*	-																																								
FG	Oxalidaceae		*Oxalis perennans*	-																																								
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																								
FG	Oxalidaceae		*Oxalis spp.*																																									
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																																								
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																																								
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily																																								
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily	0.2	10					0.2	50	0.1	2			0.2	10							1	100					0.5	100			0.1	2								
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																																								
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																																								
SG	Phyllanthaceae		*Phyllanthus hirtellus*																																									
FG	Phyllanthaceae		*Phyllanthus spp.*																																									
FG	Phyllanthaceae		*Phyllanthus virgatus*	-																																								
FG	Plantaginaceae		*Plantago gaudichaudii*																																									
EX	Plantaginaceae	*	*Plantago sp.*																																									
FG	Plantaginaceae		*Plantago spp.*																																									
FG	Plantaginaceae		*Plantago turrifera*	-																																								
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																								
GG	Poaceae		*Anthosachne scabra*	Wheatgrass																																								
GG	Poaceae		*Aristida acuta*																																									
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																																								
GG	Poaceae		*Aristida calycina*																																									
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass					0.1	1																	0.1	3																
GG	Poaceae		*Aristida longicollis*	-																																								
GG	Poaceae		*Aristida muricata*	-																																								
GG	Poaceae		*Aristida personata*	Purple Wire-grass																																								
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass															0.1	1					0.1	1			0.1	2	0.1	5	1	50	0.1	2							0.1	10
GG	Poaceae		*Aristida spp.*								0.1	2																											0.1	1				
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass																																								
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																																								
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																																								
GG	Poaceae		*Austrostipa densiflora*																																									
GG	Poaceae		*Austrostipa falcata*																																									
GG	Poaceae		*Austrostipa nodosa*																																									
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass																																								
GG	Poaceae		*Austrostipa scabra*	Speargrass															0.1	1			0.1	20	0.1	10	0.3	100	0.5	100	0.1	20	3	100	0.1	5							0.2	50
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-					0.1	1																																		
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																	0.1	1																						
GG	Poaceae		*Austrostipa setacea*																																									
GG	Poaceae		*Austrostipa sp.*																																		0.3	30						
GG	Poaceae		*Austrostipa spp.*										0.1	10																							0.1	1	0.2	30				
GG	Poaceae		*Austrostipa variabilis*																																									
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass																																								
EX	Poaceae	*	*Avena barbata*	Bearded Oats																																								
EX	Poaceae	*	*Avena fatua*	Wild Oats																																								
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																																								
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																																									
GG	Poaceae		*Bothriochloa macra*	Red Grass																																								
GG	Poaceae		*Bothriochloa spp.*																																									
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass																																								
GG	Poaceae		*Bromus diandrus*																																									
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																																								
GG	Poaceae		*Bromus spp.*																																									
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																																								
GG	Poaceae		*Chloris divaricata*	Slender Chloris																																								
GG	Poaceae		*Chloris divaricata var. divaricata*																																									

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																																								
GG	Poaceae		*Chloris spp.*																																				2	1000	0.1	20	0.4	100
GG	Poaceae		*Chloris truncata*	Windmill Grass																											0.1	2												
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass																																								
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																											0.1	2												
GG	Poaceae		*Cymbopogon refractus*																																									
GG	Poaceae		*Cynodon dactylon*	Couch																													0.1	2							0.1	3		
GG	Poaceae		*Dactyloctenium radulans*	Button Grass																																								
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																																								
GG	Poaceae		*Dichanthium sp.*																																									
GG	Poaceae		*Dichanthium spp.*																																									
GG	Poaceae		*Digitaria ammophila*																																									
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass																																								
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																																								
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass																																								
GG	Poaceae		*Digitaria ramularis*																																									
GG	Poaceae		*Digitaria spp.*																																									
GG	Poaceae		*Echinochloa spp.*																																									
GG	Poaceae		*Echinopogon spp.*																																									
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																																								
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																																								
GG	Poaceae		*Enneapogon spp.*																						0.1	3																		
GG	Poaceae		*Enteropogon acicularis*	-							0.1	3	0.1	5																														
GG	Poaceae		*Eragrostis alveiformis*																																									
GG	Poaceae		*Eragrostis australasica*	-																																								
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass																																								
EX	Poaceae	*	*Eragrostis cilianensis*																																									
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																								
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																																								
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																								
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																																								
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																																								
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																																								
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																								
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																																								
GG	Poaceae		*Eragrostis spp.*																				0.1	5															0.1	5	0.1	5	0.3	200
GG	Poaceae		*Eriachne spp.*																																									
GG	Poaceae		*Eriochloa australiensis*	-																																								
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																																								
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass																																								
EX	Poaceae	*	*Hordeum spp.*																																									
GG	Poaceae		*Imperata cylindrica*	Blady Grass																																								
GG	Poaceae		*Lachnagrostis spp.*																																									
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass																																								
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass																																								
GG	Poaceae		*Microlaena stipoides*																																									
GG	Poaceae		*Panicum decompositum*																																									
GG	Poaceae		*Panicum effusum*	Hairy Panic																																								
GG	Poaceae		*Panicum spp.*																												0.1	1												
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																																								
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass																																								
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass																																								
GG	Poaceae		*Paspalidium spp.*																																									
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																																								
GG	Poaceae		*Phragmites australis*	Common Reed																																								
GG	Poaceae		*Poa sieberiana*	-																																								
GG	Poaceae		*Poa spp.*																																									
GG	Poaceae		*Poaceae sp.*																																									
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																								
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																			0.1	2																				
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																																								
GG	Poaceae		*Rytidosperma duttonianum*	-																																								
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Poaceae		*Rytidosperma racemosum*	-																																								
GG	Poaceae		*Rytidosperma racemosum*																																									
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																																								
GG	Poaceae		*Rytidosperma spp.*										0.1	20																														
GG	Poaceae		*Rytidosperma spp.*												0.1	1																												
EX	Poaceae	*	*Setaria parviflora*	-																																								
GG	Poaceae		*Setaria spp.*	A Setaria species																																								
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																																								
GG	Poaceae		*Sporobolus caroli*	Fairy Grass																																								
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass																																								
GG	Poaceae		*Sporobolus spp.*																																									
GG	Poaceae		*Themeda spp.*																																									
GG	Poaceae		*Themeda triandra*	Kangaroo Grass																																								
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass																																								
GG	Poaceae		*Tragus australianus*	Small Burrgrass																																								
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																																								
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																																								
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																																								
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																																								
GG	Poaceae spp.		*Poaceae spp.*																																									
SG	Polygonaceae		*Duma florulenta*	Lignum																																								
EX	Polygonaceae	*	*Emex spinosa*	-																																								
EX	Polygonaceae	*	*Emex spp.*																																									
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																																								
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed																																								
FG	Polygonaceae		*Rumex brownii*	Swamp Dock																																								
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																																								
FG	Portulacaceae		*Calandrinia eremaea*	-																																								
FG	Portulacaceae		*Portulaca oleracea*	Pigweed																																	0.1	10						
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																																								
FG	Portulacaceae		*Portulaca spp.*																																									
FG	Portulacaceae		*Portulaca spp.*																																									
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea											0.1	1	0.1	2	0.1	2																								
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																								
SG	Proteaceae		*Persoonia sericea*	-																																								
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																																								
EG	Pteridaceae		*Cheilanthes sieberi*	-	0.1	2	0.2	200	0.1	15	0.1	2			0.1	1					0.1	1	0.1	20	0.1	20					0.1	1	0.1	5										
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																								
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																																								
SG	Rhamnaceae		*Cryptandra spp.*																																									
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																																								
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																																								
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																																								
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																								
SG	Rutaceae		*Boronia occidentalis*	-																																								
SG	Rutaceae		*Geijera parviflora*	Wilga																			0.3	1													0.1	1						
SG	Rutaceae		*Philotheca brevifolia*	-																																								
SG	Rutaceae		*Philotheca ciliata*	-																																								
SG	Rutaceae		*Philotheca spp.*																																									
SG	Santalaceae		*Exocarpos spp.*																								0.2	1																
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood																																								
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																																								
SG	Sapindaceae		*Dodonaea boronifolia*																																									
SG	Sapindaceae		*Dodonaea hetromorpha*																																									
SG	Sapindaceae		*Dodonaea spp.*																																									
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																																								
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush							50	200																																
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush									2	15																					1	5								
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-	0.3	3																																						
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																																								
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple																																								
SG	Scrophulariaceae		*Eremophila deserti*																																									
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP21		T1-MP22		T1-MP23		T1-MP24		T1-MP25		T1-MP26		T1-MP27		T1-MP28		T1-MP29		T1-MP30		T1-MP31		T1-MP32		T1-MP33		T1-MP34		T1-MP35		T1-MP36		T1-MP37		T1-MP38		T1-MP39		T1-MP40	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																																								
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda																																								
SG	Scrophulariaceae		*Eremophila spp.*																																									
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																																								
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																																								
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn																																								
SG	Solanaceae		*Lycium spp.*																																									
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																					0.1	1	0.1	1																
FG	Solanaceae		*Solanum cleistogamum*																																									
FG	Solanaceae		*Solanum ellipticum*																																									
SG	Solanaceae		*Solanum erianthum*	Potato Tree																																								
FG	Solanaceae		*Solanum esuriale*	Quena																																			0.1	10			0.1	1
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush			0.1	1			0.1	1	0.1	3									0.1	2	0.1	2					0.1	1	0.1	1	0.1	1							0.1	10
SG	Solanaceae		*Solanum jucundum*																																									
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																																								
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																																								
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																																								
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																																								
SG	Thymelaeaceae		*Pimelea spp.*																																									
EX	Urticaceae	*	*Urtica urens*	Small Nettle																																								
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest																																								
HT	Verbenaceae	*	*Phyla canescens*	-																																								
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																																								
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop																																								
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																																								
FG	Violaceae		*Hybanthus spp.*																																									
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-											0.2	1																												
OG	Zamiaceae		*Macrozamia glaucophylla*	-																																								
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																																								
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop																																	0.1	1	0.1	1				

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																											0.1	19	0.1	20	0.1	5								
FG	Acanthaceae		*Brunoniella spp.*																																									
FG	Acanthaceae		*Rostellularia adscendens*	-																																								
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																																								
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																																								
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																								
FG	Aizoaceae		*Trianthema triquetra*																																									
FG	Aizoaceae		*Zaleya galericulata*	Hogweed	0.1	2																																						
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed																																								
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																																								
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed																																								
FG	Amaranthaceae		*Alternanthera spp.*																																									
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																																								
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																																									
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																																								
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																																								
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																								
FG	Anthericaceae		*Arthropodium minus*	-																																								
FG	Anthericaceae		*Arthropodium spp.*																																									
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																																								
FG	Anthericaceae		*Thysanotus spp.*																																									
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																																								
FG	Anthericaceae		*Tricoryne elatior*																																									
FG	Apiaceae		*Actinotus gibbonsii*																																									
SG	Apiaceae	*	*Apiaceae sp.*												0.1	6																												
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																																								
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																																								
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																																								
FG	Apiaceae		*Eryngium spp.*																																									
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																											0.1	1												
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																					0.1	1																		
OG	Apocynaceae		*Tylophora linearis*	-																																								
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																																								
FG	Asphodelaceae		*Bulbine semibarbata*																																									
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																																								
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed																																								
FG	Asteraceae		*Asteraceae sp.*																																									
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																																								
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																																								
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																																								
FG	Asteraceae		*Brachyscome spp.*																																									
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																																								
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy																									0.1	1														
FG	Asteraceae		*Calotis hispidula*	Bogan Flea																																								
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy																													0.1	1										
FG	Asteraceae		*Calotis scapigera*																																									
FG	Asteraceae		*Calotis spp.*																																									
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle																																								
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush									0.1	1																							0.1	4						
SG	Asteraceae		*Cassinia spp.*																																									
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																																								
FG	Asteraceae		*Centipeda cunninghamii*																																									
FG	Asteraceae		*Centipeda thespidioides*																																									
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																			0.1	1				
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting																																								
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																								
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																																								
FG	Asteraceae		*Conyza spp.*																																									
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																								
FG	Asteraceae		*Cotula australis*																																									
FG	Asteraceae		*Cotula spp.*																																									
EX	Asteraceae	*	*Cotula spp.*																																									
FG	Asteraceae		*Eclipta platyglossa*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Asteraceae		*Euchiton involucratus*																																									
FG	Asteraceae		*Euchiton sphaericus*																																									
FG	Asteraceae		*Euchiton sphaericus*																																									
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																																								
FG	Asteraceae	*	*Gnaphalium spp.*	-																																								
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																																								
FG	Asteraceae		*Hyalosperma spp.*																																									
FG	Asteraceae		*Hyalosperma spp.*																																									
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																																								
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear																																								
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions																																								
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																																								
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																																								
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																																								
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																								
FG	Asteraceae		*Leptorhynchos spp.*																																									
FG	Asteraceae		*Myriocephalus pluriflorus*																																									
SG	Asteraceae		*Olearia pimeleoides*	-																																								
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																																								
SG	Asteraceae		*Ozothamnus diosmifolius*																																									
FG	Asteraceae		*Picris spp.*																																									
FG	Asteraceae		*Podolepis spp.*																																									
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																									
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																																								
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle																																								
EX	Asteraceae	*	*Stuartina meulleri*																																									
FG	Asteraceae		*Stuartina spp.*																																									
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion																																								
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																																								
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed																																								
FG	Asteraceae		*Vittadinia triloba*																																									
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr																																								
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																																								
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse																																								
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																								
FG	Boraginaceae		*Hackelia suaveolens*	-																																								
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																																								
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																																								
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																								
EX	Brassicaceae	*	*Brassica spp.*																																									
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																								
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																																								
FG	Brassicaceae		*Harmsiodoxa spp.*																																									
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																																								
EX	Brassicaceae	*	*Lepidium africanum*																																									
EX	Brassicaceae	*	*Lepidium bonariense*	-																																								
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																																								
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress																																								
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																																								
EX	Brassicaceae	*	*Lepidium spp.*																																									
EX	Brassicaceae	*	*Lepidium spp.*																																									
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed																																								
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																								
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																																								
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear			0.1	1																					0.1	4	0.1	8	0.1	8	0.1	8			0.1	4	0.1	2	0.1	1
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear																																								
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia																																								
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																								
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell																																								
FG	Campanulaceae		*Wahlenbergia gracilenta*																																									
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell																																			0.1	1				
FG	Campanulaceae		*Wahlenbergia luteola*																																									
FG	Campanulaceae		*Wahlenbergia planiflora*																																									

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species																																								
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell																																								
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																																								
SG	Capparaceae		*Capparis mitchelli*	Wild Orange			0.3	1																																				
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																								
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																																								
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																																								
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																																								
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																									
EX	Caryophyllaceae	*	*Spergularia spp.*																																									
SG	Casuarinaceae		*Allocasuarina diminuta*	-															0.1	10	0.1	2																						
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak					0.1	1	0.1	2	0.2	2	0.2	2									30	80			0.1	4			0.1	1	25	40	0.2	6			0.1	7	0.1	3
SG	Casuarinaceae		*Allocasuarina spp.*																																									
TG	Casuarinaceae		*Casuarina cristata*	Belah																																								
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																																								
SG	Celastraceae		*Denhamia cunninghamii*	-																					0.1	1																		
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																									
SG	Chenopodiaceae		*Atriplex leptocarpa*																																									
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																																								
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																																								
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush																																								
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																																								
SG	Chenopodiaceae		*Chenopodium desertorum*																																									
FG	Chenopodiaceae		*Chenopodium melanocarpum*																																									
EX	Chenopodiaceae	*	*Chenopodium spp.*																																									
FG	Chenopodiaceae		*Chenopodium spp.*																																									
SG	Chenopodiaceae		*Dissocarpus paradoxus*																																									
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																																								
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																																								
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed																																								
FG	Chenopodiaceae		*Dysphania spp.*																																									
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush																															0.1	1			0.1	10				
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush	0.1	50																																						
FG	Chenopodiaceae		*Einadia polygonoides*	-																																								
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed																									0.1	2														
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush																																								
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																																								
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush																																								
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush	0.1	1																																						
SG	Chenopodiaceae		*Maireana spp.*																																									
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																																								
SG	Chenopodiaceae		*Salsola australis*	-																																								
SG	Chenopodiaceae		*Salsola kali*	-																																								
SG	Chenopodiaceae		*Salsola spp.*																																									
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr																																								
SG	Chenopodiaceae		*Sclerolaena diacantha*																																									
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																																								
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly																																								
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																																								
SG	Chenopodiaceae		*Sclerolaena tricuspis*																																									
FG	Commelinaceae		*Commelina cyanea*	-																											0.1	1												
FG	Commelinaceae		*Commelina spp.*																																									
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed																																								
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed																																								
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																																								
FG	Crassulaceae		*Crassula colorata*	-																																								
FG	Crassulaceae		*Crassula sieberiana*																																									
FG	Crassulaceae		*Crassula spp.*																																									
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon																																								
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine	0.1	1	50	65	15	28	15	30	4	7	0.5	4	10	7	15	16	35	50			1	5	10	6	15	40	35	80	15	12	10	8	20	30	0.2	2	20	50	25	100
GG	Cyperaceae		*Baumea spp.*																																									
GG	Cyperaceae		*Carex appressa*	Tall Sedge																																								
GG	Cyperaceae		*Carex inversa*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Cyperaceae		*Carex spp.*																																									
GG	Cyperaceae		*Cyathochaeta diandra*	-					0.1	2	0.1	2																																
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																																								
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																									
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																																								
GG	Cyperaceae		*Cyperus spp.*																																									
GG	Cyperaceae		*Eleocharis spp.*																																									
GG	Cyperaceae		*Eleocharis spp.*																																									
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																								
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge					0.1	2			0.2	9																	0.1	1												
GG	Cyperaceae		*Gahnia spp.*																																									
GG	Cyperaceae		*Lepidosperma laterale*	-																																								
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																																								
GG	Cyperaceae		*Schoenus kennyi*	-													0.1	10			0.1	10																						
GG	Cyperaceae		*Schoenus spp.*																																									
SG	Dilleniaceae		*Hibbertia linearis*	-																																								
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower							0.1	3																																
SG	Dilleniaceae		*Hibbertia riparia*																																									
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																																								
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																	0.1	10			0.1	3	0.1	2																
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath					0.2	17	0.1	1			0.1	10	0.1	2	0.1	10	0.1	4							0.1	1														
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners					0.1	1											0.1	1																						
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																																								
FG	Euphorbiaceae		*Chamaesyce drummondii*																																									
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed																																								
FG	Euphorbiaceae		*Euphorbia spp.*																																									
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																																								
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																																								
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																																								
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle											35	100																												
TG	Fabaceae		*Acacia cheelii*	Motherumbah																							0.1	3																
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																																								
SG	Fabaceae		*Acacia deanei*	Deans Wattle	0.1	1	0.1	1					5	7																											0.1	3		
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																											0.1	2	0.5	12	0.5	30	0.1	2	0.1	2				
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																								
TG	Fabaceae		*Acacia decurrens*	Black Wattle																																								
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																													0.1	5										
TG	Fabaceae		*Acacia harpophylla*	Brigalow																																								
TG	Fabaceae		*Acacia homalophylla*	Yarran																																								
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																																								
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle					1	20	10	20	0.1	1	0.2	5	0.1	5			0.1	20	30	2400	40	1000											0.5	8						
SG	Fabaceae		*Acacia montana*	Mallee Wattle																															0.1	2	0.1	3						
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle					0.2	16													25	2000																				
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																																								
TG	Fabaceae		*Acacia pendula*	Weeping Myall																																								
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory													0.2	20																										
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																																								
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																																								
SG	Fabaceae		*Acacia spp.*				0.2	2																																				
SG	Fabaceae		*Acacia spp.*										0.1	1																														
SG	Fabaceae		*Acacia stenophylla*																																									
SG	Fabaceae		*Acacia subulata*																																									
SG	Fabaceae		*Acacia trineura*																																									
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																																								
SG	Fabaceae		*Bossiaea concolor*																																									
SG	Fabaceae		*Bossiaea spp.*																																									
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea													0.1	6							0.1	1																		
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																																							0.1	1
OG	Fabaceae		*Desmodium spp.*																																									
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																																								
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																																								
SG	Fabaceae		*Dillwynia sp.*																																									
OG	Fabaceae		*Glycine clandestina*	-																																			0.1	2				

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																																								
OG	Fabaceae		*Glycine tabacina*	-																									0.1	1									0.1	1				
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																																								
SG	Fabaceae		*Hovea apiculata*	-													0.1	10	0.1	20	0.1	10																						
EX	Fabaceae	*	*Lotus spp.*																																									
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																								
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic																																								
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																																								
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic																																								
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																																								
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																								
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant																																								
SG	Fabaceae		*Pultenaea microphylla*	-																																								
SG	Fabaceae		*Pultenaea microphylla*	-					2	80					0.1	20																												
SG	Fabaceae		*Pultenaea sp.*																																									
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																																								
FG	Fabaceae		*Senna barclayana*	Smooth Senna																																								
SG	Fabaceae		*Senna sp.*																																									
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																																								
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																								
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover																																								
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																																								
EX	Fabaceae	*	*Trifolium sp.*																																									
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																																								
EX	Fabaceae	*	*Vicia spp.*																																									
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																									
SG	Fabaceae (Faboideae)		*Cullen tenax*																																									
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																									
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																									
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																									
EX	Gentianaceae	*	*Centaurium erythraea*																																									
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																																								
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill																																								
FG	Goodeniaceae		*Brunonia australis*																																									
FG	Goodeniaceae		*Dampiera adpressa*																																									
FG	Goodeniaceae		*Goodenia cycloptera*	-																																								
FG	Goodeniaceae		*Goodenia fasicularis*	-																																								
FG	Goodeniaceae		*Goodenia glabra*																																									
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																																								
FG	Goodeniaceae		*Goodenia rotundifolia*	-																																								
FG	Haloragaceae		*Gonocarpus elatus*																																									
GG	Juncaceae		*Juncus continuus*	-																																			1	100				
GG	Juncaceae		*Juncus spp.*										0.5	20																														
GG	Juncaceae		*Juncus subsecundus*	-																																								
FG	Lamiaceae		*Ajuga australis*	Austral Bugle									0.1	1																														
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																																								
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																																								
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed																																								
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																																								
FG	Lamiaceae		*Teucrium betchei*	-																																								
SG	Lamiaceae		*Westringia cheelii*	-																																								
SG	Lamiaceae		*Westringia spp.*																																									
OG	Lauraaceae		*Cassytha melantha*																																									
OG	Lauraaceae		*Cassytha pubescens*	-																																			1	20				
FG	Linaceae		*Linum marginale*																																									
FG	Lobeliaceae		*Lobelia concolor*																																									
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush							0.1	10	0.1	10	0.1	2	0.1	40			0.1	20									0.1	10	0.1	20	0.1	10	0.1	30			0.1	2	0.1	20
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																								
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush					0.1	20	0.1	3	5	30	0.1	10	0.1	10											0.2	50	0.1	20	0.1	20	0.1	10	0.1	5	1	20	0.1	7	0.1	20
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																																								
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush			0.1	1																																				
GG	Lomandraceae		*Lomandra spp.*		0.1	1																																						
OG	Loranthaceae		*Amyema miquelii*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Loranthaceae		*Amyema quandang*	-																																								
OG	Loranthaceae		*Amyema spp.*																																									
FG	Lythraceae		*Lythrum hyssopifolia*																																									
SG	Malvaceae		*Abutilon otocarpum*																																									
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush																																								
SG	Malvaceae		*Abutilon spp.*																																									
TG	Malvaceae		*Brachychiton populneus*	Kurrajong																											0.1	2												
SG	Malvaceae		*Commersonia procumbens*																																									
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow																																								
EX	Malvaceae	*	*Malva spp.*																																									
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																																								
FG	Malvaceae		*Sida corrugata*	Corrugated Sida																																								
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida																																								
FG	Malvaceae		*Sida hackettiana*	Golden Rod																																								
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne																																								
EX	Malvaceae	*	*Sida spinosa*	-																																								
EX	Malvaceae	*	*Sida spp.*																																									
FG	Malvaceae		*Sida trichopoda*																																									
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																																								
TG	Meliaceae		*Melia azedarach*	White Cedar																																								
SG	Myrtaceae		*Acacia sp*																																									
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple									10	6																														
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																			15	10				
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle													0.1	30	0.5	30	0.1	30					2	30									0.1	2						
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood					3	3	5	5					20	19	10	7	20	9					1	3																
SG	Myrtaceae		*Darwinia spp.*																																									
TG	Myrtaceae		*Eucalyptus albens*	White Box																																								
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum									12	4																									25	4				
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum																																								
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum							1	1			0.5	2																												
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																																								
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																																								
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark	40	8	2	1	5	3	10	2			1	1							10	20	1	2			0.1	1			0.2	1	5	7	15	8					0.5	1
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																																								
TG	Myrtaceae		*Eucalyptus dwyeri*	-															0.1	1							0.1	3																
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark													1	1									20	18																
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																																								
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																																								
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																									1	2	0.2	1												
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box																													10	1										
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box																									10	6	10	6									10	9	20	12
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																																								
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark					5	3									1	1																								
TG	Myrtaceae		*Eucalyptus spp.*																																									
TG	Myrtaceae		*Eucalyptus spp.*																																									
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																																								
SG	Myrtaceae		*Harmogia densifolia*	-							0.1	4									0.1	1																						
SG	Myrtaceae		*Homoranthus flavescens*	-											0.2	20																												
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																																								
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																			25	30				
SG	Myrtaceae		*Leptospermum spp.*										10	30																														
SG	Myrtaceae		*Melaleuca erubescens*	-																																								
SG	Myrtaceae		*Melaleuca erubescens*																																									
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																			0.5	5																				
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle					0.1	12					0.5	12																												
SG	Myrtaceae		*Micromyrtus sessilis*	-													0.1	5	0.1	5	0.1	7																						
SG	Myrtaceae		*Micromyrtus spp.*																																									
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine																																								
FG	Nyctaginaceae		*Boerhavia dominii*																																									
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																																								
OG	Oleaceae		*Jasminum spp.*																																									
TG	Oleaceae		*Notelaea microcarpa*																																									
TG	Oleaceae		*Notelaea spp.*																																									

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
EX	Onagraceae	*	*Oenothera mollissima*	-																																								
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid									0.1	1																														
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																								
FG	Orchidaceae		*Orchidaceae spp.*																																									
FG	Orchidaceae		*Orchidaceae spp.*																																									
FG	Oxalidaceae		*Oxalis chnoodes*																																									
EX	Oxalidaceae	*	*Oxalis corniculata*	-																																								
FG	Oxalidaceae		*Oxalis exilis*	-																																								
FG	Oxalidaceae		*Oxalis perennans*	-																																								
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																								
FG	Oxalidaceae		*Oxalis spp.*																																									
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																																								
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																																								
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily																																								
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily					0.2	30	0.1	2			0.1	3	0.1	7							0.1	1			0.1	1							0.1	1	0.1	1				
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																																								
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																																								
SG	Phyllanthaceae		*Phyllanthus hirtellus*																																									
FG	Phyllanthaceae		*Phyllanthus spp.*																																									
FG	Phyllanthaceae		*Phyllanthus virgatus*	-																																								
FG	Plantaginaceae		*Plantago gaudichaudii*																																									
EX	Plantaginaceae	*	*Plantago sp.*																																									
FG	Plantaginaceae		*Plantago spp.*																																									
FG	Plantaginaceae		*Plantago turrifera*	-																																								
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																								
GG	Poaceae		*Anthosachne scabra*	Wheatgrass																																								
GG	Poaceae		*Aristida acuta*																																									
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																																								
GG	Poaceae		*Aristida calycina*																																									
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass																																								
GG	Poaceae		*Aristida longicollis*	-																																								
GG	Poaceae		*Aristida muricata*	-																																								
GG	Poaceae		*Aristida personata*	Purple Wire-grass																																								
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass					0.1	20	0.1	20	0.1	10			0.1	10			0.1	10							0.1	30	0.1	5	0.1	20	0.1	10	0.1	10			0.1	10	0.1	20
GG	Poaceae		*Aristida spp.*				0.1	20																																				
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass							0.1	20																			0.1	4												
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																																								
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																																								
GG	Poaceae		*Austrostipa densiflora*																																									
GG	Poaceae		*Austrostipa falcata*																																									
GG	Poaceae		*Austrostipa nodosa*																																									
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass																																								
GG	Poaceae		*Austrostipa scabra*	Speargrass	0.2	100	0.1	50																					0.1	60	0.1	50	0.1	50	0.1	30	40	80	0.1	20	0.1	50	1	100
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																																								
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																																								
GG	Poaceae		*Austrostipa setacea*																																									
GG	Poaceae		*Austrostipa sp.*																																									
GG	Poaceae		*Austrostipa spp.*																																									
GG	Poaceae		*Austrostipa variabilis*																																									
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass																																			0.1	5				
EX	Poaceae	*	*Avena barbata*	Bearded Oats																																								
EX	Poaceae	*	*Avena fatua*	Wild Oats																																								
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																																								
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																																									
GG	Poaceae		*Bothriochloa macra*	Red Grass																																								
GG	Poaceae		*Bothriochloa spp.*																																									
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass																																								
GG	Poaceae		*Bromus diandrus*																																									
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																																								
GG	Poaceae		*Bromus spp.*																																									
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																																								
GG	Poaceae		*Chloris divaricata*	Slender Chloris																																								
GG	Poaceae		*Chloris divaricata var. divaricata*																																									

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																																								
GG	Poaceae		*Chloris spp.*																																									
GG	Poaceae		*Chloris truncata*	Windmill Grass	0.1	30																																						
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass																																								
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																																								
GG	Poaceae		*Cymbopogon refractus*																																									
GG	Poaceae		*Cynodon dactylon*	Couch																																								
GG	Poaceae		*Dactyloctenium radulans*	Button Grass																																								
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																																								
GG	Poaceae		*Dichanthium sp.*																																									
GG	Poaceae		*Dichanthium spp.*																																									
GG	Poaceae		*Digitaria ammophila*																																									
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass																																								
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																																								
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass																																								
GG	Poaceae		*Digitaria ramularis*																																									
GG	Poaceae		*Digitaria spp.*																																									
GG	Poaceae		*Echinochloa spp.*																																									
GG	Poaceae		*Echinopogon spp.*																																									
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																																								
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																																								
GG	Poaceae		*Enneapogon spp.*																																									
GG	Poaceae		*Enteropogon acicularis*	-																									0.1	1														
GG	Poaceae		*Eragrostis alveiformis*																																									
GG	Poaceae		*Eragrostis australasica*	-																																								
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass																																								
EX	Poaceae	*	*Eragrostis cilianensis*																																									
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																								
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																																								
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																								
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																																								
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																															0.1	10								
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																																								
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																								
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																																								
GG	Poaceae		*Eragrostis spp.*		0.1	100	0.1	30																																				
GG	Poaceae		*Eriachne spp.*																																				0.1	1				
GG	Poaceae		*Eriochloa australiensis*	-																																								
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																																								
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass																																								
EX	Poaceae	*	*Hordeum spp.*																																									
GG	Poaceae		*Imperata cylindrica*	Blady Grass																																								
GG	Poaceae		*Lachnagrostis spp.*																																									
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass																																								
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass																																								
GG	Poaceae		*Microlaena stipoides*																																									
GG	Poaceae		*Panicum decompositum*																																									
GG	Poaceae		*Panicum effusum*	Hairy Panic																																								
GG	Poaceae		*Panicum spp.*																																									
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																																								
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass																																								
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass																																								
GG	Poaceae		*Paspalidium spp.*																																									
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																																								
GG	Poaceae		*Phragmites australis*	Common Reed																																								
GG	Poaceae		*Poa sieberiana*	-																																								
GG	Poaceae		*Poa spp.*																																									
GG	Poaceae		*Poaceae sp.*																																									
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																								
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																																								
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																																								
GG	Poaceae		*Rytidosperma duttonianum*	-																																								
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Poaceae		*Rytidosperma racemosum*	-																																								
GG	Poaceae		*Rytidosperma racemosum*																																									
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																																								
GG	Poaceae		*Rytidosperma spp.*																																									
GG	Poaceae		*Rytidosperma spp.*																										0.1	2														
EX	Poaceae	*	*Setaria parviflora*	-																																								
GG	Poaceae		*Setaria spp.*	A Setaria species																																								
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																																								
GG	Poaceae		*Sporobolus caroli*	Fairy Grass																																								
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass																																								
GG	Poaceae		*Sporobolus spp.*																																									
GG	Poaceae		*Themeda spp.*																																									
GG	Poaceae		*Themeda triandra*	Kangaroo Grass																																								
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass																																								
GG	Poaceae		*Tragus australianus*	Small Burrgrass																																								
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																																								
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																																								
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																																								
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																																								
GG	Poaceae spp.		*Poaceae spp.*																																									
SG	Polygonaceae		*Duma florulenta*	Lignum																																								
EX	Polygonaceae	*	*Emex spinosa*	-																																								
EX	Polygonaceae	*	*Emex spp.*																																									
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																																								
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed																																								
FG	Polygonaceae		*Rumex brownii*	Swamp Dock																																								
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																																								
FG	Portulacaceae		*Calandrinia eremaea*	-																																								
FG	Portulacaceae		*Portulaca oleracea*	Pigweed																																								
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																																								
FG	Portulacaceae		*Portulaca spp.*																																									
FG	Portulacaceae		*Portulaca spp.*																																									
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea																																								
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																								
SG	Proteaceae		*Persoonia sericea*	-																					0.1	1																		
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																									0.1	5														
EG	Pteridaceae		*Cheilanthes sieberi*	-					0.1	30	0.1	10			0.1	1							0.1	10					0.1	5													0.1	1
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																								
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																																								
SG	Rhamnaceae		*Cryptandra spp.*																								0.1	5																
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																																								
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																																								
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																																								
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																	0.1	1						
SG	Rutaceae		*Boronia occidentalis*	-											0.1	5																												
SG	Rutaceae		*Geijera parviflora*	Wilga																																								
SG	Rutaceae		*Philotheca brevifolia*	-																																								
SG	Rutaceae		*Philotheca ciliata*	-																																								
SG	Rutaceae		*Philotheca spp.*																																									
SG	Santalaceae		*Exocarpos spp.*																																									
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood																																								
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																																								
SG	Sapindaceae		*Dodonaea boronifolia*																																									
SG	Sapindaceae		*Dodonaea hetromorpha*																																									
SG	Sapindaceae		*Dodonaea spp.*																								0.1	5																
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush	0.1	1																																						
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush													0.1	10																			0.1	20						
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																							0.1	1					0.1	2										
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-																																								
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																																								
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple																																							0.1	1
SG	Scrophulariaceae		*Eremophila deserti*																																									
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																																								

GF	Family	Exotic	Scientific name	Common Name	T1-MP41		T1-MP42		T2-MP1		T2-MP2		T2-MP3		T2-MP4		T2-MP5		T2-MP6		T2-MP7		T2-MP8		T2-MP9		T2-MP10		T2-MP11		T2-MP12		T2-MP13		T2-MP14		T2-MP15		T2-MP16		T2-MP17		T2-MP18	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																																								
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda																																								
SG	Scrophulariaceae		*Eremophila spp.*																																									
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																																								
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																																								
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn																																								
SG	Solanaceae		*Lycium spp.*																																									
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																																								
FG	Solanaceae		*Solanum cleistogamum*																																									
FG	Solanaceae		*Solanum ellipticum*																																									
SG	Solanaceae		*Solanum erianthum*	Potato Tree																																								
FG	Solanaceae		*Solanum esuriale*	Quena	0.1	1																																						
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush	0.1	50	0.1	10																					0.1	5	0.1	10			0.1	1	0.1	20						
SG	Solanaceae		*Solanum jucundum*																																									
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																																								
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower													0.1	1																										
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																																								
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																																								
SG	Thymelaeaceae		*Pimelea spp.*																																									
EX	Urticaceae	*	*Urtica urens*	Small Nettle																																								
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest																																								
HT	Verbenaceae	*	*Phyla canescens*	-																																								
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																																								
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop																																								
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																																								
FG	Violaceae		*Hybanthus spp.*																																									
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-							0.1	1							0.1	4	0.1	2																						
OG	Zamiaceae		*Macrozamia glaucophylla*	-							0.3	8																																
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																																								
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop																																								

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																																								
FG	Acanthaceae		*Brunoniella spp.*																																									
FG	Acanthaceae		*Rostellularia adscendens*	-																																								
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																																								
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																																								
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																																								
FG	Aizoaceae		*Trianthema triquetra*																																								0.1	40
FG	Aizoaceae		*Zaleya galericulata*	Hogweed																																								
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed																			0.2	70	0.1	5	0.1	10											0.2	100				
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																																								
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed																																								
FG	Amaranthaceae		*Alternanthera spp.*																																									
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																																								
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																				0.1	1																				
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																																								
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																																								
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																																								
FG	Anthericaceae		*Arthropodium minus*	-																																								
FG	Anthericaceae		*Arthropodium spp.*																																									
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																													0.1	2										
FG	Anthericaceae		*Thysanotus spp.*																																									
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily																															0.1	5								
FG	Anthericaceae		*Tricoryne elatior*																																									
FG	Apiaceae		*Actinotus gibbonsii*																																									
SG	Apiaceae	*	*Apiaceae sp.*																																									
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																																								
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot																													0.2	100	1	500								
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																																								
FG	Apiaceae		*Eryngium spp.*																																									
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																																								
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																																								
OG	Apocynaceae		*Tylophora linearis*	-													0.1	1																										
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																									0.3	250														
FG	Asphodelaceae		*Bulbine semibarbata*																				0.2	50	0.3	150	0.1	10					0.1	10										
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																					0.1	10																		
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed																																								
FG	Asteraceae		*Asteraceae sp.*																																									
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																																								
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																																								
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																																								
FG	Asteraceae		*Brachyscome spp.*																																									
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																																								
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy																													45	57							0.1	1	0.1	10
FG	Asteraceae		*Calotis hispidula*	Bogan Flea																																							0.1	10
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy																	0.1	10	0.1	1			0.4	100			0.1	10							2	50			30	1000
FG	Asteraceae		*Calotis scapigera*																						0.1	20	0.1	1																
FG	Asteraceae		*Calotis spp.*																																									
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle											0.1	10							0.1	2			1.5	500											0.2	30	0.4	50		
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush																																								
SG	Asteraceae		*Cassinia spp.*																		0.1	10													0.1	2								
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																			0.3	150																				
FG	Asteraceae		*Centipeda cunninghamii*																										0.1	50														
FG	Asteraceae		*Centipeda thespidioides*																						0.3	25	1	250																
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																																								
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting																															0.2	60	0.1	2						
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																																								
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																							0.3	100	0.1	20			0.1	5										
FG	Asteraceae		*Conyza spp.*																																									
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																																								
FG	Asteraceae		*Cotula australis*																												0.1	3												
FG	Asteraceae		*Cotula spp.*																																									
EX	Asteraceae	*	*Cotula spp.*																																									
FG	Asteraceae		*Eclipta platyglossa*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Asteraceae		*Euchiton involucratus*																								1	40	1	150			0.1	10	1	10	0.1	2						
FG	Asteraceae		*Euchiton sphaericus*																																									
FG	Asteraceae		*Euchiton sphaericus*																																									
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																																								
FG	Asteraceae	*	*Gnaphalium spp.*	-																																								
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																																								
FG	Asteraceae		*Hyalosperma spp.*																																									
FG	Asteraceae		*Hyalosperma spp.*																																									
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																																								
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear																															0.1	10					0.2	30		
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions																																								
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																																								
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																																								
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																																								
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed																																								
FG	Asteraceae		*Leptorhynchos spp.*																				0.1	5																				
FG	Asteraceae		*Myriocephalus pluriflorus*																						0.1	10																		
SG	Asteraceae		*Olearia pimeleoides*	-																																								
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																																								
SG	Asteraceae		*Ozothamnus diosmifolius*																																									
FG	Asteraceae		*Picris spp.*																																									
FG	Asteraceae		*Podolepis spp.*																				0.2	50																				
FG	Asteraceae		*Pseudognaphalium luteoalbum*																																						0.1	20		
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																	1.5	60																	0.3	100				
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle																																					0.2	200	0.1	1
EX	Asteraceae	*	*Stuartina meulleri*																																									
FG	Asteraceae		*Stuartina spp.*																																									
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion																																								
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																																								
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed																	0.1	1	0.1	1			0.1	5	0.1	5	2	600	0.1	2	0.5	50	0.1	1			0.1	30	0.1	1
FG	Asteraceae		*Vittadinia triloba*																										0.1	20														
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr																																								
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																															0.1	2	0.1	1						
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse																	0.5	350					0.5	250															0.5	100
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																																								
FG	Boraginaceae		*Hackelia suaveolens*	-																																								
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																																								
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																																								
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																																								
EX	Brassicaceae	*	*Brassica spp.*																																									
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																																								
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																																								
FG	Brassicaceae		*Harmsiodoxa spp.*																																									
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																																								
EX	Brassicaceae	*	*Lepidium africanum*																		0.5	250	0.2	40					2	500	0.1	2							0.1	10				
EX	Brassicaceae	*	*Lepidium bonariense*	-																																								
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																																								
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress																																								
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																																								
EX	Brassicaceae	*	*Lepidium spp.*																																									
EX	Brassicaceae	*	*Lepidium spp.*																																									
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed																																								
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																																								
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																	0.1	5	0.1	1																				
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear			0.1	4																																				
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear																	0.1	2	0.1	1																			0.2	50
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia																																								
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																																								
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell																															0.2	100	0.1	3						
FG	Campanulaceae		*Wahlenbergia gracilenta*																														0.2	1	0.1	1								
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell																																								
FG	Campanulaceae		*Wahlenbergia luteola*																																				0.1	2				
FG	Campanulaceae		*Wahlenbergia planiflora*																						0.1	1			0.1	1	0.1	20									0.3	80	0.1	1

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species																																								
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell																							0.1	1																
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																																								
SG	Capparaceae		*Capparis mitchelli*	Wild Orange					0.1	1	0.1	2																																
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																																								
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																																								
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-																																								
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																																								
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*																																									
EX	Caryophyllaceae	*	*Spergularia spp.*																																									
SG	Casuarinaceae		*Allocasuarina diminuta*	-																																								
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak	20	30	0.1	6																									0.1	1	0.5	1								
SG	Casuarinaceae		*Allocasuarina spp.*																																									
TG	Casuarinaceae		*Casuarina cristata*	Belah									70	50																														
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																																								
SG	Celastraceae		*Denhamia cunninghamii*	-																																								
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																																									
SG	Chenopodiaceae		*Atriplex leptocarpa*																										2	300	0.1	1												
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																																								
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																																								
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush																																			0.2	50				
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																																								
SG	Chenopodiaceae		*Chenopodium desertorum*																														10	2										
FG	Chenopodiaceae		*Chenopodium melanocarpum*																		0.1	20																	30	2000	0.1	3		
EX	Chenopodiaceae	*	*Chenopodium spp.*																																									
FG	Chenopodiaceae		*Chenopodium spp.*																																									
SG	Chenopodiaceae		*Dissocarpus paradoxus*																						0.1	1			0.1	10														
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																																								
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																																								
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed																																								
FG	Chenopodiaceae		*Dysphania spp.*																																									
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush																	0.2	10																						
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush			0.1	1			0.1	20			0.1	2	0.1	10			3	100	0.3	150					0.1	5	0.1	1	0.3	100			0.1	10	10	500			0.1	5
FG	Chenopodiaceae		*Einadia polygonoides*	-							0.1	10																																
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed					0.1	30	0.2	50																																
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush					0.1	30	1	50											0.3	150																				
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush							0.1	20																																
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush									0.1	10																														
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush							0.1	1																	0.1	10														
SG	Chenopodiaceae		*Maireana spp.*																																									
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush							0.2	20																																
SG	Chenopodiaceae		*Salsola australis*	-																	3	300	2	250					0.1	1	0.1	1							0.1	2				
SG	Chenopodiaceae		*Salsola kali*	-																																								
SG	Chenopodiaceae		*Salsola spp.*																																								0.2	100
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr											0.1	20					3	150	3	600					0.2	1	0.1	2							0.1	10	0.1	2	0.3	30
SG	Chenopodiaceae		*Sclerolaena diacantha*																												0.3	80												
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																											0.1	2												
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly											0.1	5					10	2000	0.8	350	0.1	3	0.1	5	0.1	5											0.2	100	0.3	200
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly							0.1	20																																
SG	Chenopodiaceae		*Sclerolaena tricuspis*																						0.1	1																		
FG	Commelinaceae		*Commelina cyanea*	-																																								
FG	Commelinaceae		*Commelina spp.*																																									
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed																	0.3	100	1.5	250	0.1	7	0.2	300	0.1	2									0.1	1	0.1	5		
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed									0.1	50											0.3	150	5	2000	0.1	1									2	100			0.1	1
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																																								
FG	Crassulaceae		*Crassula colorata*	-																																								
FG	Crassulaceae		*Crassula sieberiana*																																									
FG	Crassulaceae		*Crassula spp.*																																									
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon																									0.6	200														
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine	5	7	15	16									10	10															0.1	15	0.1	10	0.1	5						
GG	Cyperaceae		*Baumea spp.*																																									
GG	Cyperaceae		*Carex appressa*	Tall Sedge																																								
GG	Cyperaceae		*Carex inversa*	-																																								

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Cyperaceae		*Carex spp.*																										0.1	5														
GG	Cyperaceae		*Cyathochaeta diandra*	-																																								
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																																								
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*																																		0.2	50						
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																																								
GG	Cyperaceae		*Cyperus spp.*																																									
GG	Cyperaceae		*Eleocharis spp.*																																									
GG	Cyperaceae		*Eleocharis spp.*																																									
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																																								
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																																								
GG	Cyperaceae		*Gahnia spp.*																																									
GG	Cyperaceae		*Lepidosperma laterale*	-																																	8	800						
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																																								
GG	Cyperaceae		*Schoenus kennyi*	-																																								
GG	Cyperaceae		*Schoenus spp.*																																									
SG	Dilleniaceae		*Hibbertia linearis*	-																																								
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower																																								
SG	Dilleniaceae		*Hibbertia riparia*																																									
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																															0.1	10	6	3						
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath	0.1	4																											0.1	5										
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath	0.1	2	0.1	1																																				
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																																								
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																																								
FG	Euphorbiaceae		*Chamaesyce drummondii*																								3	350			1	1000			0.1	1					0.1	5		
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed																																								
FG	Euphorbiaceae		*Euphorbia spp.*																																									
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																																								
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																																								
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																																								
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																																								
TG	Fabaceae		*Acacia cheelii*	Motherumbah																																								
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																																								
SG	Fabaceae		*Acacia deanei*	Deans Wattle			0.2	24																									0.2	20										
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle	0.1	3																																						
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																																								
TG	Fabaceae		*Acacia decurrens*	Black Wattle																																								
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																																								
TG	Fabaceae		*Acacia harpophylla*	Brigalow																																								
TG	Fabaceae		*Acacia homalophylla*	Yarran																																								
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																																								
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle																													0.3	100	0.2	1								
SG	Fabaceae		*Acacia montana*	Mallee Wattle																																								
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																																								
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																																								
TG	Fabaceae		*Acacia pendula*	Weeping Myall					20	30	20	19											0.5	100																				
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																																								
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																																								
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																																								
SG	Fabaceae		*Acacia spp.*																																									
SG	Fabaceae		*Acacia spp.*																																									
SG	Fabaceae		*Acacia stenophylla*																																									
SG	Fabaceae		*Acacia subulata*																																									
SG	Fabaceae		*Acacia trineura*																																									
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																																								
SG	Fabaceae		*Bossiaea concolor*																																0.1	50	10	900						
SG	Fabaceae		*Bossiaea spp.*																																									
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																																								
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																																								
OG	Fabaceae		*Desmodium spp.*																																									
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																													0.4	150										
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																																								
SG	Fabaceae		*Dillwynia sp.*																																									
OG	Fabaceae		*Glycine clandestina*	-																													0.1	1			0.1	10						

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																																								
OG	Fabaceae		*Glycine tabacina*	-																					0.1	30									0.3	30								
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																																								
SG	Fabaceae		*Hovea apiculata*	-																																								
EX	Fabaceae	*	*Lotus spp.*																																									
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic																																								
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic																																								
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																									0.5	300	15	150							20	200				
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic																	0.1	1	3	300							0.1	20												
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																																					0.1	2	0.5	10
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																																								
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant																																								
SG	Fabaceae		*Pultenaea microphylla*	-	0.1	20																																						
SG	Fabaceae		*Pultenaea microphylla*	-																																								
SG	Fabaceae		*Pultenaea sp.*																																									
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																																								
FG	Fabaceae		*Senna barclayana*	Smooth Senna																																								
SG	Fabaceae		*Senna sp.*																																									
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																																								
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																																								
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover																																			1	100	0.1	1		
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																	0.1	5	0.1	1					0.1	20	0.1	10							0.2	5				
EX	Fabaceae	*	*Trifolium sp.*																																									
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																																								
EX	Fabaceae	*	*Vicia spp.*																																									
SG	Fabaceae (Faboideae)		*Aotus subglauca*																																0.5	150								
SG	Fabaceae (Faboideae)		*Cullen tenax*																						3	1000	0.1	2																
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																																									
OG	Fabaceae (Faboideae)		*Glycine tomentella*																																									
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																																									
EX	Gentianaceae	*	*Centaurium erythraea*																						0.8	300	50	5000											0.1	3	0.1	1		
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																																								
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill																	0.2	100																	0.5	100				
FG	Goodeniaceae		*Brunonia australis*																																5	250	0.5	7						
FG	Goodeniaceae		*Dampiera adpressa*																																									
FG	Goodeniaceae		*Goodenia cycloptera*	-																																					0.1	1		
FG	Goodeniaceae		*Goodenia fasicularis*	-																																								
FG	Goodeniaceae		*Goodenia glabra*																																									
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																																								
FG	Goodeniaceae		*Goodenia rotundifolia*	-																																								
FG	Haloragaceae		*Gonocarpus elatus*																																									
GG	Juncaceae		*Juncus continuus*	-																																								
GG	Juncaceae		*Juncus spp.*														0.1	20																										
GG	Juncaceae		*Juncus subsecundus*	-																																								
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																																								
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																	0.1	5																						
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																																								
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed					0.1	6																																		
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																																								
FG	Lamiaceae		*Teucrium betchei*	-																																								
SG	Lamiaceae		*Westringia cheelii*	-																																								
SG	Lamiaceae		*Westringia spp.*																																									
OG	Lauraaceae		*Cassytha melantha*																																									
OG	Lauraaceae		*Cassytha pubescens*	-																																								
FG	Linaceae		*Linum marginale*																														0.1	1										
FG	Lobeliaceae		*Lobelia concolor*																																									
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush	0.1	20											0.1	2															0.1	5										
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																																								
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush	0.1	10																															0.1	3						
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																																								
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush			0.1	20																									0.1	2	0.2	20								
GG	Lomandraceae		*Lomandra spp.*																																									
OG	Loranthaceae		*Amyema miquelii*	-																													0.5	300										

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
OG	Loranthaceae		*Amyema quandang*	-							0.1	2											0.5	300																				
OG	Loranthaceae		*Amyema spp.*																																									
FG	Lythraceae		*Lythrum hyssopifolia*																						0.1	50																		
SG	Malvaceae		*Abutilon otocarpum*																												0.1	50												
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush							0.1	10																																
SG	Malvaceae		*Abutilon spp.*																																									
TG	Malvaceae		*Brachychiton populneus*	Kurrajong													0.1	1																										
SG	Malvaceae		*Commersonia procumbens*																																									
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow																	0.1	20	0.1	30					0.1	2	0.1	2												
EX	Malvaceae	*	*Malva spp.*																																									
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																																								
FG	Malvaceae		*Sida corrugata*	Corrugated Sida													0.1	10			0.1	10																	0.1	30				
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida																											0.1	20												
FG	Malvaceae		*Sida hackettiana*	Golden Rod																																								
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne																																								
EX	Malvaceae	*	*Sida spinosa*	-					0.1	3	0.1	2																																
EX	Malvaceae	*	*Sida spp.*																								0.1	1													0.5	500	0.1	30
FG	Malvaceae		*Sida trichopoda*																				0.1	3																				
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																																								
TG	Meliaceae		*Melia azedarach*	White Cedar																																								
SG	Myrtaceae		*Acacia sp*																																									
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple																													0.1	2										
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																																								
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle	0.1	10																													0.1	2	0.2	15						
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood																																								
SG	Myrtaceae		*Darwinia spp.*																																									
TG	Myrtaceae		*Eucalyptus albens*	White Box																																								
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum																																								
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum																																								
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum																															0.2	60	0.3	150						
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																																								
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																																								
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark	10	2	25	24																									0.1	20										
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																																								
TG	Myrtaceae		*Eucalyptus dwyeri*	-																																								
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark																																								
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																																								
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																20																								
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																	0.1	1																						
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box																																								
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box													5	5	20																									
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																	0.1	20																						
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark																																								
TG	Myrtaceae		*Eucalyptus spp.*																																									
TG	Myrtaceae		*Eucalyptus spp.*																																									
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																																								
SG	Myrtaceae		*Harmogia densifolia*	-																																								
SG	Myrtaceae		*Homoranthus flavescens*	-																																								
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																																								
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																																								
SG	Myrtaceae		*Leptospermum spp.*																																									
SG	Myrtaceae		*Melaleuca erubescens*	-																																								
SG	Myrtaceae		*Melaleuca erubescens*																																									
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																																								
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle																																								
SG	Myrtaceae		*Micromyrtus sessilis*	-																																								
SG	Myrtaceae		*Micromyrtus spp.*																																									
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine					0.1	20	0.1	10			0.1	10					1.5	200			1	200	0.1	5					0.1	10										
FG	Nyctaginaceae		*Boerhavia dominii*																		1.5	200			1	200	0.1	5					0.1	10										
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine					0.1	10	0.1	2																																
OG	Oleaceae		*Jasminum spp.*																																									
TG	Oleaceae		*Notelaea microcarpa*						0.1	2																																		
TG	Oleaceae		*Notelaea spp.*																																									

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
EX	Onagraceae	*	*Oenothera mollissima*	-																																								
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid																																								
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																																								
FG	Orchidaceae		*Orchidaceae spp.*																																									
FG	Orchidaceae		*Orchidaceae spp.*																																									
FG	Oxalidaceae		*Oxalis chnoodes*																																									
EX	Oxalidaceae	*	*Oxalis corniculata*	-																	0.9	100																						
FG	Oxalidaceae		*Oxalis exilis*	-																																								
FG	Oxalidaceae		*Oxalis perennans*	-																															0.1	1									
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																																								
FG	Oxalidaceae		*Oxalis spp.*																																									
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																																								
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																																								
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily																																								
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily	0.1	20																											0.2	20	15	9	0.1	1						
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																																								
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																																								
SG	Phyllanthaceae		*Phyllanthus hirtellus*																														0.1	2										
FG	Phyllanthaceae		*Phyllanthus spp.*																																									
FG	Phyllanthaceae		*Phyllanthus virgatus*	-																																								
FG	Plantaginaceae		*Plantago gaudichaudii*																										1.5	250	0.2	150													
EX	Plantaginaceae	*	*Plantago sp.*																																									
FG	Plantaginaceae		*Plantago spp.*																																									
FG	Plantaginaceae		*Plantago turrifera*	-																					0.1	3	0.2	150																
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																																								
GG	Poaceae		*Anthosachne scabra*	Wheatgrass																																								
GG	Poaceae		*Aristida acuta*																																									
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																																								
GG	Poaceae		*Aristida calycina*																																									
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass																100											0.1	2					10	1000	0.1	3				
GG	Poaceae		*Aristida longicollis*	-																																								
GG	Poaceae		*Aristida muricata*	-																																								
GG	Poaceae		*Aristida personata*	Purple Wire-grass																																								
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass			0.1	20							0.1	10	0.1	20	2										35	1000	0.2	90	0.2	60	0.3	80					40	1000	5	200
GG	Poaceae		*Aristida spp.*																																		0.2	1						
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass																																								
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																20																								
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																	0.5	250	10	1000																				
GG	Poaceae		*Austrostipa densiflora*																																1	1								
GG	Poaceae		*Austrostipa falcata*																												8	650												
GG	Poaceae		*Austrostipa nodosa*																																									
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass																																								
GG	Poaceae		*Austrostipa scabra*	Speargrass	0.1	30	0.1	50											0.1		2	250	0.1	10									0.1	10	0.3	1	0.2	2			0.1	10	20	500
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																			0.3	50					0.1	20														
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																																								
GG	Poaceae		*Austrostipa setacea*																																									
GG	Poaceae		*Austrostipa sp.*																																									
GG	Poaceae		*Austrostipa spp.*																																									
GG	Poaceae		*Austrostipa variabilis*																		0.2	100																						
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass							0.1	5																																
EX	Poaceae	*	*Avena barbata*	Bearded Oats																							0.1	3																
EX	Poaceae	*	*Avena fatua*	Wild Oats																	2	100																						
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																																								
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																								0.1	2																
GG	Poaceae		*Bothriochloa macra*	Red Grass																					73	####																	0.2	30
GG	Poaceae		*Bothriochloa spp.*						2	60	0.1	10																																
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass																	0.1	5																						
GG	Poaceae		*Bromus diandrus*																		0.1	30																						
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																																								
GG	Poaceae		*Bromus spp.*																																									
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																																								
GG	Poaceae		*Chloris divaricata*	Slender Chloris																																								
GG	Poaceae		*Chloris divaricata var. divaricata*																		0.2	20			1	400																		

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																																								
GG	Poaceae		*Chloris spp.*																																									
GG	Poaceae		*Chloris truncata*	Windmill Grass							0.1	20	0.1	20	0.1	30	0.1	20					0.3	20	0.8	1000	0.8	450	2.5	500	0.1	10							0.1	20	0.1	10	0.1	30
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass											0.1	30									0.3	300	0.2	200	0.1	1	0.5	250												
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																																								
GG	Poaceae		*Cymbopogon refractus*																																		4	1						
GG	Poaceae		*Cynodon dactylon*	Couch																																							0.1	1
GG	Poaceae		*Dactyloctenium radulans*	Button Grass																																								
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																																								
GG	Poaceae		*Dichanthium sp.*																																									
GG	Poaceae		*Dichanthium spp.*																																									
GG	Poaceae		*Digitaria ammophila*																																2	200								
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass																															5	250			5	200			5	300
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																																								
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass																					0.1	2	0.1	15	35	2000			0.5	40					0.2	30	10	300		
GG	Poaceae		*Digitaria ramularis*																																		3	200						
GG	Poaceae		*Digitaria spp.*																																									
GG	Poaceae		*Echinochloa spp.*																																									
GG	Poaceae		*Echinopogon spp.*																																									
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																																								
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass																									0.1	5	0.1	25												
GG	Poaceae		*Enneapogon spp.*																																									
GG	Poaceae		*Enteropogon acicularis*	-					0.1	20																			0.3	20	0.1	1											0.5	1
GG	Poaceae		*Eragrostis alveiformis*																																									
GG	Poaceae		*Eragrostis australasica*	-																																								
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass																																	0.1	10			0.2	100	0.2	100
EX	Poaceae	*	*Eragrostis cilianensis*																																									
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																																								
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																																								
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																																								
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																													0.1	5										
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																																								
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																																								
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass																																			0.4	100	0.1	10		
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																											1	1000												
GG	Poaceae		*Eragrostis spp.*																																									
GG	Poaceae		*Eriachne spp.*																																									
GG	Poaceae		*Eriochloa australiensis*	-																																								
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass																					3	300	0.1	5											1	40			1	100
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass																20	0.2	20																						
EX	Poaceae	*	*Hordeum spp.*																																									
GG	Poaceae		*Imperata cylindrica*	Blady Grass																																								
GG	Poaceae		*Lachnagrostis spp.*																																				2	200				
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass																			5	2	0.1	10	0.1	3	0.2	80	0.1	15												
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass																																			0.1	1				
GG	Poaceae		*Microlaena stipoides*																																0.1	15	0.1	10						
GG	Poaceae		*Panicum decompositum*																														0.1	10										
GG	Poaceae		*Panicum effusum*	Hairy Panic			0.1	10	1	50			0.1	20	0.1	30	0.1	20	0.1																									
GG	Poaceae		*Panicum spp.*														0.1	20																			0.1	20							
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																																								
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass																			0.1	5									0.1	1			2	150						
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass																	0.1	1																						
GG	Poaceae		*Paspalidium spp.*																																									
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																																								
GG	Poaceae		*Phragmites australis*	Common Reed																																								
GG	Poaceae		*Poa sieberiana*	-																																								
GG	Poaceae		*Poa spp.*																																									
GG	Poaceae		*Poaceae sp.*																																									
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass																																								
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																																								
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																																								
GG	Poaceae		*Rytidosperma duttonianum*	-																																								
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass																													0.1	1										

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
GG	Poaceae		*Rytidosperma racemosum*	-																																	0.1	1						
GG	Poaceae		*Rytidosperma racemosum*																																		0.1	1						
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																																								
GG	Poaceae		*Rytidosperma spp.*																																						0.1	2		
GG	Poaceae		*Rytidosperma spp.*								0.1	10																													0.1	2		
EX	Poaceae	*	*Setaria parviflora*	-																																								
GG	Poaceae		*Setaria spp.*	A Setaria species																																								
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																																								
GG	Poaceae		*Sporobolus caroli*	Fairy Grass							0.1	30					0.1	20					0.1	2																				
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass																																								
GG	Poaceae		*Sporobolus spp.*																																									
GG	Poaceae		*Themeda spp.*																																		0.1	5						
GG	Poaceae		*Themeda triandra*	Kangaroo Grass																																								
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass																															0.3	100								
GG	Poaceae		*Tragus australianus*	Small Burrgrass																																								
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																																								
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																									0.1	1														
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																																								
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																																								
GG	Poaceae spp.		*Poaceae spp.*																																									
SG	Polygonaceae		*Duma florulenta*	Lignum																																								
EX	Polygonaceae	*	*Emex spinosa*	-																																								
EX	Polygonaceae	*	*Emex spp.*																																									
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																																								
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed																																								
FG	Polygonaceae		*Rumex brownii*	Swamp Dock																																								
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																																								
FG	Portulacaceae		*Calandrinia eremaea*	-																																								
FG	Portulacaceae		*Portulaca oleracea*	Pigweed							0.1	10									0.2	30	0.7	10					0.1	2	0.1	20							0.2	40	0.2	50	0.1	10
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																											0.5	500												
FG	Portulacaceae		*Portulaca spp.*																																									
FG	Portulacaceae		*Portulaca spp.*																	30																								
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea																																								
SG	Proteaceae		*Hakea leucoptera*	Needlewood																																								
SG	Proteaceae		*Persoonia sericea*	-																																								
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																																								
EG	Pteridaceae		*Cheilanthes sieberi*	-															0.1														10	10	0.1	2	2	50						
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																																								
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																																								
SG	Rhamnaceae		*Cryptandra spp.*																																									
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																1																								
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																																								
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																																								
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																																								
SG	Rutaceae		*Boronia occidentalis*	-																																								
SG	Rutaceae		*Geijera parviflora*	Wilga					0.5	5	2	3	0.5	2			1	4	1																									
SG	Rutaceae		*Philotheca brevifolia*	-																																								
SG	Rutaceae		*Philotheca ciliata*	-																																								
SG	Rutaceae		*Philotheca spp.*																																									
SG	Santalaceae		*Exocarpos spp.*																																									
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood							0.1	1																																
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood							2	40																																
SG	Sapindaceae		*Dodonaea boronifolia*																																									
SG	Sapindaceae		*Dodonaea hetromorpha*																																									
SG	Sapindaceae		*Dodonaea spp.*																																									
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																																								
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush	0.1	2																											0.5	200										
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																																								
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-																																								
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																																								
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple													0.1	2																										
SG	Scrophulariaceae		*Eremophila deserti*																		4	500																						
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																																								

GF	Family	Exotic	Scientific name	Common Name	T2-MP19		T2-MP20		T2-MP21		T2-MP22		T2-MP23		T2-MP24		T2-MP25		T2-MP26		BN1		BN2		BN3		BN4		BN5		BN6		BN7		BN8		BN9		AN1		AN2		AN3	
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																																								
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda							0.1	1																																
SG	Scrophulariaceae		*Eremophila spp.*																																									
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																																								
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																																								
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn									0.1	1			0.1	2																										
SG	Solanaceae		*Lycium spp.*																																									
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																																								
FG	Solanaceae		*Solanum cleistogamum*																																		0.1	1						
FG	Solanaceae		*Solanum ellipticum*																																0.2	60								
SG	Solanaceae		*Solanum erianthum*	Potato Tree																																								
FG	Solanaceae		*Solanum esuriale*	Quena									0.1	1	0.1	2					0.1	1	0.4	50	0.1	1	0.2	25	0.1	5	0.1	1									0.2	200	0.1	1
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush	0.1	10											0.1	5																	0.3	5								
SG	Solanaceae		*Solanum jucundum*																																0.1	10								
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																	10	1	0.1	2																				
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																																								
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																																								
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea					0.1	1	0.1	3																																
SG	Thymelaeaceae		*Pimelea spp.*																																									
EX	Urticaceae	*	*Urtica urens*	Small Nettle																																								
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest																																								
HT	Verbenaceae	*	*Phyla canescens*	-																																								
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																																								
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop																																								
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																																								
FG	Violaceae		*Hybanthus spp.*																														0.1	1										
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-																																								
OG	Zamiaceae		*Macrozamia glaucophylla*	-																																								
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine					0.1	10																																		
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop																	15	2																			0.2	40	0.1	10

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
FG	Acanthaceae		*Brunoniella australis*	Blue Trumpet																									
FG	Acanthaceae		*Brunoniella spp.*																										
FG	Acanthaceae		*Rostellularia adscendens*	-																									
FG	Acanthaceae		*Rostellularia adscendens var. adscendens*	-																									
FG	Acanthaceae		*Rostellularia adscendens var. pogonanthera*	-																									
FG	Aizoaceae		*Tetragonia tetragoniodes*	New Zealand Spinach																									
FG	Aizoaceae		*Trianthema triquetra*																										
FG	Aizoaceae		*Zaleya galericulata*	Hogweed																									
FG	Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed									0.1	10	0.1	2			0.1	3									
FG	Amaranthaceae		*Alternanthera nodiflora*	Common Joyweed																									
HT	Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed																									
FG	Amaranthaceae		*Alternanthera spp.*																										
EX	Amaranthaceae	*	*Gomphrena celosioides*	Gomphrena Weed																									
FG	Amaranthaceae		*Ptilotus exaltatus var. exaltatus*																										
FG	Amaryllidaceae		*Calostemma purpureum*	Garland Lily																									
EX	Anarcardiacece	*	*Schinus molle var. areira*	Pepper Tree																									
FG	Anthericaceae		*Arthropodium gaudichaudii*	-																									
FG	Anthericaceae		*Arthropodium minus*	-																									
FG	Anthericaceae		*Arthropodium spp.*																										
FG	Anthericaceae		*Dichopogon fimbriatus*	Nodding Chocolate Lily																									
FG	Anthericaceae		*Thysanotus spp.*																										
FG	Anthericaceae		*Thysanotus tuberosus*	Common Fringe Lily	0.1	2																							
FG	Anthericaceae		*Tricoryne elatior*		0.3	100			0.1	1																			
FG	Apiaceae		*Actinotus gibbonsii*		0.2	50																							
SG	Apiaceae	*	*Apiaceae sp.*																										
FG	Apiaceae		*Centella asiatica*	Indian Pennywort																									
FG	Apiaceae		*Daucus glochidiatus*	Native Carrot													0.1	30	0.1	10							0.1	30	
FG	Apiaceae		*Eryngium paludosum*	Long Eryngium																									
FG	Apiaceae		*Eryngium spp.*																										
TG	Apocynaceae		*Alstonia constricta*	Bitter Bark																									
OG	Apocynaceae		*Parsonsia eucalyptophylla*	Gargaloo																									
OG	Apocynaceae		*Tylophora linearis*	-																									
FG	Asphodelaceae		*Bulbine bulbosa*	Bulbine Lily																							0.1	15	
FG	Asphodelaceae		*Bulbine semibarbata*						0.1	1	3	37																	
FG	Asteraceae		*Actinobole uliginosum*	Flannel Cudweed																					0.1	30			
EX	Asteraceae	*	*Arctotheca calendula*	Capeweed									0.1	40	0.1	30	5	200	0.1	30	0.1	1	1	30	0.1	10	15	1000	
FG	Asteraceae		*Asteraceae sp.*																										
HT	Asteraceae	*	*Bidens subalternans*	Greater Beggars Ticks																									
FG	Asteraceae		*Brachyscome lineariloba*	Hard-headed Daisy																									
FG	Asteraceae		*Brachyscome multifida*	Cut-leaved Daisy																									
FG	Asteraceae		*Brachyscome spp.*																										
FG	Asteraceae		*Calotis anthemoides*	Cut-leaved Burr-daisy																									
FG	Asteraceae		*Calotis cuneifolia*	Purple Burr-daisy	70	500													0.1	2					0.1	2	20	300	
FG	Asteraceae		*Calotis hispidula*	Bogan Flea									0.1	6	0.1	1	10	300	0.1	10	2	100			1	500	0.1	3	
FG	Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy	0.1	5													0.1	10	5	300							
FG	Asteraceae		*Calotis scapigera*																										
FG	Asteraceae		*Calotis spp.*																										
HT	Asteraceae	*	*Carthamus lanatus*	Saffron Thistle													0.5	200					1	50					
SG	Asteraceae		*Cassinia arcuata*	Drooping Bush																									
SG	Asteraceae		*Cassinia spp.*								0.1	30																	
EX	Asteraceae	*	*Centaurea melitensis*	Maltese Cockspur																									
FG	Asteraceae		*Centipeda cunninghamii*																										
FG	Asteraceae		*Centipeda thespidioides*																										
EX	Asteraceae	*	*Chondrilla juncea*	Skeleton Weed																									
FG	Asteraceae		*Chrysocephalum apiculatum*	Common Everlasting							0.1	2																	
FG	Asteraceae		*Chthonocephalus pseudevax*	Ground heads																					0.1	30			
EX	Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane																									
FG	Asteraceae		*Conyza spp.*																										
EX	Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane																									
FG	Asteraceae		*Cotula australis*																										
FG	Asteraceae		*Cotula spp.*																										
EX	Asteraceae	*	*Cotula spp.*																										
FG	Asteraceae		*Eclipta platyglossa*	-																									

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
FG	Asteraceae		*Euchiton involucratus*						2	5																			
FG	Asteraceae		*Euchiton sphaericus*								0.1	5																	
FG	Asteraceae		*Euchiton sphaericus*								0.1	5																	
FG	Asteraceae		*Glossocardia bidens*	Cobbler's Tack																									
FG	Asteraceae	*	*Gnaphalium spp.*	-																									
EX	Asteraceae	*	*Hedypnois rhagadioloides*	Cretan Weed																									
FG	Asteraceae		*Hyalosperma spp.*																										
FG	Asteraceae		*Hyalosperma spp.*																										
EX	Asteraceae	*	*Hypochaeris glabra*	Smooth Catsear																									
EX	Asteraceae	*	*Hypochaeris radicata*	Flatweed, Catsear									0.1	5	0.1	2	0.1	30	0.1	2					0.1	1	0.1	1	
FG	Asteraceae		*Isoetopsis graminifolia*	Grass Cushions													0.1	5									0.1	3	
EX	Asteraceae	*	*Lactuca serriola*	Prickly Lettuce																									
FG	Asteraceae		*Leiocarpa panaetioides*	Wooly Buttons																									
FG	Asteraceae		*Leiocarpa tomentosa*	Wooly Plover-daisy																									
FG	Asteraceae		*Leontodon rhagadioloides*	Cretan Weed													0.1	5											
FG	Asteraceae		*Leptorhynchos spp.*																										
FG	Asteraceae		*Myriocephalus pluriflorus*																										
SG	Asteraceae		*Olearia pimeleoides*	-																									
SG	Asteraceae		*Olearia romulosa*	Twiggy Daisy Bush																									
SG	Asteraceae		*Ozothamnus diosmifolius*		0.1	2																							
FG	Asteraceae		*Picris spp.*																										
FG	Asteraceae		*Podolepis spp.*																										
FG	Asteraceae		*Pseudognaphalium luteoalbum*																										
EX	Asteraceae	*	*Silybum marianum*	Variegated Thistle																			10	500					
EX	Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle					0.1	2													0.1	3			1	100	
EX	Asteraceae	*	*Stuartina meulleri*																										
FG	Asteraceae		*Stuartina spp.*																										
EX	Asteraceae	*	*Taraxacum officinale*	Dandelion															0.1	12					0.1	2	0.1	30	
FG	Asteraceae		*Triptilodiscus pygmaeus*	Common Sunray																					0.1	3			
FG	Asteraceae		*Vittadinia cuneata*	Fuzzweed							0.1	1			0.1	2	0.1	40	0.1	1	0.1	3							
FG	Asteraceae		*Vittadinia triloba*																										
HT	Asteraceae	*	*Xanthium spinosum*	Bathurst Burr																									
FG	Asteraceae		*Xerochrysum bracteatum*	Golden Everlasting																									
EX	Boraginaceae	*	*Echium plantagineum*	Patersons Curse																	5	200							
EX	Boraginaceae	*	*Echium vulgare*	Vipers Bugloss																									
FG	Boraginaceae		*Hackelia suaveolens*	-																									
HT	Boraginaceae	*	*Heliotropium amplexicaule*	Blue Heliotrope																									
EX	Boraginaceae	*	*Heliotropium europaeum*	Potato Weed																									
EX	Brassicaceae	*	*Brassica rapa*	Field Mustard																									
EX	Brassicaceae	*	*Brassica spp.*																										
HT	Brassicaceae	*	*Brassica tournefortii*	Mediterranean Turnip																									
EX	Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse																									
FG	Brassicaceae		*Harmsiodoxa spp.*																0.1	1									
EX	Brassicaceae	*	*Hirschfeldia incana*	Hairy Brassica																									
EX	Brassicaceae	*	*Lepidium africanum*														0.1	30			0.1	1							
EX	Brassicaceae	*	*Lepidium bonariense*	-																									
EX	Brassicaceae	*	*Lepidium didymum*	Lesser Swinecress																									
FG	Brassicaceae		*Lepidium hyssopifolium*	Basalt peppercress																									
FG	Brassicaceae		*Lepidium pseudohyssopifolium*	Peppercress																									
EX	Brassicaceae	*	*Lepidium spp.*																										
EX	Brassicaceae	*	*Lepidium spp.*																										
EX	Brassicaceae	*	*Rapistrum rugosum*	Turnip Weed																									
EX	Brassicaceae	*	*Sisymbrium erysimoides*	Smooth Mustard																									
EX	Brassicaceae	*	*Sisymbrium irio*	London Rocket																			0.1	5					
HT	Cactaceae	*	*Opuntia aurantiaca*	Tiger Pear																									
HT	Cactaceae	*	*Opuntia stricta*	Common Prickly Pear																							0.1	30	
FG	Campanulaceae		*Lobelia concolor*	Poison Pratia																									
FG	Campanulaceae		*Lobelia purpurascens*	Whiteroot																									
FG	Campanulaceae		*Wahlenbergia communis*	Tufted Bluebell							0.1	1															0.1	3	
FG	Campanulaceae		*Wahlenbergia gracilenta*																										
FG	Campanulaceae		*Wahlenbergia gracilis*	Sprawling Bluebell							1	50																	
FG	Campanulaceae		*Wahlenbergia luteola*																										
FG	Campanulaceae		*Wahlenbergia planiflora*						5	200																			

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
FG	Campanulaceae		*Wahlenbergia spp.*	A Wahlenbergia species	0.1	2							0.1	2															
FG	Campanulaceae		*Wahlenbergia stricta*	Australian Bluebell																									
SG	Capparaceae		*Apophyllum anomalum*	Warrior Bush																									
SG	Capparaceae		*Capparis mitchelli*	Wild Orange																									
EX	Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed																			0.1	2					
EX	Caryophyllaceae	*	*Petrorhagia dubia*	-																									
EX	Caryophyllaceae	*	*Petrorhagia nanteuilii*	-							0.2	50																	
FG	Caryophyllaceae		*Polycarpaea corymbosa*	-																									
EX	Caryophyllaceae	*	*Polycarpon tetraphyllum*								15	300																	
EX	Caryophyllaceae	*	*Spergularia spp.*																										
SG	Casuarinaceae		*Allocasuarina diminuta*	-	0.1	1																							
TG	Casuarinaceae		*Allocasuarina luehmannii*	Bulloak					10	33											20	4							
SG	Casuarinaceae		*Allocasuarina spp.*																										
TG	Casuarinaceae		*Casuarina cristata*	Belah																			0.1	15					
TG	Casuarinaceae		*Casuarina pauper*	Black Oak																									
SG	Celastraceae		*Denhamia cunninghamii*	-																									
GG	Centrolepidaceae		*Centrolepis strigosa subsp. Strigosa*																										
SG	Chenopodiaceae		*Atriplex leptocarpa*																										
EX	Chenopodiaceae	*	*Atriplex prostrata*	-																									
SG	Chenopodiaceae		*Atriplex pseudocampanulata*	-																									
SG	Chenopodiaceae		*Atriplex semibaccata*	Creeping Saltbush									0.1	1					0.1	1									
EX	Chenopodiaceae	*	*Chenopodium album*	Fat Hen																									
SG	Chenopodiaceae		*Chenopodium desertorum*																										
FG	Chenopodiaceae		*Chenopodium melanocarpum*										0.1	12	0.1	1			0.1	30	0.1	5	5	200	0.1	30	0.1	5	
EX	Chenopodiaceae	*	*Chenopodium spp.*																		0.1	1							
FG	Chenopodiaceae		*Chenopodium spp.*																		0.1	1							
SG	Chenopodiaceae		*Dissocarpus paradoxus*																										
FG	Chenopodiaceae		*Dysphania melanocarpa*	Black Crumbweed																									
FG	Chenopodiaceae		*Dysphania multifida*	Scented Goosefoot																									
FG	Chenopodiaceae		*Dysphania pumilo*	Small Crumbweed																									
FG	Chenopodiaceae		*Dysphania spp.*														0.1	1											
FG	Chenopodiaceae		*Einadia hastata*	Berry Saltbush							2	2							0.1	5	20	1000							
FG	Chenopodiaceae		*Einadia nutans*	Climbing Saltbush															5	100	5	200	50	2000					
FG	Chenopodiaceae		*Einadia polygonoides*	-									0.1	4															
FG	Chenopodiaceae		*Einadia trigonos*	Fishweed																									
SG	Chenopodiaceae		*Enchylaena tomentosa*	Ruby Saltbush																									
SG	Chenopodiaceae		*Maireana aphylla*	Leafless Bluebush																									
FG	Chenopodiaceae		*Maireana enchylaenoides*	Wingless Bluebush													0.1	30	0.1	2			0.1	1					
SG	Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush									0.1	2							10	15							
SG	Chenopodiaceae		*Maireana spp.*																										
SG	Chenopodiaceae		*Rhagodia spinescens*	Spiny Saltbush																									
SG	Chenopodiaceae		*Salsola australis*	-															0.1	1			1	100					
SG	Chenopodiaceae		*Salsola kali*	-																									
SG	Chenopodiaceae		*Salsola spp.*																										
SG	Chenopodiaceae		*Sclerolaena birchii*	Galvanized Burr									2	50	1	30	1	50	0.1	5	0.1	5	0.1	2					
SG	Chenopodiaceae		*Sclerolaena diacantha*																										
SG	Chenopodiaceae		*Sclerolaena divaricata*	Tangled Copperburr																									
SG	Chenopodiaceae		*Sclerolaena muricata*	Black Rolypoly									0.1	3	0.1	2			0.1	2	5	300	1	200					
SG	Chenopodiaceae		*Sclerolaena muricata var. villosa*	Black Rolypoly																									
SG	Chenopodiaceae		*Sclerolaena tricuspis*																				30	20					
FG	Commelinaceae		*Commelina cyanea*	-																									
FG	Commelinaceae		*Commelina spp.*																										
OG	Convolvulaceae		*Convolvulus erubescens*	Blushing Bindweed									0.1	50	1	500	0.5	100	0.1	5	0.1	10							
FG	Convolvulaceae		*Dichondra repens*	Kidney Weed															0.1	5			1	100					
HT	Crassulaceae	*	*Bryophyllum delagoense*	Mother-of-millions																									
FG	Crassulaceae		*Crassula colorata*	-																									
FG	Crassulaceae		*Crassula sieberiana*																1	100									
FG	Crassulaceae		*Crassula spp.*										0.1	3															
EX	Cucurbitaceae	*	*Citrullus lanatus*	Watermelon																									
TG	Cupressaceae		*Callitris glaucophylla*	White Cypress Pine			18	3	0.1	3	0.2	5									0.1	2			1	200	40	60	
GG	Cyperaceae		*Baumea spp.*																										
GG	Cyperaceae		*Carex appressa*	Tall Sedge																									
GG	Cyperaceae		*Carex inversa*	-																									

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
GG	Cyperaceae		*Carex spp.*																										
GG	Cyperaceae		*Cyathochaeta diandra*	-																									
HT	Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge																									
GG	Cyperaceae		*Cyperus gunnii subsp. gunnii*								5	100																	
GG	Cyperaceae		*Cyperus lucidus*	Leafy Flat Sedge																									
GG	Cyperaceae		*Cyperus spp.*																										
GG	Cyperaceae		*Eleocharis spp.*																										
GG	Cyperaceae		*Eleocharis spp.*																										
GG	Cyperaceae		*Fimbristylis dichotoma*	Common Fringe-sedge																									
GG	Cyperaceae		*Gahnia apsera*	Rough Saw-sedge																									
GG	Cyperaceae		*Gahnia spp.*						3	60																			
GG	Cyperaceae		*Lepidosperma laterale*	-	2	10																							
GG	Cyperaceae		*Schoenus apogon*	Common Bog-rush																									
GG	Cyperaceae		*Schoenus kennyi*	-																									
GG	Cyperaceae		*Schoenus spp.*																										
SG	Dilleniaceae		*Hibbertia linearis*	-																									
SG	Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower							0.3	100																	
SG	Dilleniaceae		*Hibbertia riparia*				9	17																					
SG	Ericaceae		*Brachyloma daphnoides*	Daphne Heath																									
SG	Ericaceae		*Lissanthe strigosa*	Peach Heath																									
SG	Ericaceae		*Melichrus urceolatus*	Urn-heath																									
SG	Ericaceae		*Styphelia triflora*	Pink Five-Corners																									
SG	Euphorbiaceae		*Beyeria viscosa*	Pinkwood																									
FG	Euphorbiaceae		*Chamaesyce drummondii*										0.1	5	0.1	5	0.1	40	0.1	1									
FG	Euphorbiaceae		*Euphorbia drummondii*	Caustic Weed																									
FG	Euphorbiaceae		*Euphorbia spp.*																										
SG	Euphorbiaceae		*Ricinocarpos bowmanii*	Western Wedding Bush																									
SG	Fabaceae		*Acacia boormanii*	Snowy River Wattle																									
TG	Fabaceae		*Acacia burrowii*	Burrow's Wattle																									
TG	Fabaceae		*Acacia caroleae*	Carol's Wattle																									
TG	Fabaceae		*Acacia cheelii*	Motherumbah																									
TG	Fabaceae		*Acacia dealbata*	Silver Wattle																									
SG	Fabaceae		*Acacia deanei*	Deans Wattle																									
SG	Fabaceae		*Acacia deanei subsp. deanei*	Deane's Wattle																									
SG	Fabaceae		*Acacia decora*	Western Silver Wattle																									
TG	Fabaceae		*Acacia decurrens*	Black Wattle																									
SG	Fabaceae		*Acacia hakeoides*	Hakea Wattle																									
TG	Fabaceae		*Acacia harpophylla*	Brigalow																									
TG	Fabaceae		*Acacia homalophylla*	Yarran																									
SG	Fabaceae		*Acacia lineata*	Streaked Wattle																									
SG	Fabaceae		*Acacia mariae*	Golden-top Wattle	3	20			3	2																			
SG	Fabaceae		*Acacia montana*	Mallee Wattle																									
SG	Fabaceae		*Acacia murrayana*	Murray's Wattle																									
SG	Fabaceae		*Acacia parvipinnula*	Silver-stemmed Wattle																									
TG	Fabaceae		*Acacia pendula*	Weeping Myall																									
SG	Fabaceae		*Acacia penninervis*	Mountain Hickory																									
SG	Fabaceae		*Acacia rubida*	Red-stemmed Wattle																									
SG	Fabaceae		*Acacia spectabilis*	Mudgee Wattle																									
SG	Fabaceae		*Acacia spp.*																						0.1	1			
SG	Fabaceae		*Acacia spp.*																						0.1	1			
SG	Fabaceae		*Acacia stenophylla*																										
SG	Fabaceae		*Acacia subulata*				0.2	2	0.1	50																			
SG	Fabaceae		*Acacia trineura*		1	1	1	1																					
SG	Fabaceae		*Acacia triptera*	Spurwing Wattle																									
SG	Fabaceae		*Bossiaea concolor*																										
SG	Fabaceae		*Bossiaea spp.*								0.1	40																	
SG	Fabaceae		*Daviesia ulicifolia*	Gorse Bitter Pea																									
FG	Fabaceae		*Desmodium brachypodum*	Large Tick-trefoil																									
OG	Fabaceae		*Desmodium spp.*																										
OG	Fabaceae		*Desmodium varians*	Slender Tick-trefoil																									
SG	Fabaceae		*Dillwynia sericea*	Showy Parrot-pea																									
SG	Fabaceae		*Dillwynia sp.*																										
OG	Fabaceae		*Glycine clandestina*	-							0.5	50															0.1	2	

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
OG	Fabaceae		*Glycine microphylla*	Small-leaf Glycine																									
OG	Fabaceae		*Glycine tabacina*	-																									
OG	Fabaceae		*Hardenbergia violacea*	Purple Coral Pea																									
SG	Fabaceae		*Hovea apiculata*	-																									
EX	Fabaceae	*	*Lotus spp.*																										
EX	Fabaceae	*	*Medicago arabica*	Spotted Burr Medic									1	100	1	100			1	50	5	200							
EX	Fabaceae	*	*Medicago laciniata*	Cut-leaved Medic											0.1	30	10	500			0.1	30	0.1	3					
EX	Fabaceae	*	*Medicago minima*	Woolly Burr Medic																									
EX	Fabaceae	*	*Medicago polymorpha*	Burr Medic									0.1	5			0.1	10											
EX	Fabaceae	*	*Medicago praecox*	Small-leaved Burr Medic																									
EX	Fabaceae	*	*Medicago trunculata*	Barrel Medic																									
FG	Fabaceae		*Neptunia gracilis*	Native Sensitive Plant																									
SG	Fabaceae		*Pultenaea microphylla*	-																									
SG	Fabaceae		*Pultenaea microphylla*	-																									
SG	Fabaceae		*Pultenaea sp.*																										
SG	Fabaceae		*Senna artemisioides*	Silver Cassia																									
FG	Fabaceae		*Senna barclayana*	Smooth Senna																									
SG	Fabaceae		*Senna sp.*																										
FG	Fabaceae		*Swainsona galegifolia*	Smooth Darling-pea																									
FG	Fabaceae		*Swainsona murrayana*	Slender Darling-pea																									
EX	Fabaceae	*	*Trifolium arvense*	Haresfoot Clover																									
EX	Fabaceae	*	*Trifolium glomeratum*	Clustered Clover																									
EX	Fabaceae	*	*Trifolium sp.*																										
EX	Fabaceae	*	*Trifolium subterraneum*	Subterranean Clover																									
EX	Fabaceae	*	*Vicia spp.*																										
SG	Fabaceae (Faboideae)		*Aotus subglauca*																										
SG	Fabaceae (Faboideae)		*Cullen tenax*																										
FG	Fabaceae (Faboideae)		*Fabaceae spp.*																										
OG	Fabaceae (Faboideae)		*Glycine tomentella*								0.1	10																	
EX	Fabaceae (Faboideae)	*	*Trifolium spp.*																										
EX	Gentianaceae	*	*Centaurium erythraea*																										
EX	Geraniaceae	*	*Erodium botrys*	Long Storksbill																									
FG	Geraniaceae		*Erodium crinitum*	Blue Storksbill													0.1	30	0.1	6	5	100					1	100	
FG	Goodeniaceae		*Brunonia australis*																						0.1	30	0.1	30	
FG	Goodeniaceae		*Dampiera adpressa*		0.1	30																							
FG	Goodeniaceae		*Goodenia cycloptera*	-	2	10	2	7	3	30	0.3	100													0.1	30	0.1	1	
FG	Goodeniaceae		*Goodenia fasicularis*	-																									
FG	Goodeniaceae		*Goodenia glabra*																						5	500			
FG	Goodeniaceae		*Goodenia hederacea*	Forest Goodenia																							0.1	3	
FG	Goodeniaceae		*Goodenia rotundifolia*	-																									
FG	Haloragaceae		*Gonocarpus elatus*		2	6	3	8	0.1	4															0.1	50	0.1	10	
GG	Juncaceae		*Juncus continuus*	-																									
GG	Juncaceae		*Juncus spp.*																										
GG	Juncaceae		*Juncus subsecundus*	-																									
FG	Lamiaceae		*Ajuga australis*	Austral Bugle																									
EX	Lamiaceae	*	*Marrubium vulgare*	White Horehound																									
FG	Lamiaceae		*Plectranthus parviflorus*	Cockspur Flower																									
EX	Lamiaceae	*	*Salvia reflexa*	Mintweed																									
EX	Lamiaceae	*	*Salvia verbenaca*	Vervain																									
FG	Lamiaceae		*Teucrium betchei*	-																									
SG	Lamiaceae		*Westringia cheelii*	-					0.1	4																			
SG	Lamiaceae		*Westringia spp.*						0.1	1																			
OG	Lauraaceae		*Cassytha melantha*		0.5	50																							
OG	Lauraaceae		*Cassytha pubescens*	-																									
FG	Linaceae		*Linum marginale*																										
FG	Lobeliaceae		*Lobelia concolor*																										
GG	Lomandraceae		*Lomandra filiformis*	Wattle Mat-Rush																									
GG	Lomandraceae		*Lomandra glauca*	Pale Mat-rush																									
GG	Lomandraceae		*Lomandra leucocephala*	Wooly Mat-rush																									
GG	Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush																									
GG	Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush					0.1	4	0.1	5																	
GG	Lomandraceae		*Lomandra spp.*																										
OG	Loranthaceae		*Amyema miquelii*	-																									

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
OG	Loranthaceae		*Amyema quandang*	-																									
OG	Loranthaceae		*Amyema spp.*																										
FG	Lythraceae		*Lythrum hyssopifolia*																										
SG	Malvaceae		*Abutilon otocarpum*																										
SG	Malvaceae		*Abutilon oxycarpum*	Straggly Lantern-bush																			5	100					
SG	Malvaceae		*Abutilon spp.*																										
TG	Malvaceae		*Brachychiton populneus*	Kurrajong																									
SG	Malvaceae		*Commersonia procumbens*																										x
EX	Malvaceae	*	*Malva parviflora*	Small-flowered Mallow																			0.2	30					
EX	Malvaceae	*	*Malva spp.*																										
EX	Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow																									
FG	Malvaceae		*Sida corrugata*	Corrugated Sida									0.1	2	0.1	3	0.1	30	0.1	1			0.1	5					
FG	Malvaceae		*Sida cunninghamii*	Ridged Sida																									
FG	Malvaceae		*Sida hackettiana*	Golden Rod																									
EX	Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne																									
EX	Malvaceae	*	*Sida spinosa*	-																									
EX	Malvaceae	*	*Sida spp.*												0.1	3													
FG	Malvaceae		*Sida trichopoda*																										
EG	Marsileaceae		*Marsilea drummondii*	Common Nardoo																									
TG	Meliaceae		*Melia azedarach*	White Cedar																									
SG	Myrtaceae		*Acacia sp*																										
TG	Myrtaceae		*Angophora floribunda*	Rough-barked Apple																									
SG	Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush																									
SG	Myrtaceae		*Calytrix tetragona*	Common Fringe-myrtle	0.1	2																							
TG	Myrtaceae		*Corymbia trachyphloia*	White Bloodwood			50	2000																					
SG	Myrtaceae		*Darwinia spp.*																										
TG	Myrtaceae		*Eucalyptus albens*	White Box																									
TG	Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum																									
TG	Myrtaceae		*Eucalyptus camaldulensis*	River Red Gum																									
TG	Myrtaceae		*Eucalyptus chloroclada*	Dirty Gum							0.1	2													0.1	30	1	100	
TG	Myrtaceae		*Eucalyptus clodacalyx*	-																									
TG	Myrtaceae		*Eucalyptus conica*	Fuzzy Box																									
TG	Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark																									
TG	Myrtaceae		*Eucalyptus cumaldulensis*	-																									
TG	Myrtaceae		*Eucalyptus dwyeri*	-	0.1	3																							
TG	Myrtaceae		*Eucalyptus fibrosa*	Red-Ironbark			20	3	2	200																			
TG	Myrtaceae		*Eucalyptus melanophloia*	Silver-leaved Ironbark																									
TG	Myrtaceae		*Eucalyptus melliodora*	Yellow Box Gum																									
TG	Myrtaceae		*Eucalyptus microcarpa*	Grey Box Gum																									
TG	Myrtaceae		*Eucalyptus pilligaensis*	Narrow-leaved Grey Box															0.1	10									
TG	Myrtaceae		*Eucalyptus populnea*	Bimble Box																	0.1	2							
TG	Myrtaceae		*Eucalyptus populnea subsp. bimbil*	Bimble Box																									
TG	Myrtaceae		*Eucalyptus sideroxylon*	Mugga Ironbark																									
TG	Myrtaceae		*Eucalyptus spp.*																										
TG	Myrtaceae		*Eucalyptus spp.*																										
TG	Myrtaceae		*Eucalyptus viridis*	Green Mallee																									
SG	Myrtaceae		*Harmogia densifolia*	-																									
SG	Myrtaceae		*Homoranthus flavescens*	-																									
SG	Myrtaceae		*Kunzea parviflora*	Violet Kunzea																									
SG	Myrtaceae		*Leptospermum polygalifolium*	Tantoon																									
SG	Myrtaceae		*Leptospermum spp.*																										
SG	Myrtaceae		*Melaleuca erubescens*	-																									
SG	Myrtaceae		*Melaleuca erubescens*																										
SG	Myrtaceae		*Melaleuca uncinata*	Broombush																									
SG	Myrtaceae		*Micromyrtus ciliata*	Fringed Heath-myrtle																									
SG	Myrtaceae		*Micromyrtus sessilis*	-			4	20	5	200																			
SG	Myrtaceae		*Micromyrtus spp.*		5	500																							
FG	Nyctaginaceae		*Boerhavia dominii*	Tarvine																									
FG	Nyctaginaceae		*Boerhavia dominii*																										
OG	Oleaceae		*Jasminum lineare*	Desert Jasmine																									
OG	Oleaceae		*Jasminum spp.*																										
TG	Oleaceae		*Notelaea microcarpa*																										
TG	Oleaceae		*Notelaea spp.*																										

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
EX	Onagraceae	*	*Oenothera mollissima*	-																									
OG	Orchidaceae		*Cymbidium canaliculatum*	Tiger Orchid																									
FG	Orchidaceae		*Diuris tricolor*	Pine Donkey Orchid																									
FG	Orchidaceae		*Orchidaceae spp.*																										
FG	Orchidaceae		*Orchidaceae spp.*																										
FG	Oxalidaceae		*Oxalis chnoodes*																				0.1	1			5	200	
EX	Oxalidaceae	*	*Oxalis corniculata*	-																									
FG	Oxalidaceae		*Oxalis exilis*	-																									
FG	Oxalidaceae		*Oxalis perennans*	-							0.1	3																	
EX	Oxalidaceae	*	*Oxalis pes-caprae*	-																									
FG	Oxalidaceae		*Oxalis spp.*																										
EX	Papaveraceae	*	*Fumaria capreolata*	Climbing Fumitory																									
FG	Phormiaceae		*Dianella caerulea*	Blue Flax-Lily																									
FG	Phormiaceae		*Dianella longifolia*	Blueberry Lily							0.1	3																	
FG	Phormiaceae		*Dianella revoluta*	Blue Flax-Lily	0.1	2																							
FG	Phrymaceae		*Elacholoma prostrata*	Small Monkey-flower																									
FG	Phrymaceae		*Mimulus gracilis*	Slender Monkey-flower																									
SG	Phyllanthaceae		*Phyllanthus hirtellus*																										
FG	Phyllanthaceae		*Phyllanthus spp.*																										
FG	Phyllanthaceae		*Phyllanthus virgatus*	-																									
FG	Plantaginaceae		*Plantago gaudichaudii*																										
EX	Plantaginaceae	*	*Plantago sp.*																										
FG	Plantaginaceae		*Plantago spp.*														5	200											
FG	Plantaginaceae		*Plantago turrifera*	-																									
EX	Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass																									
GG	Poaceae		*Anthosachne scabra*	Wheatgrass																									
GG	Poaceae		*Aristida acuta*						0.2	200																			
GG	Poaceae		*Aristida behriana*	Bunch Wiregrass																									
GG	Poaceae		*Aristida calycina*						0.1	1																			
GG	Poaceae		*Aristida jerichoensis*	Jericho Wiregrass											0.1	10	0.1	5			0.1	1			25	1000			
GG	Poaceae		*Aristida longicollis*	-																									
GG	Poaceae		*Aristida muricata*	-																									
GG	Poaceae		*Aristida personata*	Purple Wire-grass																									
GG	Poaceae		*Aristida ramosa*	Purple Wiregrass							5	100	0.1	2													0.1	10	
GG	Poaceae		*Aristida spp.*		0.1	10																							
GG	Poaceae		*Aristida vagans*	Threeawn Speargrass							2	50																	
GG	Poaceae		*Astrebla lappacea*	Curly Mitchell Grass																									
GG	Poaceae		*Austrostipa aristiglumis*	Plains Grass																									
GG	Poaceae		*Austrostipa densiflora*																										
GG	Poaceae		*Austrostipa falcata*																										
GG	Poaceae		*Austrostipa nodosa*																		0.1	30	0.1	2					
GG	Poaceae		*Austrostipa ramosissima*	Stout Bamboo Grass																									
GG	Poaceae		*Austrostipa scabra*	Speargrass							1	30																	
GG	Poaceae		*Austrostipa scabra subsp. falcata*	-																									
GG	Poaceae		*Austrostipa scabra subsp. scabra*	-																									
GG	Poaceae		*Austrostipa setacea*						40	1000																			
GG	Poaceae		*Austrostipa sp.*																										
GG	Poaceae		*Austrostipa spp.*														0.1	1											
GG	Poaceae		*Austrostipa variabilis*																										
GG	Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass																									
EX	Poaceae	*	*Avena barbata*	Bearded Oats																									
EX	Poaceae	*	*Avena fatua*	Wild Oats																									
GG	Poaceae		*Bothriochloa decipiens*	Red Grass																									
GG	Poaceae		*Bothriochloa decipiens var. decipiens*																										
GG	Poaceae		*Bothriochloa macra*	Red Grass											0.1	1	0.1	2											
GG	Poaceae		*Bothriochloa spp.*																										
EX	Poaceae	*	*Bromus catharticus*	Prairie Grass																									
GG	Poaceae		*Bromus diandrus*																										
EX	Poaceae	*	*Bromus molliformis*	Soft Brome																									
GG	Poaceae		*Bromus spp.*																										
HT	Poaceae	*	*Cenchrus longispinus*	Innocent Weed																									
GG	Poaceae		*Chloris divaricata*	Slender Chloris																									
GG	Poaceae		*Chloris divaricata var. divaricata*																										

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
HT	Poaceae	*	*Chloris gayana*	Rhodes Grass																									
GG	Poaceae		*Chloris spp.*																										
GG	Poaceae		*Chloris truncata*	Windmill Grass									15	1000	5	200	0.1	5	20	1000	0.1	40	0.1	1			0.1	30	
GG	Poaceae		*Chloris ventricosa*	Plump Windmill Grass															0.1	1									
GG	Poaceae		*Cymbopogon ambiguus*	Scent Grass																									
GG	Poaceae		*Cymbopogon refractus*								0.2	10																	
GG	Poaceae		*Cynodon dactylon*	Couch											0.1	3													
GG	Poaceae		*Dactyloctenium radulans*	Button Grass									0.1	6	0.1	40	15	200	0.1	2									
GG	Poaceae		*Dichanthium sericeum*	Queensland Bluegrass																									
GG	Poaceae		*Dichanthium sp.*																										
GG	Poaceae		*Dichanthium spp.*																								0.1	30	
GG	Poaceae		*Digitaria ammophila*								0.1	5																	
GG	Poaceae		*Digitaria brownii*	Cotton Panic Grass																									
GG	Poaceae		*Digitaria coenicola*	Finger Panic Grass																									
GG	Poaceae		*Digitaria divaricatissima*	Umbrella Grass							0.2	10			0.1	30	5	100	0.1	6									
GG	Poaceae		*Digitaria ramularis*																										
GG	Poaceae		*Digitaria spp.*																										
GG	Poaceae		*Echinochloa spp.*																										
GG	Poaceae		*Echinopogon spp.*																										
GG	Poaceae		*Enneapogon avenaceus*	Bottle Washers																									
GG	Poaceae		*Enneapogon nigricans*	Nine-awn Grass													0.1	50											
GG	Poaceae		*Enneapogon spp.*																										
GG	Poaceae		*Enteropogon acicularis*	-									10	500	10	500	0.1	50	5	500	0.1	1	30	15					
GG	Poaceae		*Eragrostis alveiformis*																						0.1	30	10	800	
GG	Poaceae		*Eragrostis australasica*	-																									
GG	Poaceae		*Eragrostis brownii*	Brown's Lovegrass							0.1	10																	
EX	Poaceae	*	*Eragrostis cilianensis*										1	50	5	200	0.1	1	20	1000	2	200	0.1	1	5	11	5	3	
EX	Poaceae	*	*Eragrostis ciliensis*	Stinkgrass																									
GG	Poaceae		*Eragrostis dielsii*	Mallee Lovegrass																									
GG	Poaceae		*Eragrostis elongata*	Clustered Lovegrass																					0.1	2			
GG	Poaceae		*Eragrostis lacunaria*	Purple Lovegrass																									
GG	Poaceae		*Eragrostis leptostachya*	Paddock Lovegrass																									
EX	Poaceae	*	*Eragrostis mexicana*	Mexican Lovegrass																									
GG	Poaceae		*Eragrostis parviflora*	Weeping Lovegrass							0.1	10	15	1000	50	1000	0.1	5	0.1	1	0.1	1	0.1	4	1	200	0.1	2	
GG	Poaceae		*Eragrostis setifolia*	Bristly Love-grass																									
GG	Poaceae		*Eragrostis spp.*										0.1	2					0.1	10	0.1	1							
GG	Poaceae		*Eriachne spp.*																										
GG	Poaceae		*Eriochloa australiensis*	-																									
GG	Poaceae		*Eriochloa pseudoacrotricha*	Early Spring Grass											0.1	1			0.1	1									
EX	Poaceae	*	*Hordeum leporinum*	Barley Grass																									
EX	Poaceae	*	*Hordeum spp.*																										
GG	Poaceae		*Imperata cylindrica*	Blady Grass																									
GG	Poaceae		*Lachnagrostis spp.*																										
EX	Poaceae	*	*Lolium perenne*	Perennial Ryegrass																									
EX	Poaceae	*	*Lolium rigidum*	Wimmera Ryegrass													0.1	2	0.1	2	0.1	20	0.1	50			0.1	2	
GG	Poaceae		*Microlaena stipoides*																										
GG	Poaceae		*Panicum decompositum*																										
GG	Poaceae		*Panicum effusum*	Hairy Panic																									
GG	Poaceae		*Panicum spp.*														0.1	3					0.2	6					
GG	Poaceae		*Paspalidium caespitosum*	Brigalow Grass																									
GG	Poaceae		*Paspalidium constrictum*	Knottybutt Grass							0.1	1					0.1	5											
GG	Poaceae		*Paspalidium jubiflorum*	Warrego Grass																									
GG	Poaceae		*Paspalidium spp.*						0.2	30																			
HT	Poaceae	*	*Paspalum dilatatum*	Paspalum																									
GG	Poaceae		*Phragmites australis*	Common Reed																									
GG	Poaceae		*Poa sieberiana*	-																									
GG	Poaceae		*Poa spp.*																										
GG	Poaceae		*Poaceae sp.*																										
GG	Poaceae		*Rytidosperma bipartitum*	Wallaby Grass													0.1	30	0.1	3	0.1	30							
GG	Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass																									
GG	Poaceae		*Rytidosperma carphoides*	Short Wallaby Grass																									
GG	Poaceae		*Rytidosperma duttonianum*	-																									
GG	Poaceae		*Rytidosperma fulvum*	Wallaby Grass					0.1	1																			

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
GG	Poaceae		*Rytidosperma racemosum*	-																									
GG	Poaceae		*Rytidosperma racemosum*																										
GG	Poaceae		*Rytidosperma setaceum*	Smallflower Wallaby Grass																			5	100					
GG	Poaceae		*Rytidosperma spp.*																				0.1	7					
GG	Poaceae		*Rytidosperma spp.*																				0.1	7					
EX	Poaceae	*	*Setaria parviflora*	-																									
GG	Poaceae		*Setaria spp.*	A Setaria species																									
HT	Poaceae	*	*Sorghum halepense*	Johnson Grass																									
GG	Poaceae		*Sporobolus caroli*	Fairy Grass									0.1	2			0.1	30	5	4			0.1	4			0.1	1	
GG	Poaceae		*Sporobolus creber*	Western Rat-tail Grass							0.1	3																	
GG	Poaceae		*Sporobolus spp.*																										
GG	Poaceae		*Themeda spp.*																										
GG	Poaceae		*Themeda triandra*	Kangaroo Grass							0.1	5																	
GG	Poaceae		*Thyridolepis mitchelliana*	Mulga Mitchell Grass	5	50			0.1	10															0.1	40	0.1	12	
GG	Poaceae		*Tragus australianus*	Small Burrgrass									10	500	5	500	0.1	1											
EX	Poaceae	*	*Urochloa panicoides*	Urochloa Grass																									
EX	Poaceae	*	*Vulpia bromoides*	Squirrel Tail Fescue																									
EX	Poaceae	*	*Vulpia myuros*	Rat's Tail fescue																									
GG	Poaceae		*Walwhalleya subxerophila*	Gilgai Grass																									
GG	Poaceae spp.		*Poaceae spp.*																										
SG	Polygonaceae		*Duma florulenta*	Lignum																									
EX	Polygonaceae	*	*Emex spinosa*	-																									
EX	Polygonaceae	*	*Emex spp.*																										
FG	Polygonaceae		*Persicaria decipiens*	Slender Knotweed																									
EX	Polygonaceae	*	*Polygonum aviculare*	Wireweed																									
FG	Polygonaceae		*Rumex brownii*	Swamp Dock																									
FG	Polygonaceae		*Rumex crystallinus*	Shiny Dock																									
FG	Portulacaceae		*Calandrinia eremaea*	-																			0.1	20	0.1	1	0.1	30	
FG	Portulacaceae		*Portulaca oleracea*	Pigweed									0.1	10	0.1	2	0.1	4	0.1	1	15	200							
EX	Portulacaceae	*	*Portulaca pilosa*	Akulikuli																									
FG	Portulacaceae		*Portulaca spp.*																										
FG	Portulacaceae		*Portulaca spp.*																										
SG	Proteaceae		*Grevillea floribunda*	Seven Dwarfs Grevillea	3	10																							
SG	Proteaceae		*Hakea leucoptera*	Needlewood																									
SG	Proteaceae		*Persoonia sericea*	-																									
EG	Pteridaceae		*Cheilanthes distans*	Bristly Cloak Fern																									
EG	Pteridaceae		*Cheilanthes sieberi*	-	5	500			0.1	2	0.3	100													0.1	4	0.5	500	
OG	Ranunculaceae		*Clematis microphylla*	Small-leaved Clematis																									
SG	Rhamnaceae		*Cryptandra amara*	Bitter Cryptandra																									
SG	Rhamnaceae		*Cryptandra spp.*																										
FG	Rubiaceae		*Asperula gemella*	Twin-leaved Bedstraw																									
EX	Rubiaceae	*	*Galium aparine*	Goosegrass																									
FG	Rubiaceae		*Galium gaudichaudii*	Rough Bedstraw																									
SG	Rubiaceae		*Psydrax odorata*	Shiny-leaved Canthium																									
SG	Rutaceae		*Boronia occidentalis*	-			0.1	10																					
SG	Rutaceae		*Geijera parviflora*	Wilga																			0.1	40					
SG	Rutaceae		*Philotheca brevifolia*	-																									
SG	Rutaceae		*Philotheca ciliata*	-																									
SG	Rutaceae		*Philotheca spp.*		1	3																							
SG	Santalaceae		*Exocarpos spp.*																										
TG	Sapindaceae		*Alectryon oleifolius*	Western Rosewood													0.1	30											
TG	Sapindaceae		*Atalaya hemiglauca*	Whitewood																									
SG	Sapindaceae		*Dodonaea boronifolia*																										
SG	Sapindaceae		*Dodonaea hetromorpha*																										
SG	Sapindaceae		*Dodonaea spp.*																										
SG	Sapindaceae		*Dodonaea viscosa*	Hopbush																									
SG	Sapindaceae		*Dodonaea viscosa subsp. angustissima*	Narrow-leaved Hopbush																									
SG	Sapindaceae		*Dodonaea viscosa subsp. cuneata*	Wedge-leaf hop-bush																									
SG	Sapindaceae		*Dodonaea viscosa subsp. mucronata*	-																									
SG	Sapindaceae		*Dodonaea viscosa subsp. spatulata*	-																									
SG	Scrophulariaceae		*Eremophila debilis*	Winter Apple																									
SG	Scrophulariaceae		*Eremophila deserti*																										
SG	Scrophulariaceae		*Eremophila glabra*	Tarbush																									

GF	Family	Exotic	Scientific name	Common Name	AN4		AN5		AN6		AN7		WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Outside plots
					%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	%	Ab	
SG	Scrophulariaceae		*Eremophila longifolia*	Berrigan																									
SG	Scrophulariaceae		*Eremophila mitchellii*	Budda															0.1	2									
SG	Scrophulariaceae		*Eremophila spp.*																										
SG	Scrophulariaceae		*Myoporum montanum*	Western Boobialla																									
HT	Solanaceae	*	*Cestrum parqui*	Green Cestrum																									
HT	Solanaceae	*	*Lycium ferocissimum*	African Boxthorn															0.1	3	10	2	0.1	10					
SG	Solanaceae		*Lycium spp.*																										
SG	Solanaceae		*Solanum cinereum*	Narrawa Burr																									
FG	Solanaceae		*Solanum cleistogamum*																										
FG	Solanaceae		*Solanum ellipticum*		2	4					15	300																	
SG	Solanaceae		*Solanum erianthum*	Potato Tree																									
FG	Solanaceae		*Solanum esuriale*	Quena									0.1	4	0.1	4	0.1	1											
SG	Solanaceae		*Solanum ferocissimum*	Spiny Potato Bush					0.5	50	0.1	2							10	2	5	100					0.1	10	
SG	Solanaceae		*Solanum jucundum*																										
EX	Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade																			0.1	3					
SG	Thymelaeaceae		*Pimelea linifolia*	Slender Rice Flower																									
SG	Thymelaeaceae		*Pimelea microcephala*	Shrubby Rice-flower																									
SG	Thymelaeaceae		*Pimelea neo-anglica*	Poison Pimelea																									
SG	Thymelaeaceae		*Pimelea spp.*																										
EX	Urticaceae	*	*Urtica urens*	Small Nettle																									
EX	Verbenaceae	*	*Glandularia aristigera*	Mayne's Pest																									
HT	Verbenaceae	*	*Phyla canescens*	-																									
HT	Verbenaceae	*	*Phyla nodiflora*	Lippia																									
EX	Verbenaceae	*	*Verbena bonariensis*	Purpletop																									
EX	Verbenaceae	*	*Verbena officinalis*	Common Verbena																									
FG	Violaceae		*Hybanthus spp.*																										
OG	Xanthorrhoeaceae		*Xanthorrhoea acaulis*	-																									
OG	Zamiaceae		*Macrozamia glaucophylla*	-																									
FG	Zygophyllaceae		*Tribulus micrococcus*	Yellow Vine																									
EX	Zygophyllaceae	*	*Tribulus terrestris*	Caltrop																									

Table E1 Weed species recorded in survey plots

Common name *Scientific Name*	WoNS (CoA 2017)	Priority weed	Biosecurity Duty (NSW WeedWise)	High Threat Exotic	Location (plot number)
Khaki Weed *Alternanthera pungens*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	Yes	T1-P1, T1-P2, T1-P8, T2-P1
Greater Beggars Ticks *Bidens subalternans*	No	No	N/A	Yes	T2-P18
Mediterranean Turnip *Brassica tournefortii*	No	No	N/A	Yes	T2-P14
Mother-of-Millions *Bryophyllum delagoense*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Regional Recommended Measure*** Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.	Yes	T1-P5, T2-P4, T2-P5
Saffron Thistle *Carthamus lanatus*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	Yes	T1-P22, T1-P23, T2-P3, T2-P10, T2-P16, T2-P20, T2-P22, T2-P26, T2-P28,T2-P29, T1-MP38, T2-MP24

Common name *Scientific Name*	WoNS (CoA 2017)	Priority weed	Biosecurity Duty (NSW WeedWise)	High Threat Exotic	Location (plot number)
Innocent Weed *Cenchrus longispinus*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Regional Recommended Measure*** Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.	Yes	T1-P4, T1-P6, T2-P10
Green Cestrum *Cestrum parqui*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Regional Recommended Measure*** Whole of region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: Land managers should mitigate the risk of new weeds being introduced to their land; land managers should mitigate spread from their land; the plant should be eradicated from the land and the land kept free of the plant. Core infestation: Land managers reduce impacts from the plant on priority assets.	Yes	T1-P25
Rhodes Grass *Chloris gayana*	No	No	N/A	Yes	T1-P9
Fleabane species *Conyza bonariensis* *Conyza sumatrensis*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	No	T2-P15, T2-P16
Umbrella Sedge *Cyperus eragrostis*	No	No	N/A	Yes	T1-P4

Common name *Scientific Name*	WoNS (CoA 2017)	Priority weed	Biosecurity Duty (NSW WeedWise)	High Threat Exotic	Location (plot number)
Patersons Curse *Echium plantagineum*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	No	T1-P10, T1-P18, T1-P24, T1-P25, T2-P15, T2-P16, T2-P18, T2-P20, T2-P28
Blue Heliotrope *Heliotropium amplexicaule*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable **Regional Recommended Measure*** Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should reduce impacts from the plant on priority assets. Land managers should mitigate the risk of the plant being introduced to their land.	Yes	T1-P10, T1-P22, T1-P23
African Boxthorn *Lycium ferocissimum*	Yes	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Prohibition on dealings** Must not be imported into the State or sold **Regional Recommended Measure*** Land managers mitigate the risk of the plant spreading from their land. Land managers reduce impact of plant on priority assets (riparian areas and floodplains).	Yes	T1-P2, T1-P7, T1-P8, T1-P12, T1-P18, T1-P19, T1-P21, T2-P1, T2-P21, T2-P24, T2-P2, T2-P27, T2-P35, T2-P36, T2-MP23, T2-MP2

Common name *Scientific Name*	WoNS (CoA 2017)	Priority weed	Biosecurity Duty (NSW WeedWise)	High Threat Exotic	Location (plot number)
White Horehound *Marrubium vulgare*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	No	T1-P9, T1-P13, T1-P24, T1-P25, T2-P35, T2-P36
Tiger Pear *Opuntia aurantiaca*	Yes	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Prohibition on dealings** Must not be imported into the State or sold **Regional Recommended Measure*** Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Core infestations: Land managers should mitigate spread from their land.	Yes	T1-P10, T1-P12, T1-P15, T2-P5, T2-P7, T2-P8, T2-P14, T2-P15, T2-P16, T1-MP29, T1-MP30, T1-MP32, T2-MP11, T2-MP12, T2-MP13, T2-MP14, T2-MP16, T2-MP17, T2-MP18, T2-MP2
Common Prickly Pear *Opuntia stricta*	Yes	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Prohibition on dealings** Must not be imported into the State or sold **Regional Recommended Measure*** Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Core infestations: Land managers should mitigate spread from their land.	Yes	T1-P3, T1-P4, T1-P5, T1-P8, T1-P15, T2-P4, T2-P14, T2-P15, T2-P33, T1-MP24

Common name *Scientific Name*	WoNS (CoA 2017)	Priority weed	Biosecurity Duty (NSW WeedWise)	High Threat Exotic	Location (plot number)
Paspalum *Paspalum dilatatum*	No	No		Yes	T1-P25, T2-P35, T2-P36
Lippia *Phyla canescens*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable	Yes	T2-P1
Lippia *Phyla nodiflora*	No	No	N/A	Yes	T1-P2
Mintweed *Salvia reflexa*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable	No	T2-P2, T2-MP2
Johnson Grass *Sorghum halepense*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. **Regional Recommended Measure*** Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.	Yes	T2-P4
Bathurst Burr *Xanthium spinosum*	No	Yes	**General Biosecurity Duty** All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	Yes	T1-P2, T2-P1

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Biodiversity development assessment report

Appendix F Fauna survey results

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

Table F1 Fauna survey results

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
FROGS								
Litoria latopalmata	Broad-palmed Frog				O	O	OW	O
Litoria rubella	Desert Tree Frog				O		W	O
Crinia parinsignifera	Eastern Sign-bearing Froglet				OW	W	W	
Litoria peronii	Emerald-spotted Tree Frog				O		OW	O
Limnodynastes interioris	Giant Banjo Frog				O			
Litoria caerulea	Green Tree Frog				W			
Limnodynastes fletcheri	Long-thumbed Frog							O
Platyplectrum ornatum	Ornate Burrowing Frog				T		T	O
Limnodynastes tasmaniensis	Spotted Grass Frog				O	W	W	O
Neobatrachus sudelli	Sudell's Frog				O			
BIRDS								
Barnardius zonarius barnardi	Australian Mallee Ringneck				O	O	O	
Struthidea cinerea	Apostlebird				OQ	O	O	O
Anhinga novaehollandiae	Australasian Darter				O			O
Tachybaptus novaehollandiae	Australasian Grebe							O
Falco longipennis	Australian Hobby							O
Cracticus tibicen	Australian Magpie				O	O	O	O
Aegotheles cristatus	Australian Owlet-nightjar				W		OW	W
Pelecanus conspicillatus	Australian Pelican				O			
Anthus novaeseelandiae	Australian Pipit				O			
Corvus coronoides	Australian Raven				O	O	O	O
Acrocephalus australis	Australian Reed-Warbler							W
Barnardius zonarius	Australian Ringneck				O	O	O	O
Chenonetta jubata	Australian Wood Duck				O			O
Ninox connivens	Barking Owl		V				O	

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Falco subniger	Black Falcon		V					O
Milvus migrans	Black Kite				O			O
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)		V		O		O	
Coracina novaehollandiae	Black-faced Cuckoo-shrike				O	O	O	O
Elseyornis melanops	Black-fronted Dotterel							O
Elanus axillaris	Black-shouldered Kite					O		O
Northiella haematogaster	Blue Bonnet				O	O		O
Entomyzon cyanotis	Blue-faced Honeyeater				O	O		
Falco berigora	Brown Falcon				O	O		O
Accipiter fasciatus	Brown Goshawk						O	
Lichmera indistincta	Brown Honeyeater					O	O	
Coturnix ypsilophora	Brown Quail							O
Cincloramphus cruralis	Brown Songlark					O		O
Acanthiza pusilla	Brown Thornbill						O	
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)		V				OQ	
Melithreptus brevirostris	Brown-headed Honeyeater						O	O
Acanthiza reguloides	Buff-rumped Thornbill				O		O	O
Ardea ibis	Cattle Egret							O
Scythrops novaehollandiae	Channel-billed Cuckoo					W		O
Acanthiza uropygialis	Chestnut-rumped Thornbill				O		O	
Nymphicus hollandicus	Cockatiel				O	O	O	O
Phaps chalcoptera	Common Bronzewing				O	O	O	O
Sturnus tristis	Common Myna	*						O
Sturnus vulgaris	Common Starling	*			O			O
Ocyphaps lophotes	Crested Pigeon				O	O	O	O
Stagonopleura guttata	Diamond Firetail						O	
Eurystomus orientalis	Dollarbird					O		O

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Taeniopygia bichenovii	Double-barred Finch				O		OW	O
Gallinula tenebrosa	Dusky Moorhen							O
Artamus cyanopterus cyanopterus	Dusky Woodswallow		V					O
Tyto javanica	Eastern Barn Owl				O		O	O
Eudynamys orientalis	Eastern Koel						W	
Platycercus eximius	Eastern Rosella				O	O	O	O
Falcunculus frontatus frontatus	Eastern Shrike-tit						O	
Acanthorhynchus tenuirostris	Eastern Spinebill							W
Eopsaltria australis	Eastern Yellow Robin				O		OQ	O
Dromaius novaehollandiae	Emu					O	OQ	O
Petrochelidon ariel	Fairy Martin				Nest			O
Cacomantis flabelliformis	Fan-tailed Cuckoo				W			
Petroica phoenicea	Flame Robin		V					
Todiramphus macleayii	Forest Kingfisher				O		O	O
Apus pacificus	Fork-tailed Swift			C,J,K	O			
Eolophus roseicapillus	Galah				O	O	O	O
Pachycephala pectoralis	Golden Whistler						O	
Calyptorhynchus lathami	Glossy Black-Cockatoo		V				O	O
Cracticus torquatus	Grey Butcherbird				O	O	O	O
Rhipidura albiscapa	Grey Fantail				O	O	O	O
Colluricincla harmonica	Grey Shrike-thrush				O	O	O	O
Anas gracilis	Grey Teal							O
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)		V		O	O	O	O
Coracina maxima	Ground Cuckoo-shrike				O			
Chalcites basalis	Horsfield's Bronze-Cuckoo						W	
Passer domesticus	House Sparrow	*				O		

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Acanthiza apicalis	Inland Thornbill				O	O	W	O
Ardea inermedia	Intermediate Egret					O		
Microeca fascinans	Jacky Winter				O	O	O	
Dacelo novaeguineae	Laughing Kookaburra				O	O	O	
Myiagra rubecula	Leaden Flycatcher						O	O
Phalacrocorax sulcirostris	Little Black Cormorant				O	O		O
Cacatua sanguinea	Little Corella				O			O
Hieraaetus morphnoides	Little Eagle		V			O		
Philemon citreogularis	Little Friarbird				O		O	O
Microcarbo melanoleucos	Little Pied Cormorant				O			O
Corvus mellori	Little Raven				O			
Grallina cyanoleuca	Magpie-lark				O	O	O	O
Vanellus miles	Masked Lapwing							O
Artamus personatus	Masked Woodswallow				O			
Dicaeum hirundinaceum	Mistletoebird						O	O
Glossopsitta concinna	Musk Lorikeet					O		O
Falco cenchroides	Nankeen Kestrel				O	O		O
Nycticorax caledonicus	Nankeen Night Heron							O
Philemon corniculatus	Noisy Friarbird				O		O	O
Manorina melanocephala	Noisy Miner				O	O	O	O
Oriolus sagittatus	Olive-backed Oriole							O
Anas superciliosa	Pacific Black Duck				O		O	O
Platycercus adscitus	Pale-headed Rosella							O
Cacomantis pallidus	Pallid Cuckoo						O	
Geopelia striata	Peaceful Dove				O	O	O	O
Cracticus nigrogularis	Pied Butcherbird				O	O	OQ	O
Strepera graculina	Pied Currawong				O	O	O	O
Merops ornatus	Rainbow Bee-eater			Ma	O		O	O

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Trichoglossus haematodus	Rainbow Lorikeet							O
Todiramphus pyrrhopygius	Red-backed Kingfisher							O
Neochmia temporalis	Red-Browed Finch							O
Petroica goodenovii	Red-capped Robin				O	O	O	
Psephotus haematonotus	Red-rumped Parrot				O	O	O	O
Aprosmictus erythropterus	Red-winged Parrot					O	O	
Myiagra inquieta	Restless Flycatcher						O	
Columba livia	Rock Dove	*						O
Rhipidura rufifrons	Rufous Fantail			M			O	
Cincloramphus mathewsi	Rufous Songlark				O	O	O	
Pachycephala rufiventris	Rufous Whistler				O	O	O	O
Todiramphus sanctus	Sacred Kingfisher				O		O	
Myiagra cyanoleuca	Satin Flycatcher			M		O		
Myzomela sanguinolenta	Scarlet Honeyeater						O	
Chalcites lucidus	Shining Bronze-Cuckoo							W
Zosterops lateralis	Silvereye							O
Gavicalis virescens	Singing Honeyeater					O		
Ninox novaeseelandiae	Southern Boobook				OW		W	O
Chthonicola sagittata	Speckled Warbler		V					O
Acanthagenys rufogularis	Spiny-cheeked Honeyeater				O		O	
Ptilonorhynchus maculatus	Spotted Bowerbird						O	
Circus assimilis	Spotted Harrier		V		O	O		
Pardalotus punctatus	Spotted Pardalote					W	W	
Threskiornis spinicollis	Straw-necked Ibis					O		O
Pardalotus striatus	Striated Pardalote				O	O	W	O
Acanthiza lineata	Striated Thornbill				O		O	O

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Plectorhyncha lanceolata	Striped Honeyeater				O		O	
Cacatua galerita	Sulphur-crested Cockatoo				O	O	O	O
Malurus cyaneus	Superb Fairy-wren				O	O	O	O
Polytelis swainsonii	Superb Parrot		V	V		O		
Podargus strigoides	Tawny Frogmouth				O	O	O	O
Megalurus timoriensis	Tawny Grassbird							O
Petrochelidon nigricans	Tree Martin				O			O
Neophema pulchella	Turquoise Parrot		V				O	
Turnix sp.	Unidentified buttonquail						O	
Accipiter sp.	Unidentified goshawk						F	
Climacteris sp.	Unidentified treecreeper							O
Daphoenositta chrysoptera	Varied Sittella		V		O		O	
Malurus lamberti	Variegated Fairy-wren					O	O	O
Aquila audax	Wedge-tailed Eagle				O	O	O	
Smicrornis brevirostris	Weebill				W	O	W	O
Hirundo neoxena	Welcome Swallow				O	O		O
Gerygone fusca	Western Gerygone				O	W	W	O
Haliastur sphenurus	Whistling Kite						O	O
Coracina papuensis	White-bellied Cuckoo-shrike							O
Artamus leucorynchus	White-breasted Woodswallow				O			O
Artamus superciliosus	White-browed Woodswallow				O	O	O	
Nesoptilotis leucotis	White-eared Honeyeater				O		O	O
Egretta novaehollandiae	White-faced Heron				OQ	O		
Ardea pacifica	White-necked Heron				O			O
Ptilotula penicillatus	White-plumed Honeyeater				O	O	O	O
Gerygone olivacea	White-throated Gerygone				O			W
Melithreptus albogularis	White-throated Honeyeater							
Hirundapus caudatus	White-throated Needletail			V, M				O

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Cormobates leucophaea	White-throated Treecreeper				O		O	O
Corcorax melanorhamphos	White-winged Chough				O	O	O	O
Malurus leucophrys	White-winged Fairy-wren					O		
Lalage sueurii	White-winged Triller				O	O	O	
Rhipidura leucophrys	Willie Wagtail				O	O	O	O
Acanthiza nana	Yellow Thornbill				O	O	O	O
Platalea flavipes	Yellow-billed Spoonbill				O			
Caligavis chrysops	Yellow-faced Honeyeater						O	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill				O	O	O	O
Calyptorhynchus funereus	Yellow-tailed Black-cockatoo							
Manorina flavigula	Yellow-throated Miner							
Lichenostomus melanops	Yellow-tufted Honeyeater				O			
Taeniopygia guttata	Zebra Finch				O			O
MAMMALS								
Lepus capensis	Brown Hare	*			O	O		O
Felis catus	Cat	*					O	
Chalinolobus morio	Chocolate Wattled Bat						D	D
Trichosurus vulpecula	Common Brushtail Possum				OP	OP	OP	OP
Sminthopsis murina	Common Dunnart							
Macropus robustus	Common Wallaroo					O		
Nyctophilus corbeni	Corben's Long-eared Bat		V	V			T	
Canis lupus familiaris	Dog	*						F
Miniopterus schreibersii oceanensis	Eastern Bentwing Bat		V		Pr	Pr		
Scotorepens orion	Eastern Broad-nosed Bat						TPr	
Falsistrellus tasmaniensis	Eastern Falsistrelle		V				Pr	
Mormopterus norfolkensis	Eastern Freetail-bat		V					Pr
Macropus giganteus	Eastern Grey Kangaroo				O	O	O	O

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Vulpes vulpes	Fox	*				O	Q	OP
Petaurus sp.	Glider						F	
Capra hircus	Goat	*			O		O	
Chalinolobus gouldii	Gould's Wattled Bat				DT	D	D	D
Mus musculus	House Mouse	*			T			K
Scotorepens balstoni	Inland Broad-nosed Bat				Pr	D	TD	Pr
Vespadelus baverstocki	Inland Forest Bat		V				Pr	
Phascolarctos cinereus	Koala		V	V			P	P
Chalinolobus dwyeri	Large-eared Pied Bat		V	V			Pr	
Nyctophilus geoffroyi	Lesser Long-eared Bat				T		T	
Scotorepens greyii	Little Broad-nosed Bat				D	D	D	D
Vespadelus vulturnus	Little Forest Bat				T	D	T, D	D
Chalinolobus picatus	Little Pied Bat		V		Pr	Pr	D	Pr
Pteropus scapulatus	Little Red Flying-fox							KO
Nyctophilus sp.	long-eared bat							D
Mormopterus lumsdenae	Northern Freetail-bat		V				D	
Sus scrofa	Pig	*				K	F	OF
Oryctolagus cuniculus	Rabbit	*			O	O		O
Macropus rufus	Red Kangaroo				O	OP	P	
Macropus rufogriseus	Red-necked Wallaby						OQ	
Mormopterus ozimops ridei	Ride's Freetail-bat				D			D
Aepyprymnus rufenscens	Rufous Bettong		V				?F	
Ovis aries	Sheep (feral)	*					O	
Tachyglossus aculeatus	Short-beaked Echidna				O	O	O	OF
Vespadelus regulus	Southern Forest Bat				PrT	Pr	T	
Petaurus norfolcensis	Squirrel Glider		V				O	
Petaurus breviceps	Sugar Glider							O
Wallabia bicolor	Swamp Wallaby				O			

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Isoodon/Perameles sp.	Unidentified Bandicoot						F	F
Austronomus australis	White-striped Freetail-Bat				D	D	D	D
Saccolaimus flaviventris	Yellow-bellied Sheathtail-Bat		V		D		D	D
Antechinus flavipes	Yellow-footed Antechinus				P	T	T	
REPTILES								
Carlia sp.	Skink				O			OO
Cryptoblepharus sp.	Skink							O
Eulamprus tenuis	Barred-sided Skink							O
Pogona barbata	Bearded Dragon				O	O	T	O
Ctenotus allotropis	Brown-blazed Wedgesnout Ctenotus						O	
Lialis burtonis	Burton's Snake-lizard						O	
Heteronotia binoei	Bynoe's Gecko				O	O	T	O
Menetia greyii	Common Dwarf Skink				O	O		
Morelia spilota spilota	Diamond Python				K			
Gehyra dubia	Dubious Dtella							
Tiliqua scincoides	Eastern Blue-tongue				O			
Lerista punctatovittata	Eastern Robust Slider							O
Chelodina longicollis	Eastern Snake-necked Turtle				O			O
Strophurus williamsi	Eastern Spiny-tailed Gecko						O	
Varanus gouldii	Gould's Goanna				FO		OFQ	O
Hemidactylus frenatus	House Gecko	*						O
Amphibolurus muricatus	Jacky Lizard							
Varanus varius	Lace Monitor				O	O	Q	O
Diporiphora nobbi	Nobbi Dragon						T	T
Oedura monilis	Ocellated Velvet Gecko						O	O
Hoplocephalus bitorquatus	Pale-headed Snake		V				O	
Cryptoblepharus pannosus	Ragged Snake-eyed Skink				O			O

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Narromine-Curban	Curban - Pilliga	Pilliga	Pilliga-Narrabri
Pseudechis porphyriacus	Red-bellied Black Snake				O			
Tiliqua rugosa	Shingle-back				O			
Morethia boulengeri	South-eastern Morethia Skink						O	O
Carlia tetradactyla	Southern Rainbow-skink					?	T	
Strophurus intermedius	Southern Spiny-tailed Gecko					O		O
Lerista timida	Timid Slider						T	
Diporiphora australis	Tommy Roundhead						T	
Gehyra variegata	Tree Dtella						TO	O
Egernia striolata	Tree Skink				T		T	O
Diplodactylus vittatus	Wood Gecko						O	
Demansia psammophis	Yellow-faced Whip Snake				O			

Key: D – definite (Anabat) F – tracks/traces, K – dead, O – observed, P – scats, Pr – probable (Anabat), Q – camera, T – trapped, W – heard

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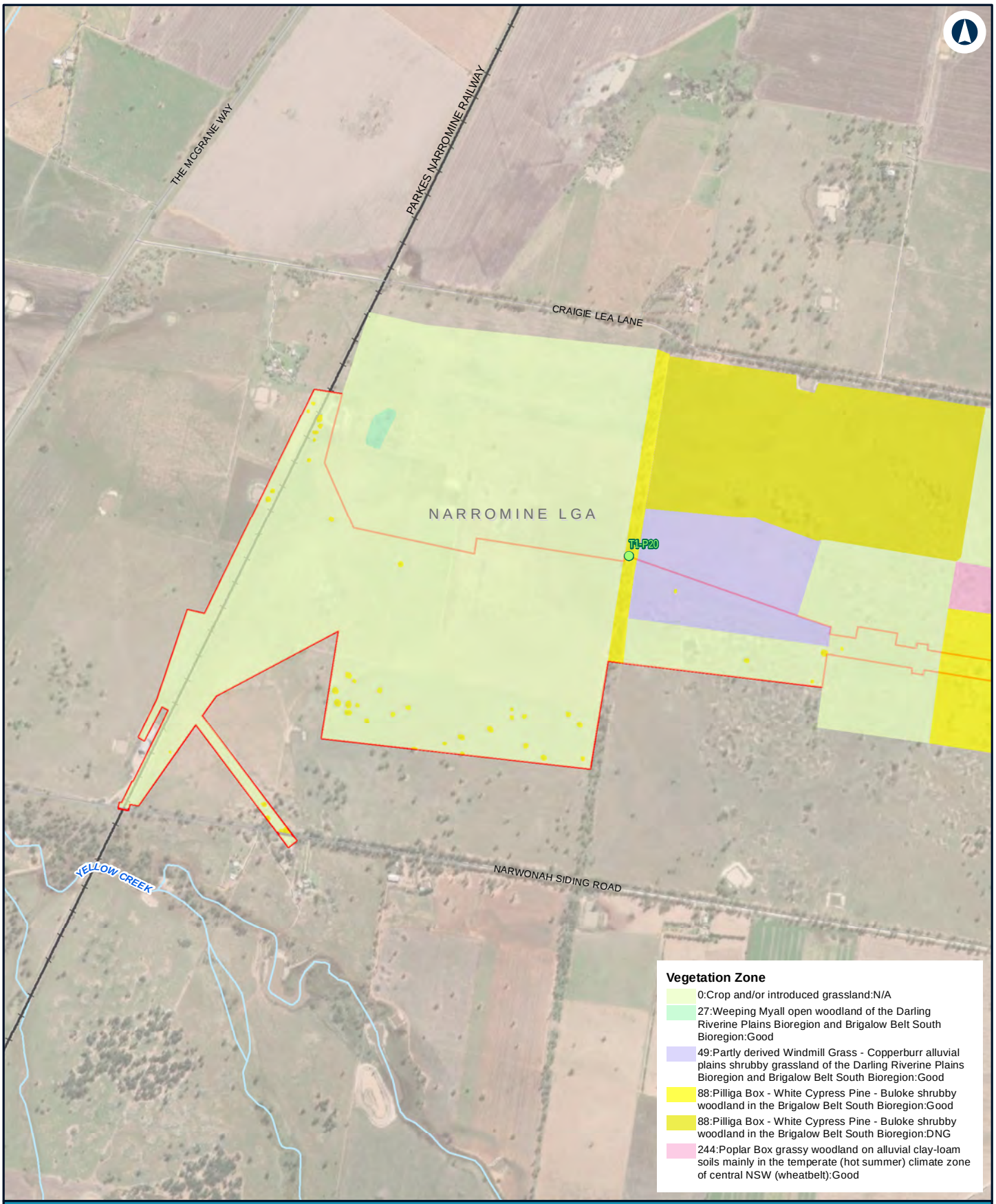
Appendix G Vegetation zone maps by segment

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS



NARROMINE TO NARRABRI Vegetation Zone Map Segment 1 Narromine South multi-function compound MAP 1 OF 20

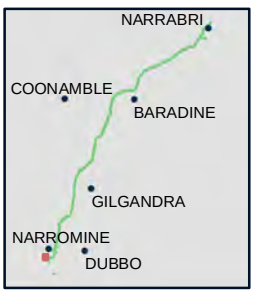
0 0.25 0.5 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:20,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

- Construction impact zone
- Vegetation plot



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NARROMINE TO NARRABRI Vegetation Zone Map Segment 2 Curban multi-function compound MAP 2 OF 20

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:15,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone

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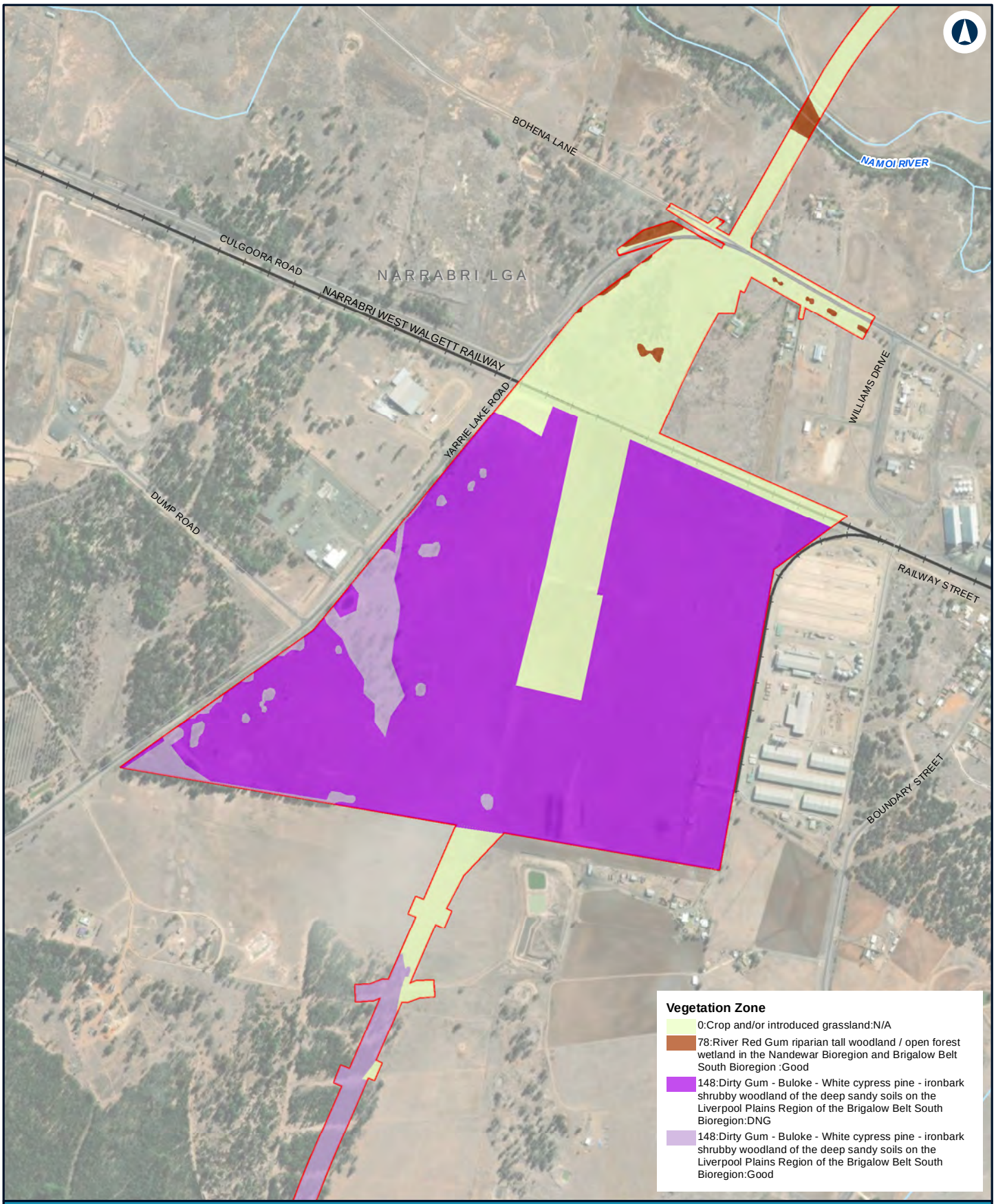

NARROMINE TO NARRABRI Vegetation Zone Map Segment 3 Narrabri West multi-function compound MAP 3 OF 20

0 0.15 0.3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:12,500
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone

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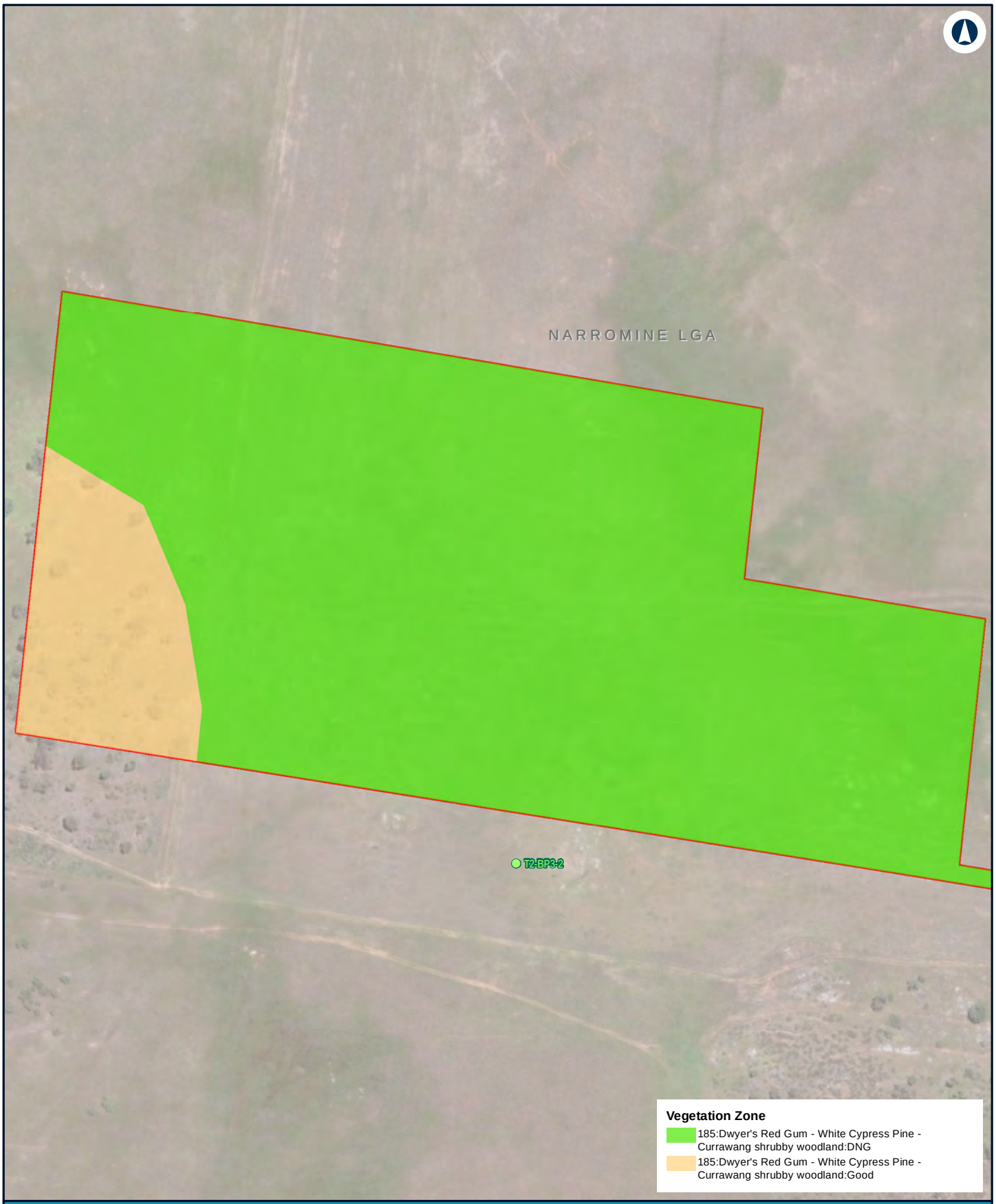

NARROMINE TO NARRABRI Vegetation Zone Map Segment 4 Borrow Pit A MAP 4 OF 20

0 0.04 0.08 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:3,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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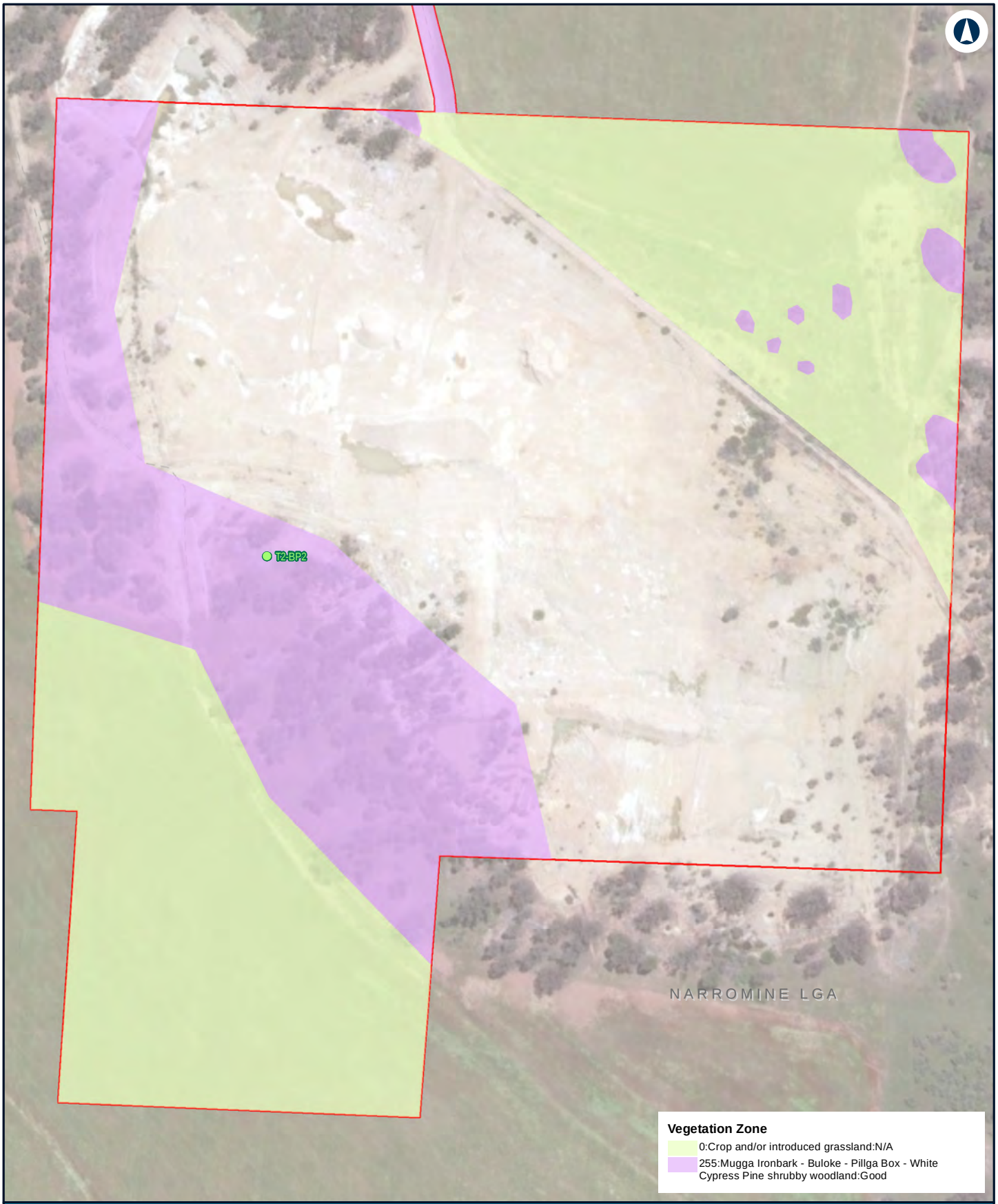


NARROMINE TO NARRABRI Vegetation Zone Map Segment 5 Borrow Pit B MAP 5 OF 20

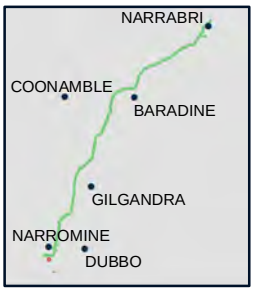
0 0.035 0.07 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:2,500
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot



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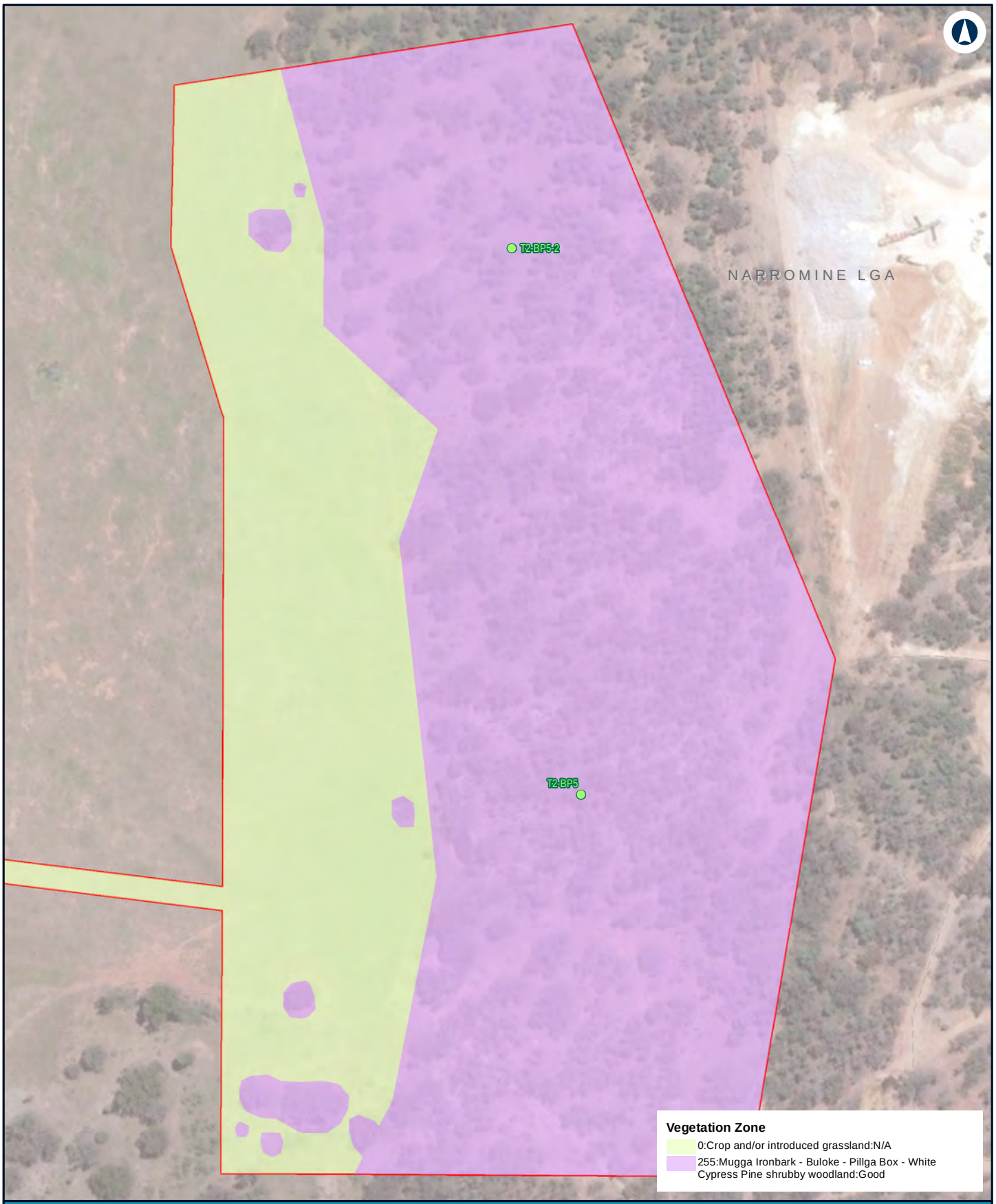

NARROMINE TO NARRABRI Vegetation Zone Map Segment 6 Borrow Pit C MAP 6 OF 20

0 0.03 0.06 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:2,255
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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NARROMINE TO NARRABRI Vegetation Zone Map Segment 7 Borrow Pit D MAP 7 OF 20

0 0.035 0.07 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:2,800
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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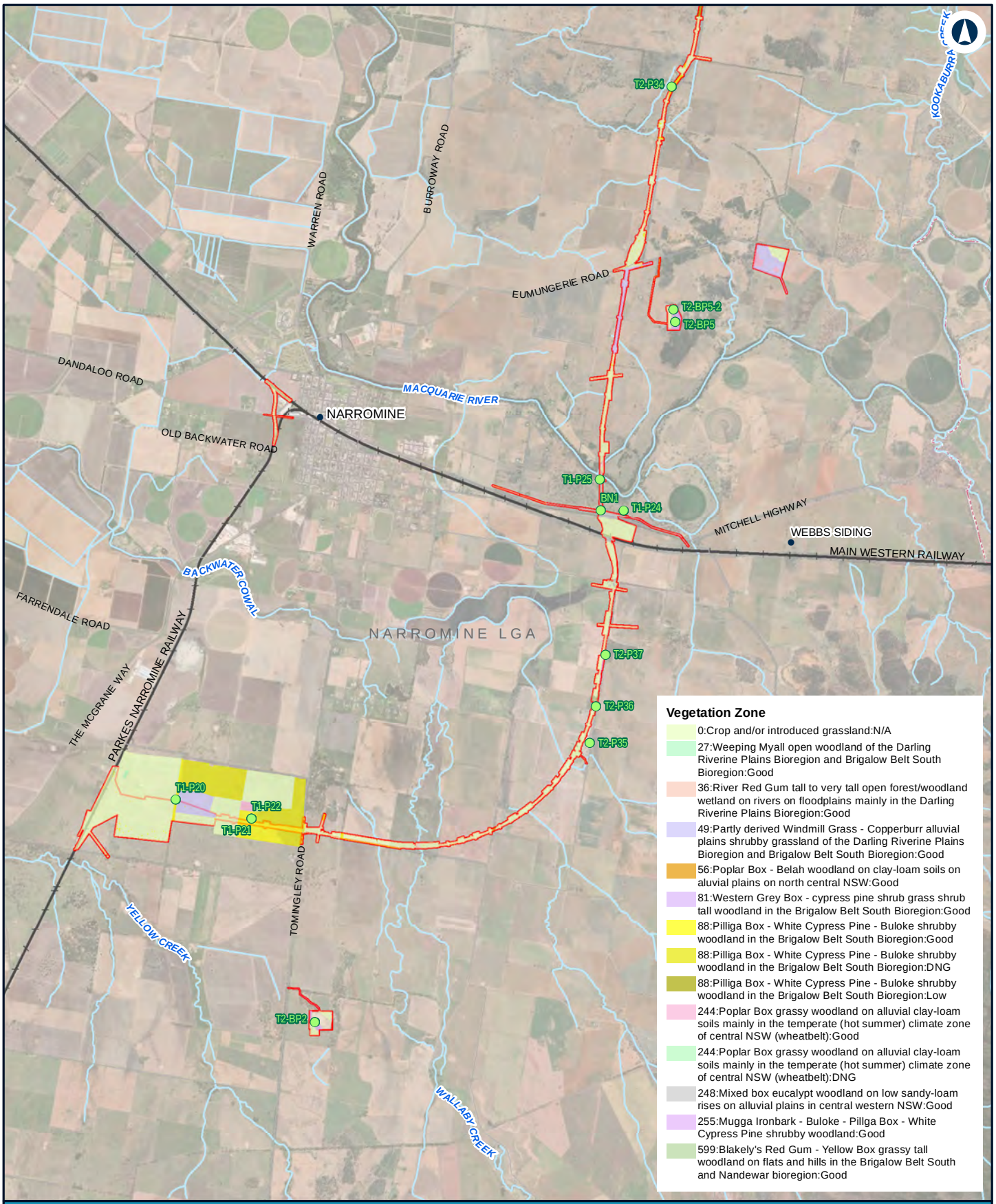


NARROMINE TO NARRABRI Vegetation Zone Map Segment 8 Narromine to Curban A MAP 8 OF 20

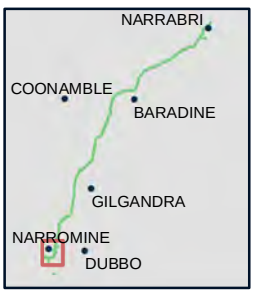
0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot



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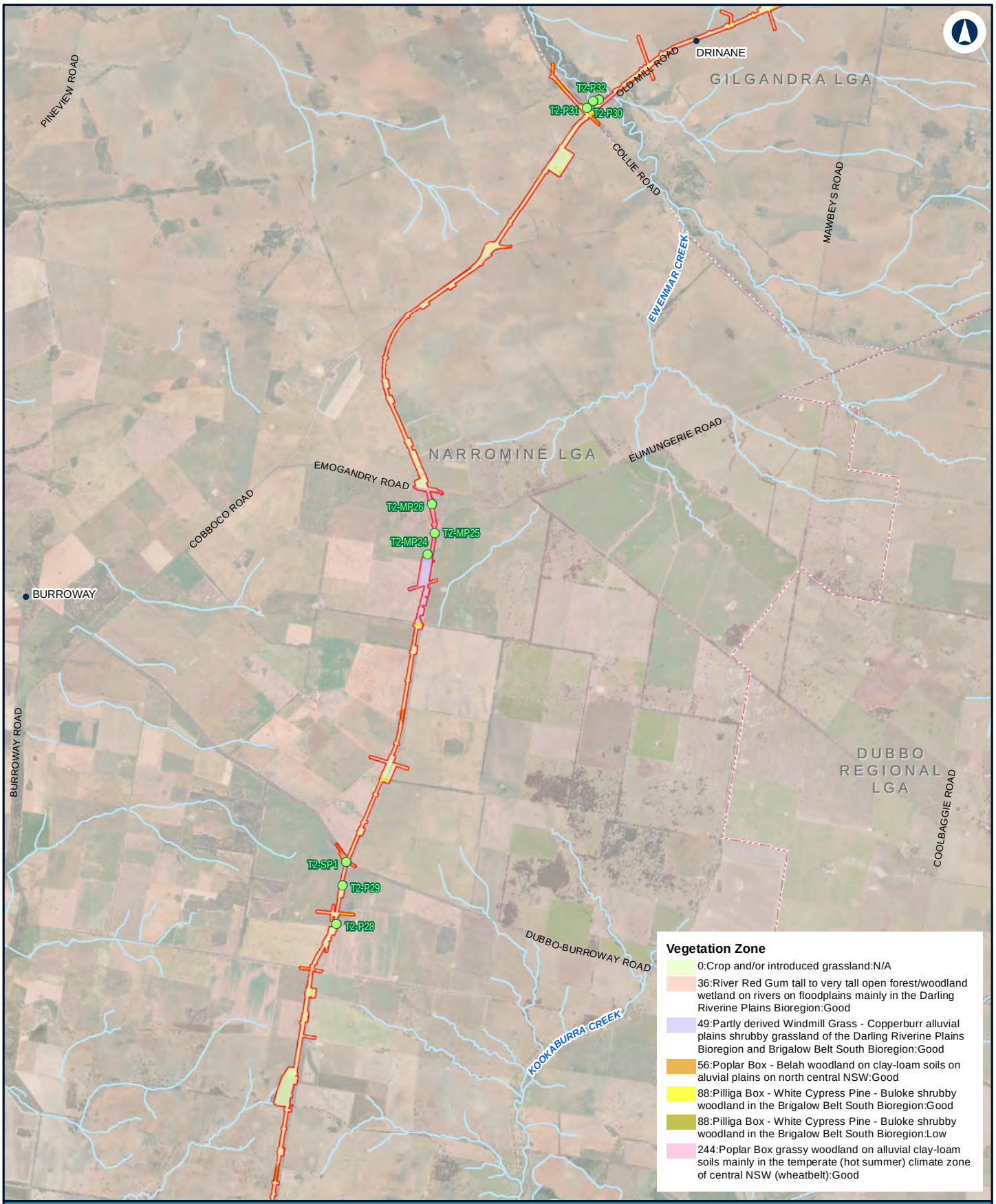

NARROMINE TO NARRABRI Vegetation Zone Map Segment 8 Narromine to Curban B MAP 9 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

- Construction impact zone
- Vegetation plot

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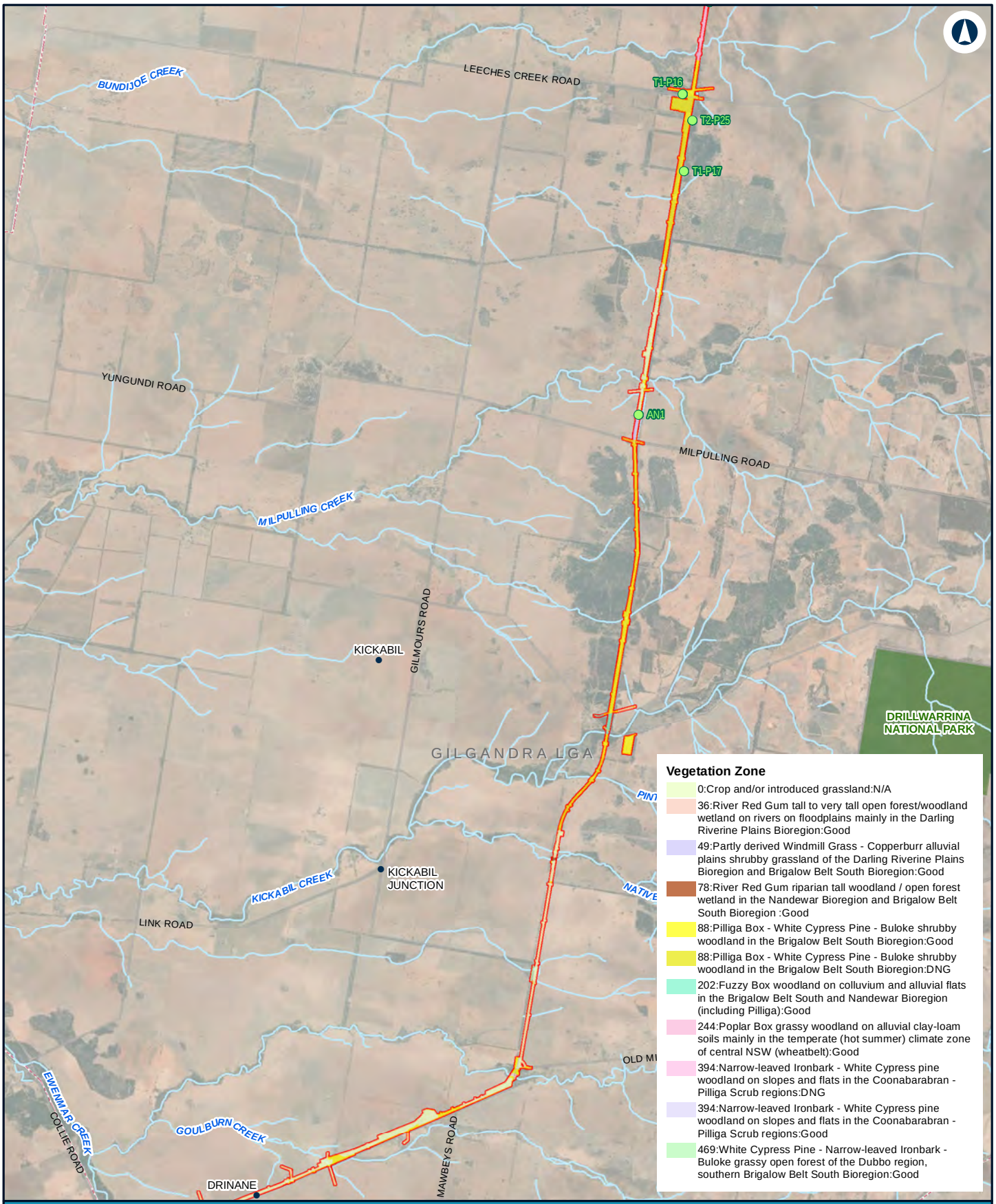

NARROMINE TO NARRABRI Vegetation Zone Map Segment 8 Narromine to Curban C MAP 10 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
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LEGEND

Construction impact zone
Vegetation plot

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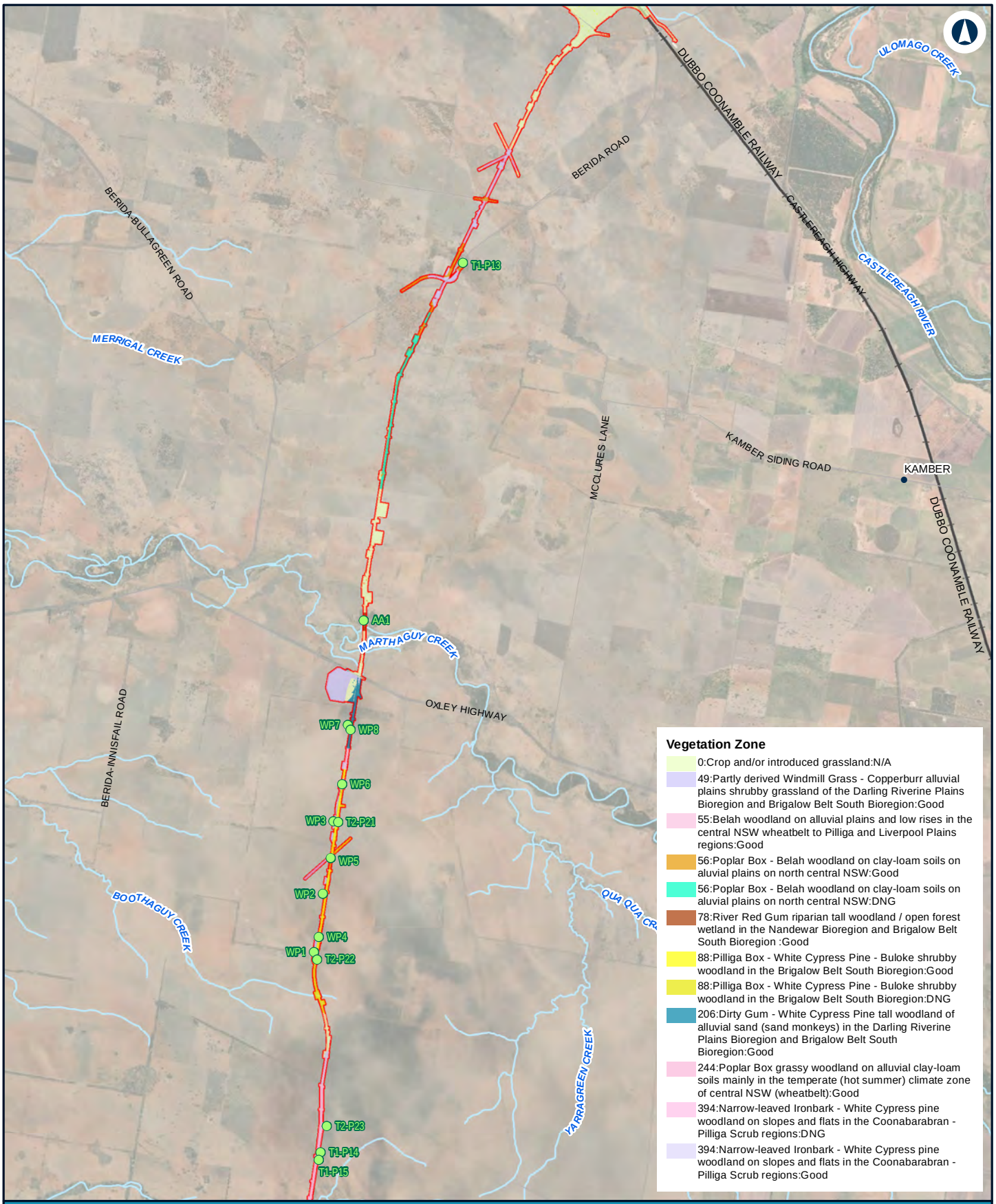

NARROMINE TO NARRABRI Vegetation Zone Map Segment 8 Narromine to Curban D MAP 11 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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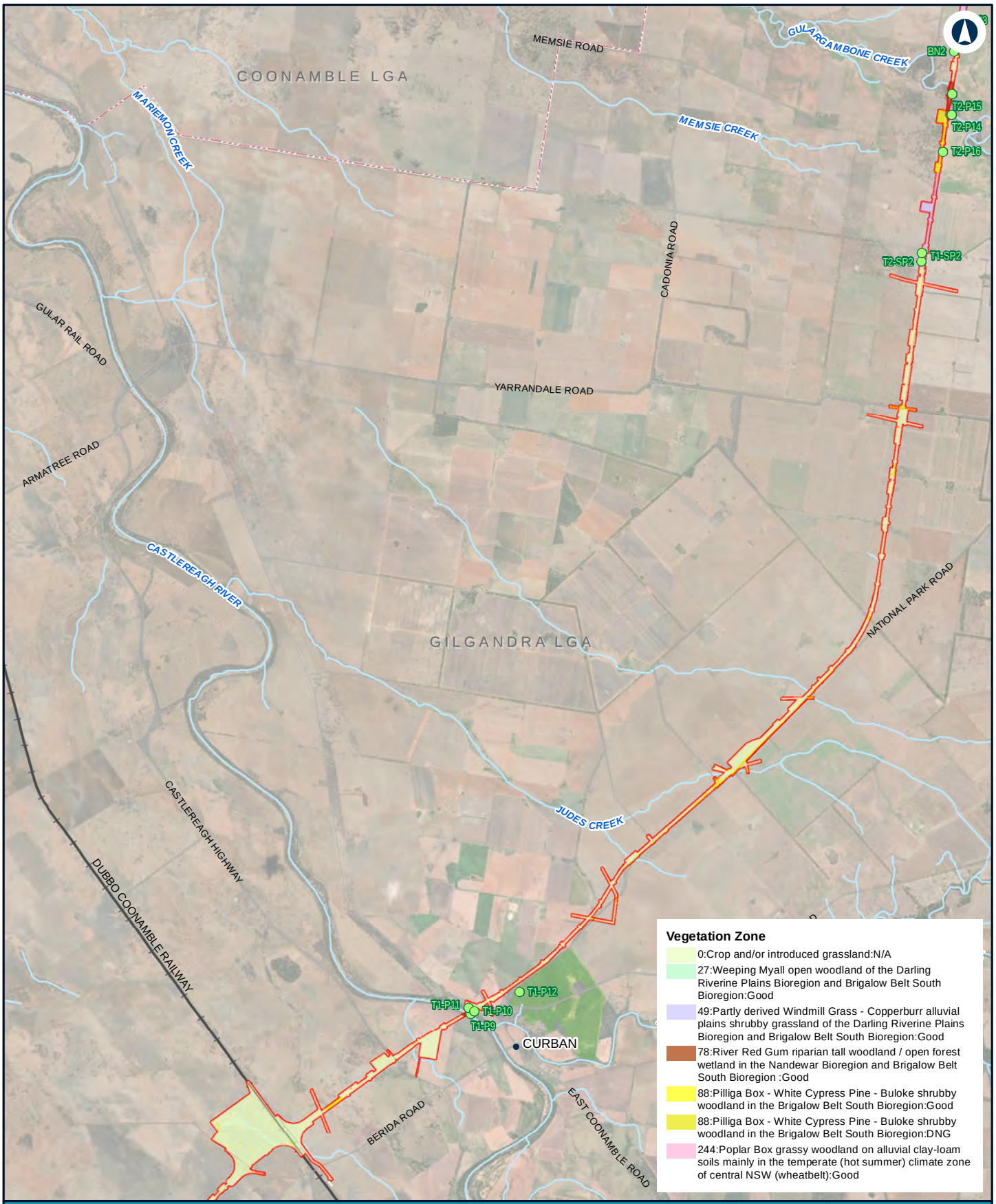

NARROMINE TO NARRABRI Vegetation Zone Map Segment 9 Curban to Pilliga A MAP 12 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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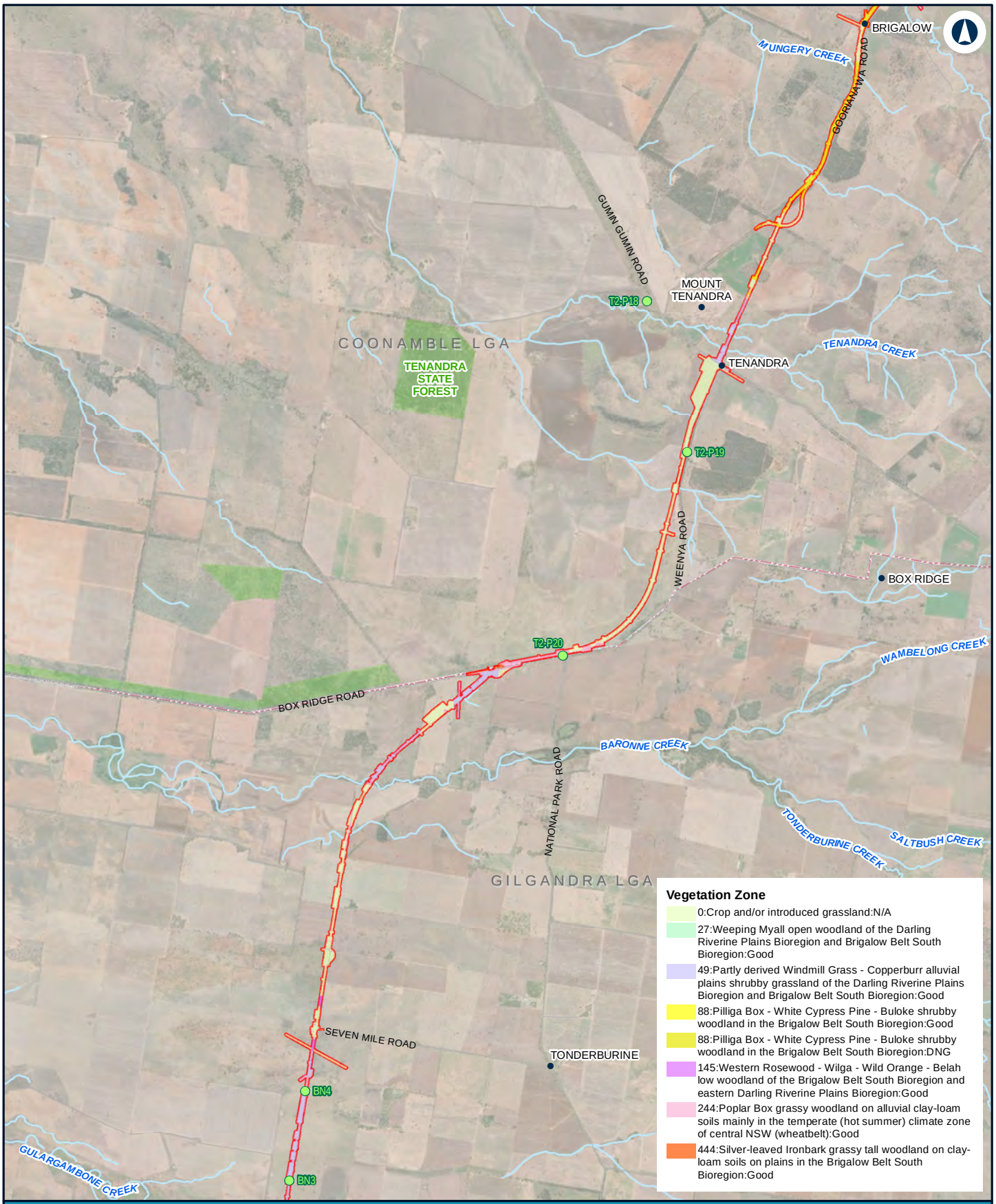

NARROMINE TO NARRABRI Vegetation Zone Map Segment 9 Curban to Pilliga B MAP 13 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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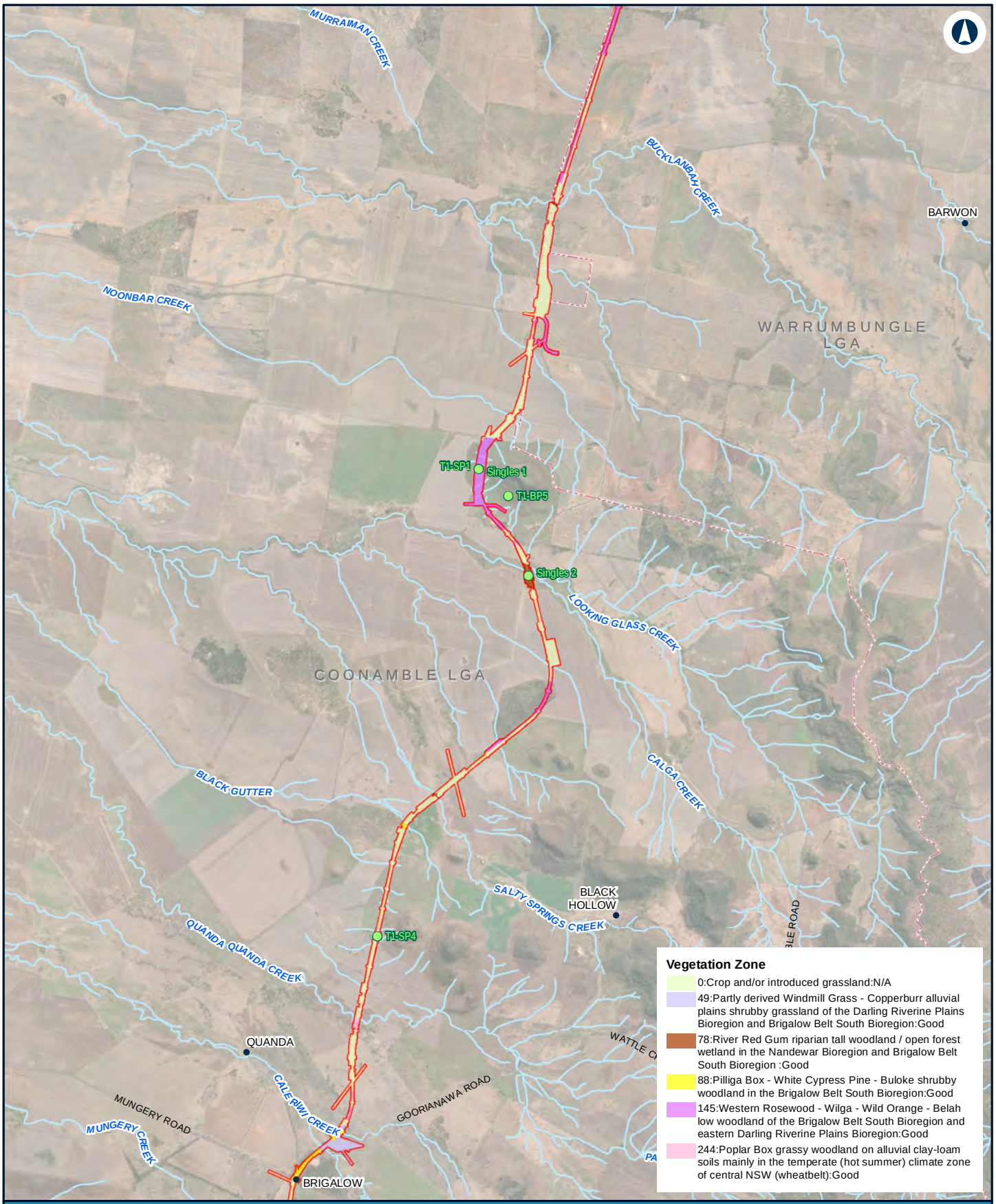

NARROMINE TO NARRABRI Vegetation Zone Map Segment 9 Curban to Pilliga C MAP 14 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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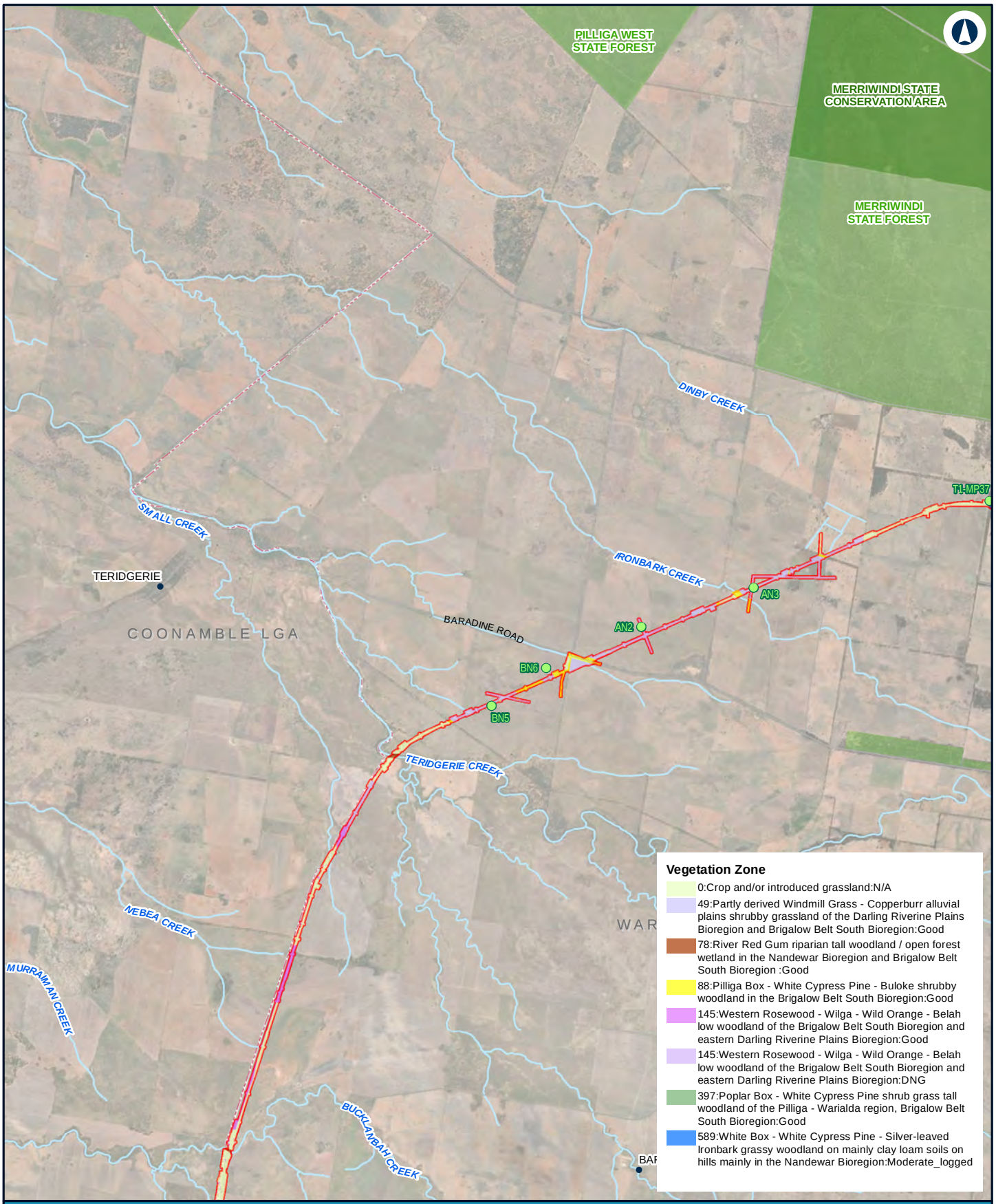

NARROMINE TO NARRABRI Vegetation Zone Map Segment 9 Curban to Pilliga D MAP 15 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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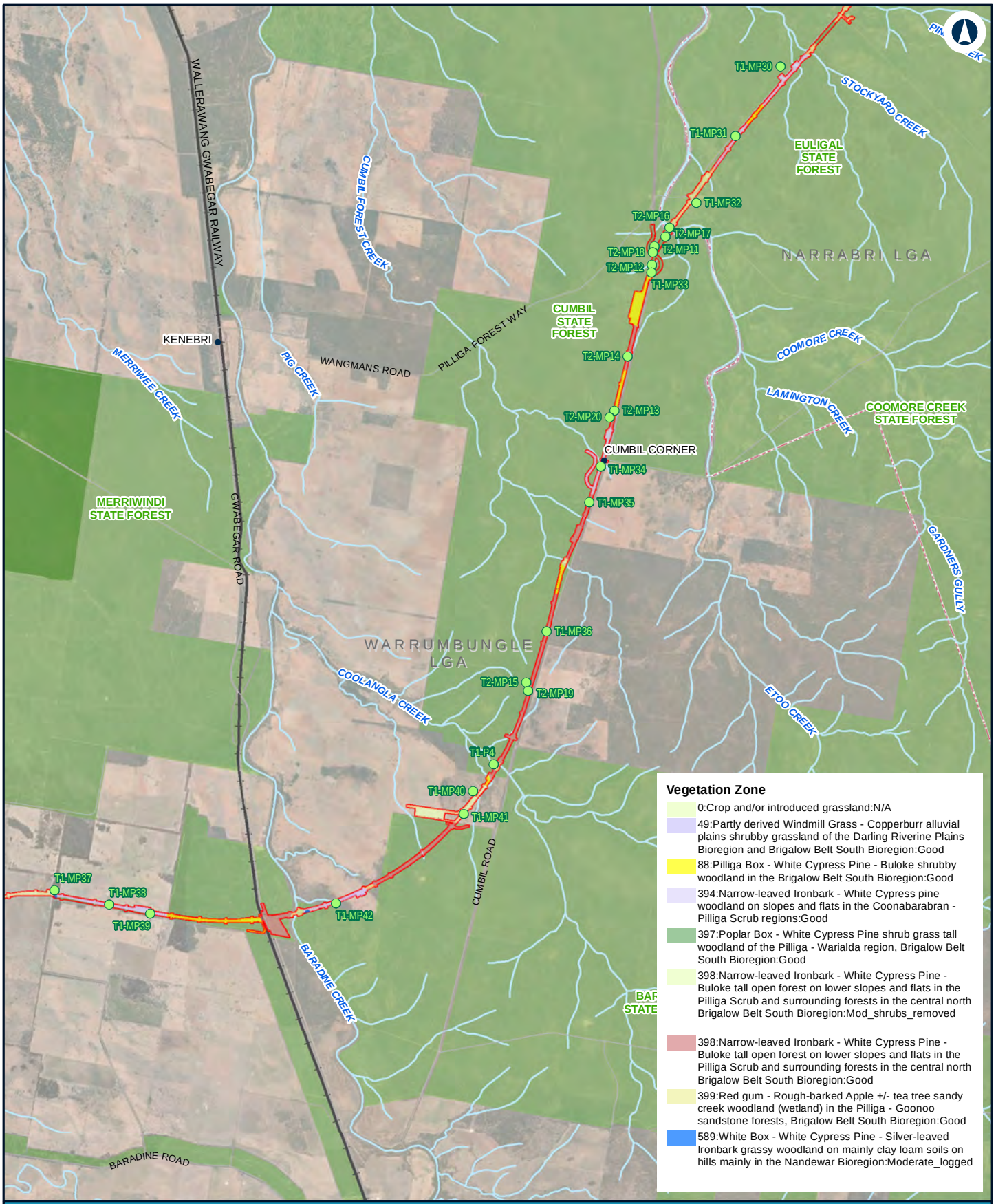

NARROMINE TO NARRABRI Vegetation Zone Map Segment 10 Pilliga A MAP 16 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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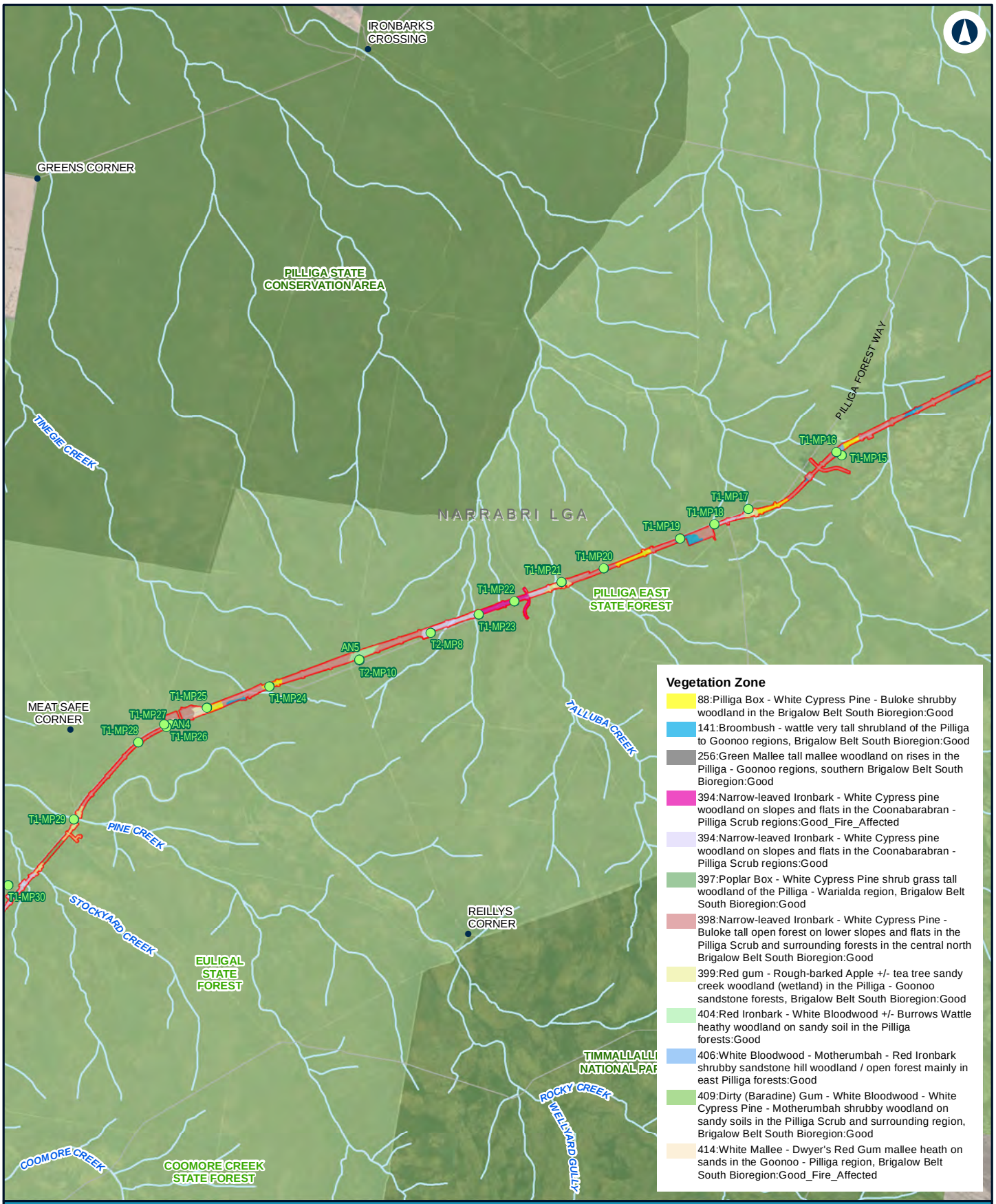

NARROMINE TO NARRABRI Vegetation Zone Map Segment 10 Pilliga B MAP 17 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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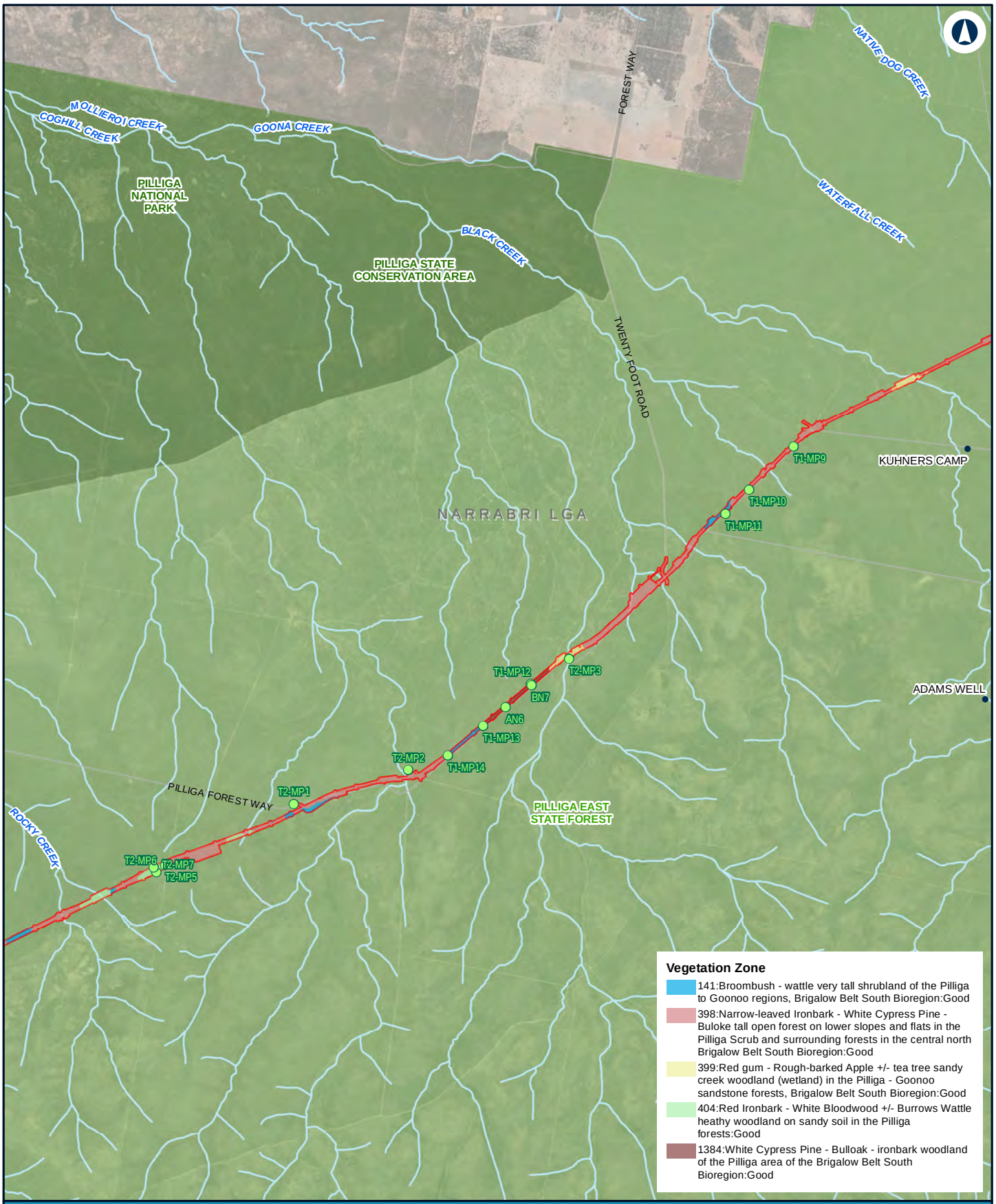

NARROMINE TO NARRABRI Vegetation Zone Map Segment 10 Pilliga C MAP 18 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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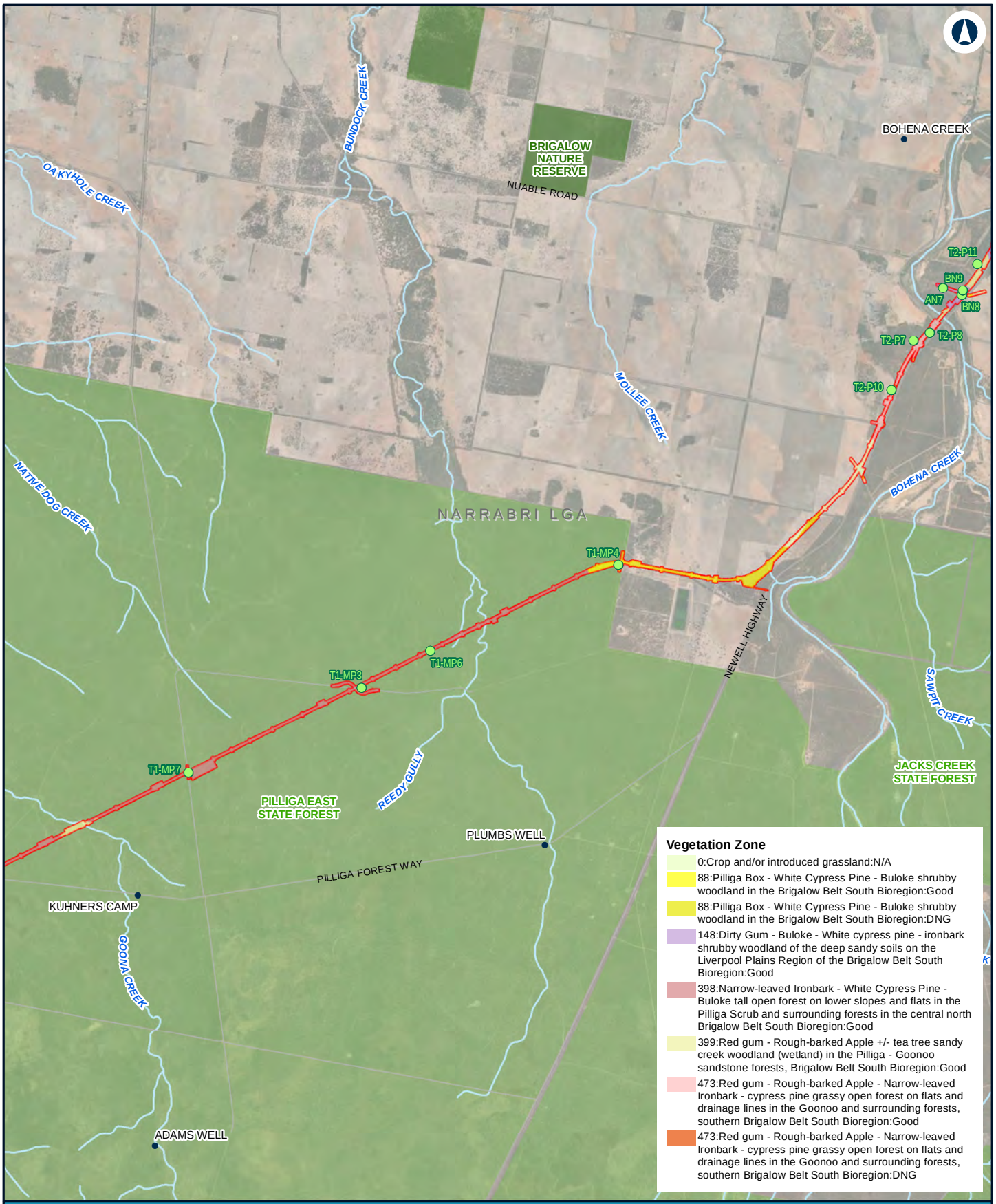

NARROMINE TO NARRABRI Vegetation Zone Map Segment 10 Pilliga D MAP 19 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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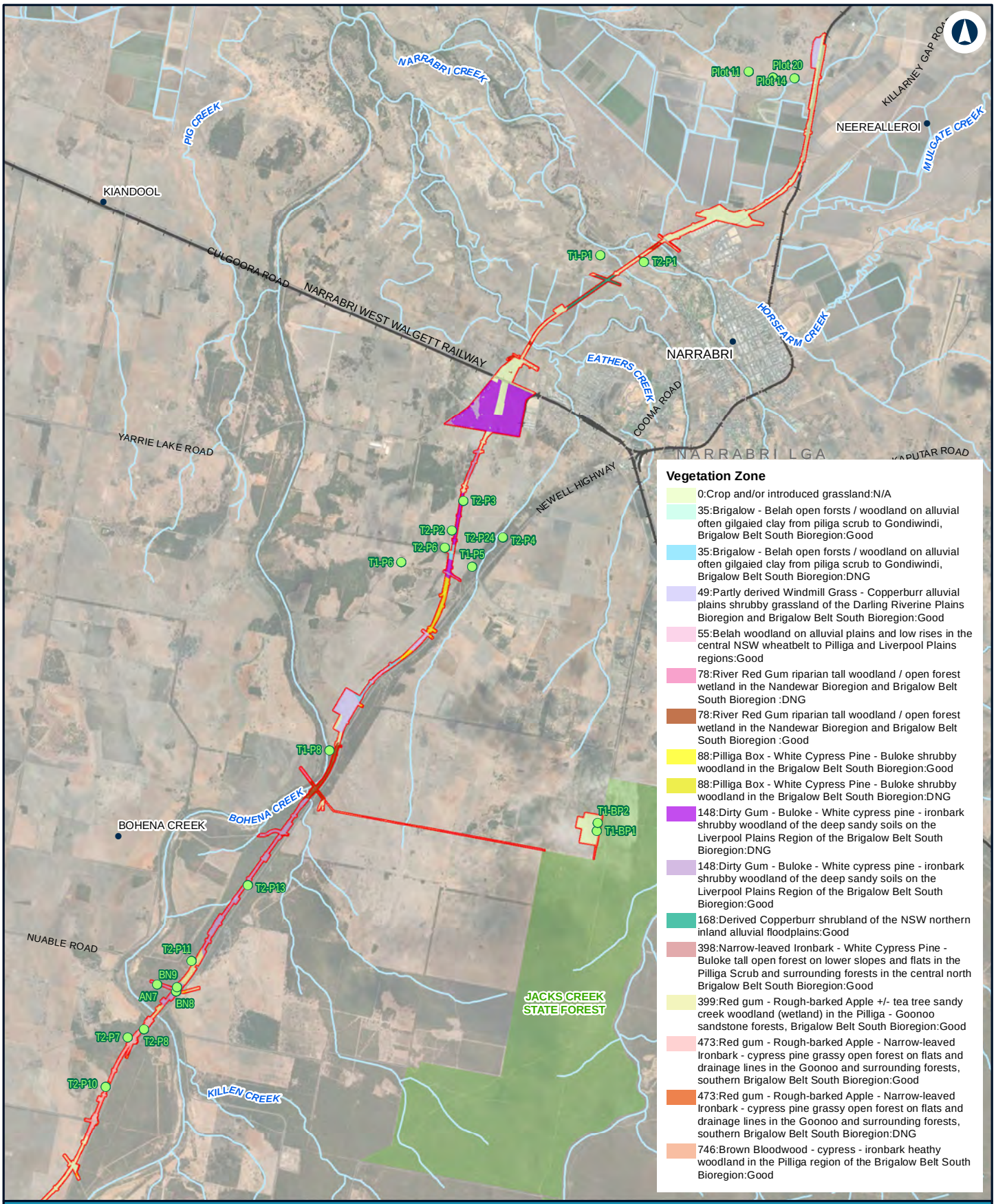

NARROMINE TO NARRABRI Vegetation Zone Map Segment 11 Pilliga to Narrabri MAP 20 OF 20

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-20 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS, esri;

LEGEND

Construction impact zone
Vegetation plot

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TECHNICAL REPORT

01

Biodiversity development assessment report

Appendix H PCT extent of impacts in investigation corridor

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

Table H1 PCT extent of impacts in investigation corridor

Plant Community Type	Impact area (ha)	Impact area as % of PCT in investigation corridor
PCT 27 Weeping Myall open woodland of the Darling Riverine Plains bioregion and Brigalow Belt South Bioregion	6.5	14.3
PCT 35 Brigalow- Belah open forest/woodland on alluvial plains often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	7.3	16.7
PCT 36 River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	5.8	6.0
PCT 49 Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	330.1	29.2
PCT 55 Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	4	43.0
PCT 56 Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	38.2	16.9
PCT 78 River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	30.7	16.2
PCT 81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	0.9	Unknown
PCT 88 Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	402.1	27.0
PCT 141 Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	30.9	28.3
PCT 145 Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains bioregion	70.9	40.1
PCT 148 Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	141.7	37.2
PCT 168 Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	7.3	11.4

Plant Community Type	Impact area (ha)	Impact area as % of PCT in investigation corridor
PCT 185 Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	13.5	23.4
PCT 202 Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	3.6	43.7
PCT 206 Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	10.1	20.2
PCT 244 Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	43.9	23.7
PCT 248 Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	16.3	35.5
PCT 255 Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	12.1	8.1
PCT 256 Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	0.3	28.3
PCT 394 Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	81.1	17.5
PCT 397 Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga-Warialda region, Brigalow Belt South Bioregion	17.8	29.2
PCT 398 Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	382.3	20.7
PCT 399 Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	54.8	32.9
PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	25.1	39.5

Plant Community Type	Impact area (ha)	Impact area as % of PCT in investigation corridor
PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	2.4	35.1
PCT 409 Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	0.8	20.1
PCT 414 White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	7.3	41.8
PCT 435 White Box White Cypress Pine shrub grass hills woodland in the Brigalow Belt South and Nandewar bioregion	5.4	Unknown
PCT 444 Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	1.7	15.1
PCT ID 469_White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	1	Unknown
PCT 473 Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	20.1	7.2
PCT 589 White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	1	11.6
PCT 599 Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	3	20.3
PCT 746 Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	2.1	2.6
PCT 1384 White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	8.8	19.0

TECHNICAL REPORT

01

Biodiversity development assessment report

Appendix I Threatened species information, species polygon maps and justification for species polygons

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

Candidate flora species that require a species polygon

Table I1 Commersonia procumbens

Commersonia procumbens	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	572.9 hectares
Breeding requirements	• Fruiting period is summer to autumn. Flowers from August to December (OEH, 2019b). • Appears to produce seed which persists for some time in the seed bank. Large numbers of seedlings have been observed germinating after fire at sites where the species was not apparent above ground before the fires. Clusters of individuals may be clonal (OEH, 2019b). • Has been recorded in populations of 50+ individuals of various ages, 28 plants on the western side of the road and 58 plants on the sunnier eastern side. Populations may comprise a single cohort of individuals, or have a multi-aged structure where some individuals appear to be old with thickened runners (OEH, 2019b).
Habitat requirements	• Pilliga sandstone (OEH, 2019b). • Grows in sandy sites, often along roadsides (OEH, 2019b). • Recorded in *Eucalyptus dealbata* and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and Callitris area. Also in *Eucalyptus fibrosa* subsp. *nubila, Eucalyptus dealbata, Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo (OEH, 2019b). • Other associated species include *Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea species, Exocarpos cupressiformis, Leptospermum parvifolium* and *Kunzea parvifolia* (OEH, 2019b). • The species is often found as a pioneer species of disturbed habitats. It has been recorded colonising disturbed areas such as roadsides, the edges of quarries and gravel stockpiles and a recently cleared easement under power lines. (OEH, 2019b).
Habitat in the CIZ	This species habitat lies primarily within the Pilliga forests on sandy soils. Due to a large habitat range and occurrence in disturbed sites also, this species is associated with many PCTs within the study area. These PCTs occur throughout the study area, extending throughout the Pilliga State Forest. Previous observations have been made within the locality which reflect these PCTs extent.
Known populations	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. Recent collections made from the Upper Hunter region, and additional populations found in Goonoo SCA in response to the 2007 fires. (OEH, 2019b). Biodiversity surveys of the Brigalow Belt South in 2002 recorded *Commersonia procumbens* at only one of 32 previously known locations. It was not relocated at Pilliga East State Forest (Threatened Species Scientific Committee, 2008b).

Commersonia procumbens	
Survey requirements	Survey months: August to May Survey: Survey recent fire or mechanical disturbance areas. Fire or disturbance within the last one to two seasons required for above ground identification. Species will then revert to underground thickened rootstock. General: Senescence age estimated – returns to underground stock in unfavourable conditions. (OEH, 2019b)
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists– flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days- targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. • March 2022: six ecologists over nine days – targeted flora searches. Surveys included targeted searches for the species in September 2019, September to November 2020, and March 2022, as well as opportunistic observations while undertaking other survey types.
Survey results	Species recorded growing on Pilliga Forest Way in March 2022. Specimens were collected and sent to the National Herbarium of NSW for confirmation. Species was not observed in any other survey period. Dry conditions and lack of recent fires in the proposal site likely to have affected growth and detectability throughout much of the proposal site. Assumed to occur and suitable potential habitat occurs in the proposal site. Other species of *Commersonia* were observed during targeted surveys for this species.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCS accountable officers. The species has been assumed to be present in associated PCTs observed in the proposal site within Segment 10 (Pilliga) and Segment 11 (Pilliga to Narrabri), where drought conditions and lack of recent fires have impacted species detectability.
Relevant IBRA subregion	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: predicted – excluded due to lack of suitable habitats in agricultural areas Pilliga: known – Yes (assumed present, recorded adjacent to proposal site) Pilliga Outwash: known – Yes (assumed present) Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case

Commersonia procumbens	
Species polygon vegetation zones and subregions	**Castlereagh-Barwon**

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	No suitable habitat present in farming matrix

Pilliga

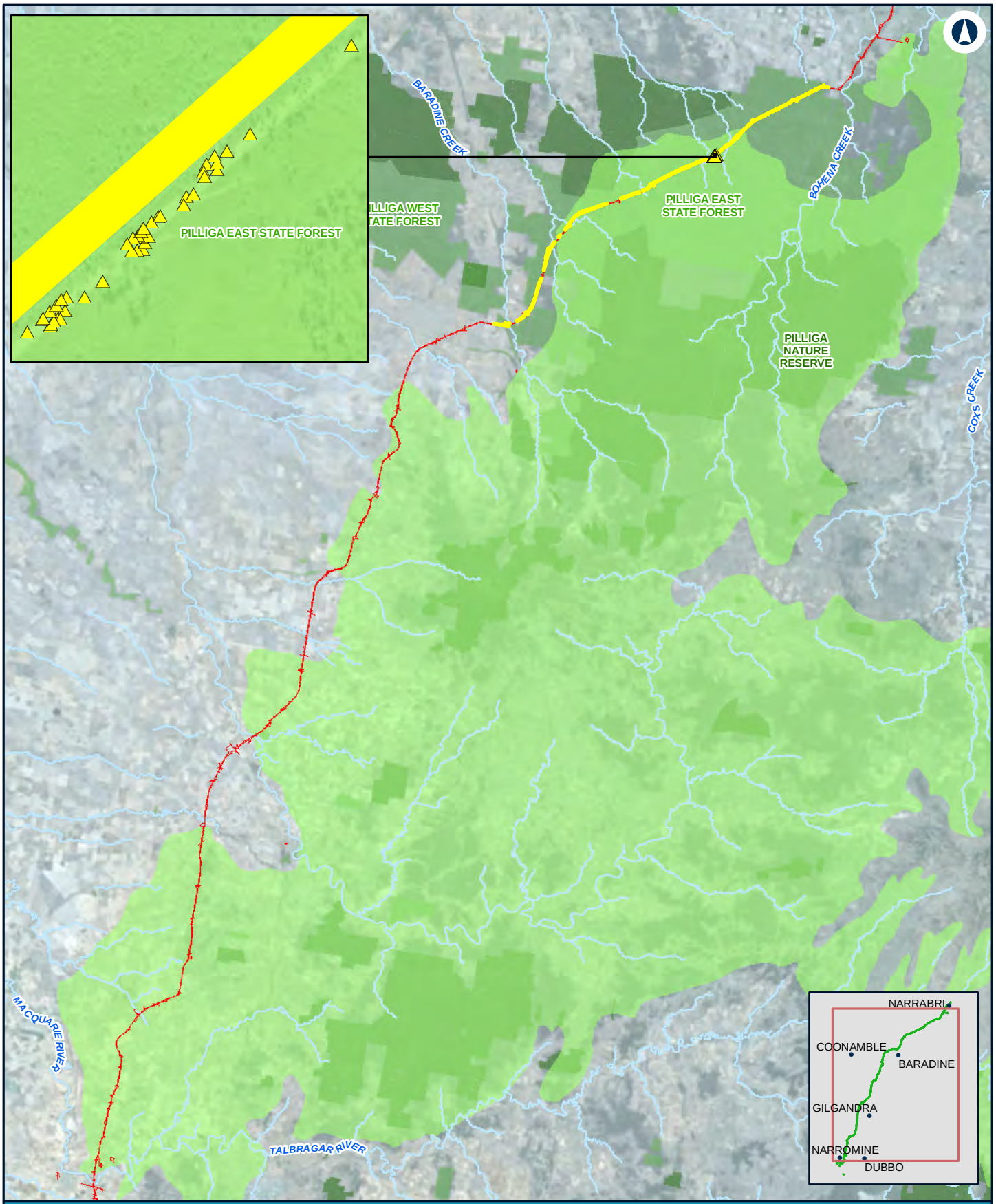
Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable habitat present, found in woodland communities
Broombush - wattle very tall shrubland – 141 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions). Individuals recorded adjacent to this vegetation type on Pilliga Forest Way.
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	No suitable habitat present – in agricultural land.
Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	No surveyed – no suitable habitat present
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests – 398 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga – Goonoo sandstone forests – 399 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests – 404 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)

Commersonia procumbens	
White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Surveyed, no suitable habitat present – in agricultural land

Pilliga Outwash

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable habitat present, found in woodland communities
Broombush - wattle very tall shrubland – 141 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	No – surveyed (no suitable habitat present in farming area)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (DNG)	No – suitable habitat present, found in woodland communities
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests – 398 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)

Commersonia procumbens		
	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (assumed present due to no suitable post fire survey conditions)
	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	No – surveyed, no suitable habitat present – in caravan park site in town limits
	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	No – surveyed (no suitable habitat present in farming area)
	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (DNG)	No – suitable habitat present, found in woodland communities
	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	No – surveyed, No suitable habitat present as site recently logged and grazed.



NARROMINE TO NARRABRI Flora Species Polygons - *Commersonia procumbens* - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:912,300
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Commersonia procumbens* species polygon
- *Commersonia procumbens*

IBRA subregion

- Pilliga

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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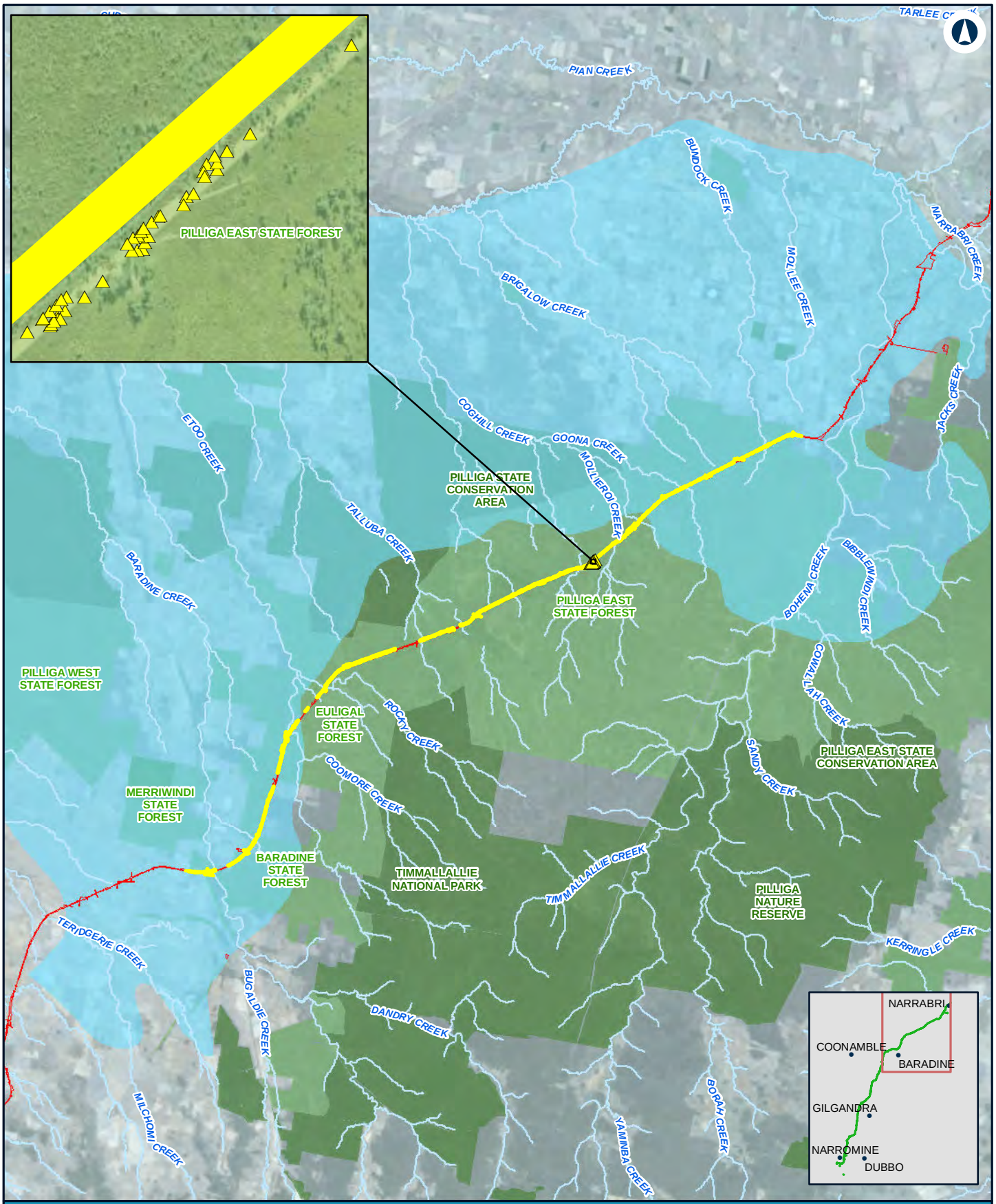

NARROMINE TO NARRABRI Flora Species Polygons - *Commersonia procumbens* - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Commersonia procumbens* species polygon
- *Commersonia procumbens*

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Table I2 Cyperus conicus

Cyperus conicus	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	50.8 hectares
Habitat requirements	• Grows in open woodland on sandy soil. In central Australia, the species grows near waterholes and on the banks of streams in sandy soils. In Qld the species usually found on heavy soils (OEH 2019b). • Recorded from Callitris forest in the Pilliga area, growing in sandy soil with *Cyperus gracilis, C. squarrosus* and *C. fulvus*. • Interstate habitats include floodplains, creek beds and banks, swamps, run-on areas and various watercourses, near or in dams and bores, and in vegetation communities such as Melaleuca swamps, open Box woodland and sedgelands. Soils are usually sandy or silty and damp to wet (OEH 2019b). • Often associated with other sedge species including *C. victoriensis, C. difformis, C. iria, C. compressus, C. nervulosus, C. dactylotes*, Fimbristylis and Eleocharis species (OEH 2019b). • *Cyperus conicus* has been recorded as very rare and occasional, to common and abundant in some populations (OEH 2019b).
Reproduction requirements	• Flowering in spring-summer. Flowerhead simple or compound with 4-10 branches to 8 centimetres long, comprising numerous spikelets 2.5 to 3 millimetres long and about 0.8 millimetres wide, pale brown tinged yellow or red-brown. Fruit a triangular black nut, about 1.8 millimetres long and 0.8 millimetres diameter (OEH 2019b).
Habitat in the CIZ	Species habitat lies primarily in the northern section of the Pilliga near Narrabri, with potential mapped habitat near Gilgandra. This species habitat in the Pilliga is located in sandy soils in *Callitris* forest in association with other *Cyperus* species. The species was not observed during targeted surveys and it considered not to occur within the CIZ in areas where access was available and seasonally surveyed areas. Habitat assumed to occur in areas where no access available and associated PCTs occur in the parts of the Pilliga forests and within Segment 111 (Pilliga to Narrabri).
Known populations	Occurs rarely in the Pilliga area of NSW and is also found across the tropics in in QLD, WA and the NT, including central deserts north of Alice Springs (OEH 2019b).
Survey requirements	Survey months: January to May Survey after rain. Use flowers to identify. Can identify by flower head (OEH 2019b). *Cyperus conicus* is a tufted, greyish perennial sedge with short thick underground stem. Leaves somewhat rough, 3 to 5 millimetres wide. Flowerhead simple or compound with four to 10 branches to 8 centimetres long, comprising numerous spikelets 2.5 to 3 millimetres long and about 0.8 millimetres wide, pale brown tinged yellow or red-brown. Fruit a triangular black nut, about 1.8 millimetres long and 0.8 millimetres diameter.

Cyperus conicus	
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys. Individuals of a *Cyperus* species collected near Narrabri were sent to the Royal Botanic Gardens for identification and returned a negative identification for *Cyperus conicus*.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present. Some suitable habitat areas were unable to be accessed during any survey month and species presence is assumed in these areas.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: predicted – No (surveyed) Pilliga: not present – Not in BAM-C case Pilliga Outwash: known – No (surveyed) and Yes (assumed present) Liverpool Plains: predicted – No (surveyed) Northern Basalts: known – No (surveyed)
Species polygon vegetation zones and subregions	**Castlereagh-Barwon**

Vegetation zone	Habitat
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Yes – surveyed (not recorded) and paddock trees
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded) and grazing paddocks amongst crops
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Yes – surveyed (not recorded) and grazing paddocks amongst crops

Cyperus conicus	
Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 206 (Good)	Yes – surveyed (not recorded)

Pilliga Outwash

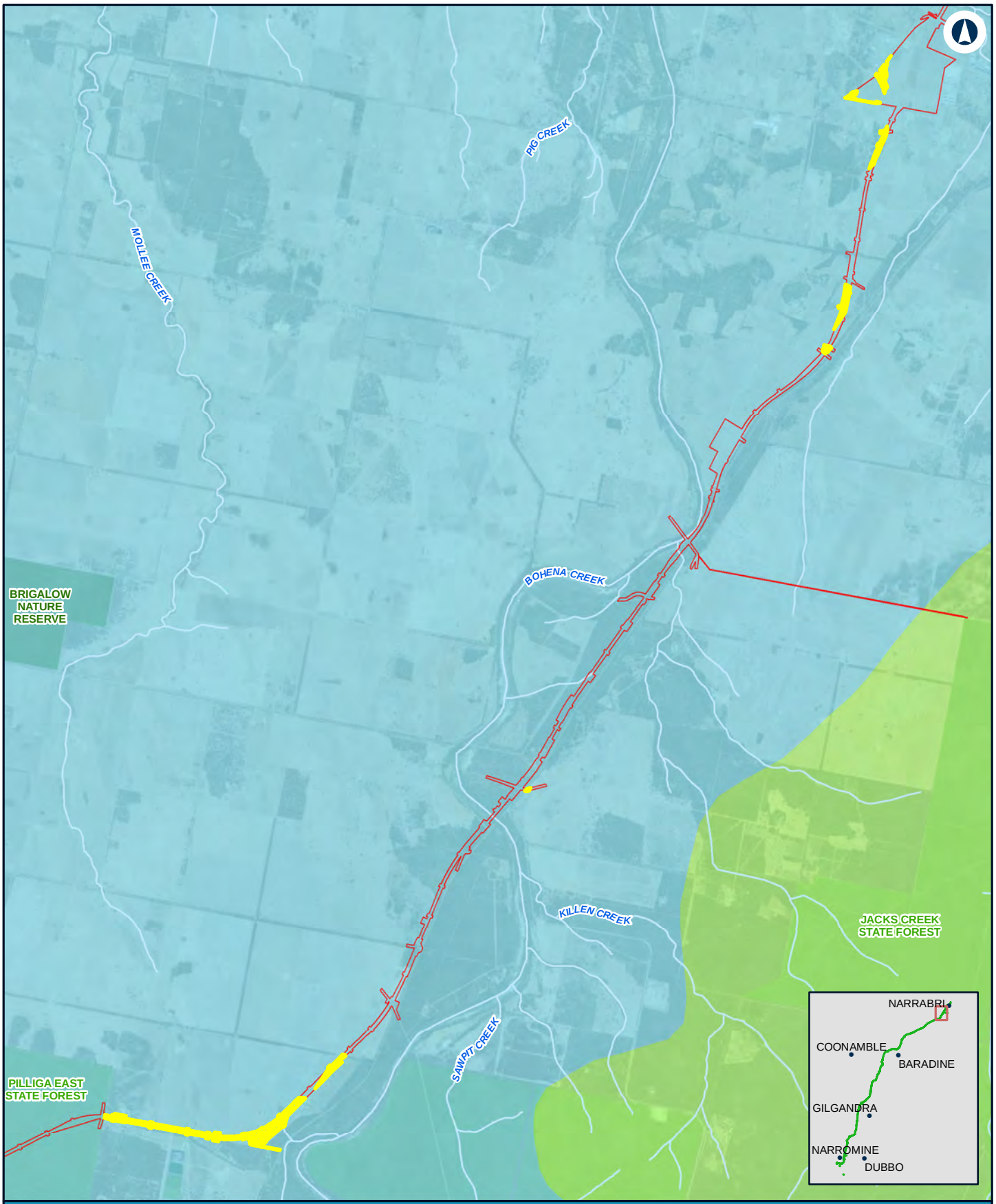
Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Assumed present – no access in some areas. No – surveyed in some areas.
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 206 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Moderate, shrubs removed)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion – 397 (Good)	Yes – surveyed (not recorded)
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion – 409 (Good)	Yes – surveyed (not recorded)

Northern Basalts

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	Yes – surveyed (not recorded)

Liverpool Plains

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI

Flora Species Polygons - *Cyperus Conicus*

MAP 1 OF 1

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:82,000
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Cyperus Conicus* species polygon

IBRA subregion

- Pilliga
- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Table I3 *Dichanthium setosum* (Bluegrass)

Dichanthium setosum (Bluegrass)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	3.5 hectares
Reproduction requirements	• Flowering time is mostly in summer (OEH 2019b) • A fire frequency of greater than five years has been recommended for the species (DEE 2020)
Habitat requirements	• Associated with heavy basaltic black soils and red-brown loams with clay subsoil (OEH 2019b). • Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat (OEH 2019b). • Associated species include Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula and Rytidosperma, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia and Psoralea species (OEH 2019b).
Habitat in the CIZ	Species habitat lies primarily in the south and north of the study area. The majority of grasslands, both disturbed, on road sides and grazed occur outside of the Pilliga State Forest. Darker soils and clay loam soils occur within these areas. These vegetation communities are located within the wider study area, generally to the north and south of the Pilliga State Forest and provide potential habitat for the species. Previous observations have been made mostly within the wider locality of the study area. The species was not observed during targeted surveys and it considered not to occur within the CIZ in areas where access was available and seasonally surveyed or where occurs within intensive farming areas. Habitat assumed to occur in areas where no access available and associated PCTs occur.
Known populations	• Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas (OEH 2019b). • Distribution extends west to Narrabri (Ayers et al. 1996). • Bluegrass is locally common or found as scattered clumps in broader populations. The extensive distribution and wide environmental tolerances make predictions about suitable habitat difficult. (OEH 2019b).

***Dichanthium setosum* (Bluegrass)**	
Survey requirements	Survey months: November to May. Use seed-head to identify. Survey in November to May, three to four weeks after effective rainfall (OEH 2019b). Bluegrass is an upright grass less than one metre tall. It has mostly hairless leaves about 2-3 millimetres wide. The flowers are densely hairy and are clustered together along a stalk in a cylinder-shape. The flower-clusters grow in pairs at the end of an eight centimetre-long stem and appear mostly during summer.
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required for those areas where access was possible. Where no access was possible (either private property or remote areas), the species is assumed to occur and a species polygon has been prepared for the no access parts of the vegetation zones.
Relevant IBRA subregions	Inland Slopes: known – Removed from BAM-C case (no associated PCT in impact area) Bogan Macquarie: predicted – In BAM-C. No (surveyed) Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – No (surveyed) and Yes (assumed present) Pilliga Outwash: predicted – No (surveyed) Liverpool Plains: known – Not in BAM-C case Northern Basalts: known – No (surveyed)

Dichanthium setosum (Bluegrass)

Species polygon vegetation zones and subregions

Bogan-Macquarie

Vegetation zone	Habitat
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Yes – surveyed (not recorded)

Northern Basalts

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	Yes – surveyed (not recorded)

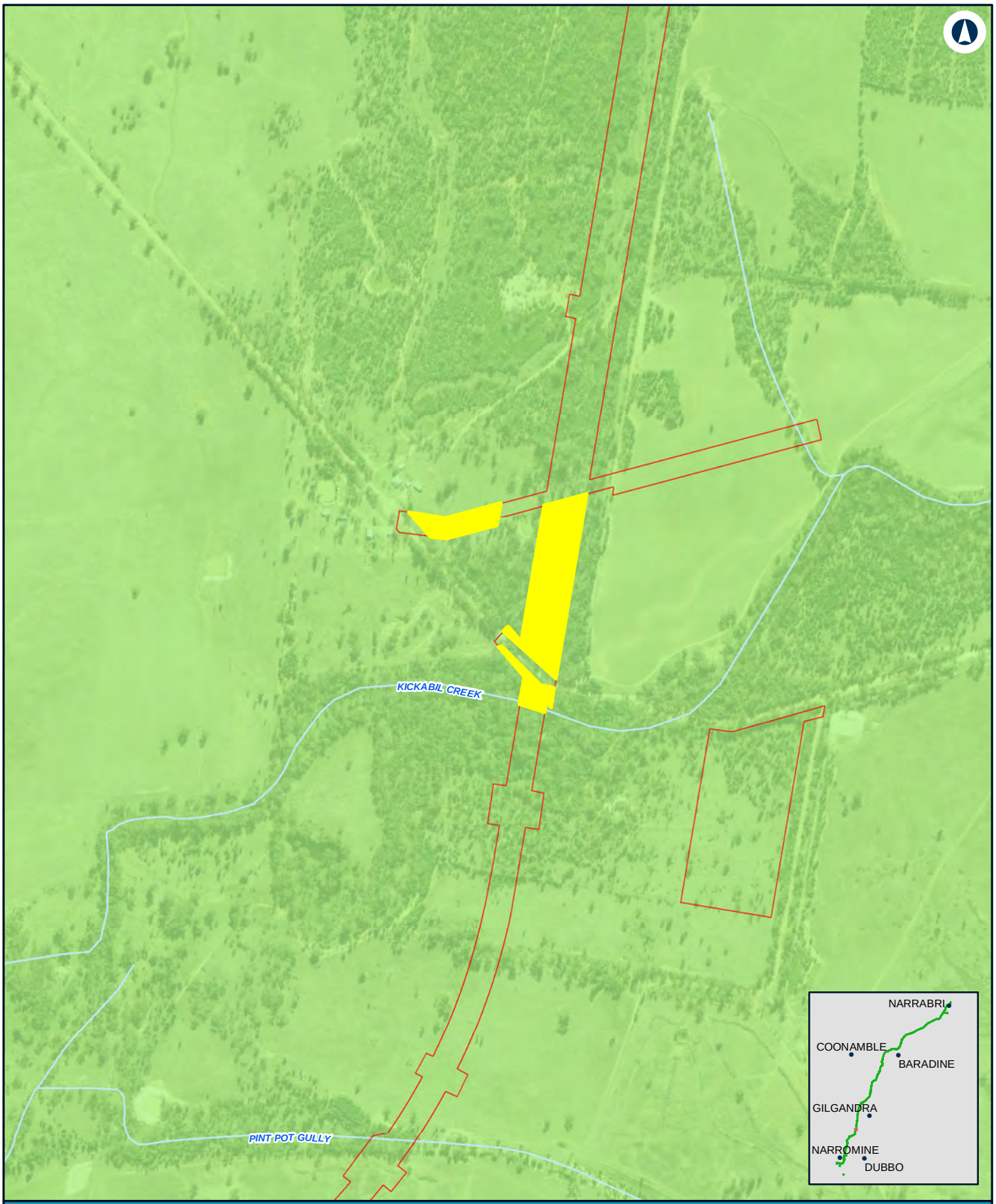
Pilliga

Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	Yes – surveyed (not recorded)
Belah woodland on alluvial plains and low rises – 55 (Good)	Yes – surveyed (not recorded)
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Yes – surveyed (not recorded)
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	Assumed present – not accessed
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub region – 394 (Good)	Yes – surveyed (not recorded)

Pilliga Outwash

Vegetation zone	Habitat
Brigalow - Belah open forests / woodland on alluvial often gilgaied clay – 35 (Good)	Yes – surveyed (not recorded)
Brigalow - Belah open forests / woodland on alluvial often gilgaied clay – 35 (DNG)	Yes – surveyed (not recorded)
River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Yes – surveyed (not recorded)
River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Yes – surveyed (not recorded)

***Dichanthium setosum* (Bluegrass)**		
	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	No – no suitable habitat present – in caravan park site in town limits
	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No – no suitable habitat present – in caravan park site in town limits



NARROMINE TO NARRABRI Flora Species Polygons - *Dichanthium Setosum* MAP 1 OF 1

0 0.1 0.2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:10,000
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Dichanthium Setosum* species polygon

IBRA subregion

- Pilliga

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Table I4 *Diuris tricolor* (Pine Donkey Orchid)

***Diuris tricolor* (Pine Donkey Orchid)**	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	388.2 hectares
Breeding requirements	Usually flowers between early September to late October. The species is a tuberous, deciduous terrestrial orchid (OEH, 2019b).
Habitat requirements	• Will grow in disturbed areas/grassland • Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta*, Ironbark and Acacia shrubland. The understorey is often grassy with herbaceous plants such as Bulbine species. • The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (*Callitris* spp.). It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW. (OEH, 2019b; Officer-Environment and Community, 2018).
Habitat in the CIZ	Species habitat lies primarily within the south-west section of the Pilliga State Forest. Species habitat requirements are characteristic of the sandy soils and grassy woodlands located within the Pilliga State Forest and reflect previous records within the locality. Previous observations have been made within the locality primarily within the Pilliga State Forest.
Known populations	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Localities in the south include Red Hill north of Narrandera, Coolamon, and several sites west of Wagga Wagga. Condobolin-Nymagee road, Wattamondara towards Cowra, Eugowra, Girilambone, Dubbo and Cooyal, in the Central West. Pilliga SCA, Pilliga National Park and Bibblewindi State Forest in the north and Muswellbrook in the east. (OEH, 2019b).
Survey requirements	Survey months: September and October (OEH, 2019b)
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches

***Diuris tricolor* (Pine Donkey Orchid)**	
	• November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species in September 2019 and September to November 2020, as well as opportunistic observations while undertaking other survey types.
Survey results	About 28 individual plants were recorded at multiple locations in the Pilliga forests, primarily in the south-western section of the Pilliga. Individuals were recorded at varying locations including flat areas rising up out of creeks, primarily in Poplar Box and red gum dominated shrubby woodland communities on sandy soils. Species assumed to occur in parts of the Pilliga and Pilliga Outwash subregions where no access was granted but associated PCTs occur. Recorded in Segment 10 and assumed present in parts of Segment 10 and 11.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCS accountable officers. Targeted survey effort throughout the Pilliga identified this species in the south-western section of the Pilliga forests and therefore associated PCTs that provide potential habitat for the species in these areas of the Pilliga have been included within the species polygon for this species. The species was not recorded in the same PCTs outside the Pilliga on accessed properties during appropriate survey conditions in spring 2020. For areas where associated PCTs occur but where no access was available, species presences has been assumed where the species could not be reliably excluded. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: known – Not in BAM-C case Bogan Macquarie: known – In BAM-C. No (surveyed) Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – Yes (recorded) Pilliga Outwash: known – Yes (recorded) Liverpool Plains: predicted – Not in BAM-C case Northern Basalts: predicted – Not in BAM-C case
Species polygon vegetation Zones and subregions	**Bogan-Macquarie**

Vegetation zone	Habitat
Poplar Box - Belah woodland – 56 (Good)	Yes – surveyed (not recorded)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded)
Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW – 248 (Good)	Yes – surveyed (not recorded)
Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Yes – surveyed (not recorded)

Diuris tricolor (Pine Donkey Orchid)

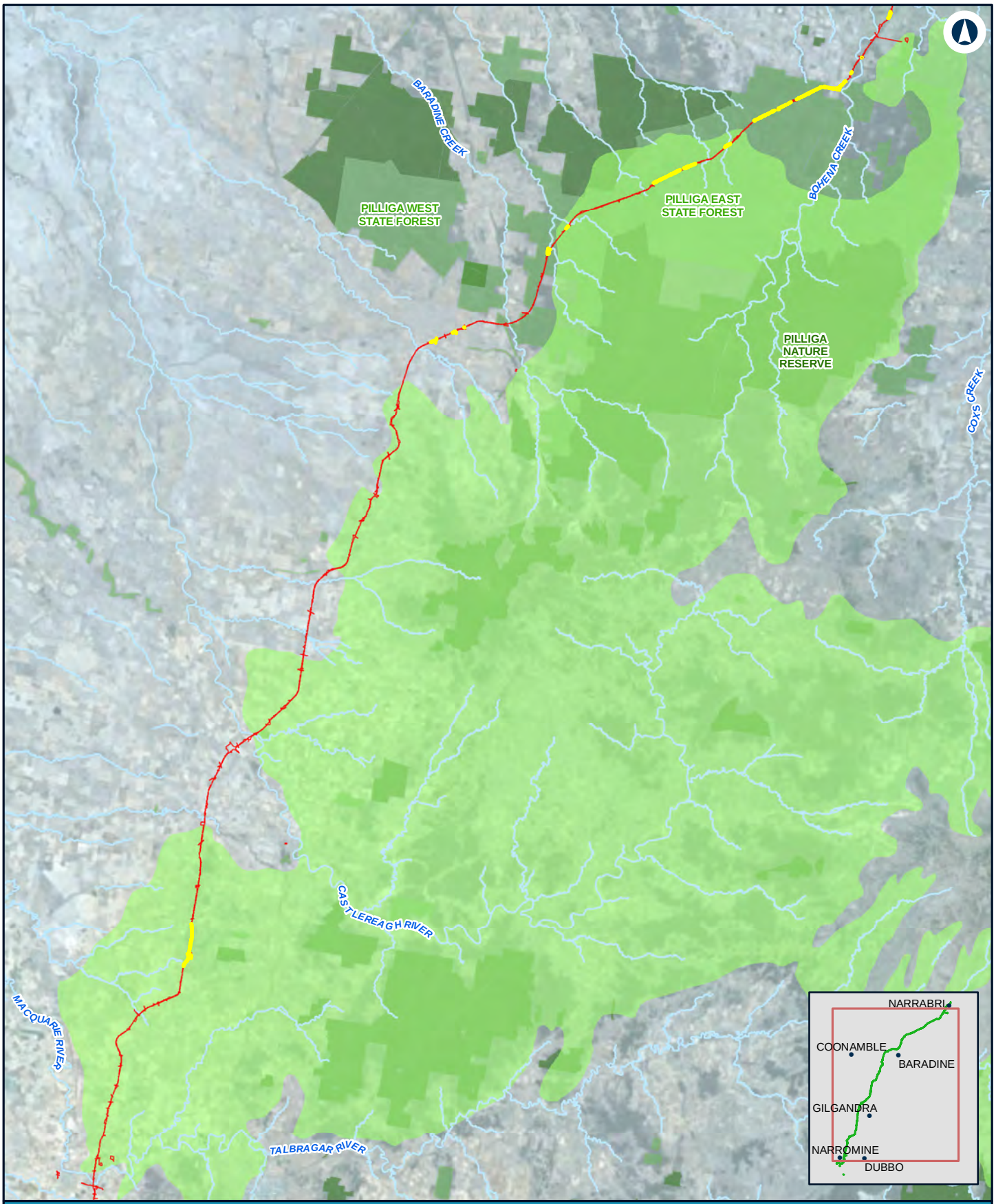
Pilliga

Vegetation zone	Habitat
Poplar Box - Belah woodland – 56 (Good)	Yes – surveyed (not recorded)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (present) and assumed present (no access)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Yes – surveyed (not recorded) and assumed present (no access)
Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion – 141 (Good)	Yes – surveyed (present)
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	Not surveyed – assumed present
Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 206 (Good)	Yes – surveyed (not recorded)
Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (present)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest – 398 (Good)	Yes – surveyed (present) and assumed present in some areas
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (present)
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Yes – surveyed (not recorded)
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Yes – surveyed (not recorded)
White Mallee - Dwyer's Red Gum mallee heath – 414 (Good – Fire Affected)	Yes – surveyed (not recorded)
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Yes – surveyed (not recorded)
White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (not recorded)

Diuris tricolor (Pine Donkey Orchid)

Pilliga Outwash

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 – (Good)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 – (DNG)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest – 398 (Good)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	Yes – surveyed (not recorded) and Yes assumed present in some areas (no access)
White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Pine Donkey Orchid *(Diuris tricolor)* species polygon

IBRA subregion

- Pilliga

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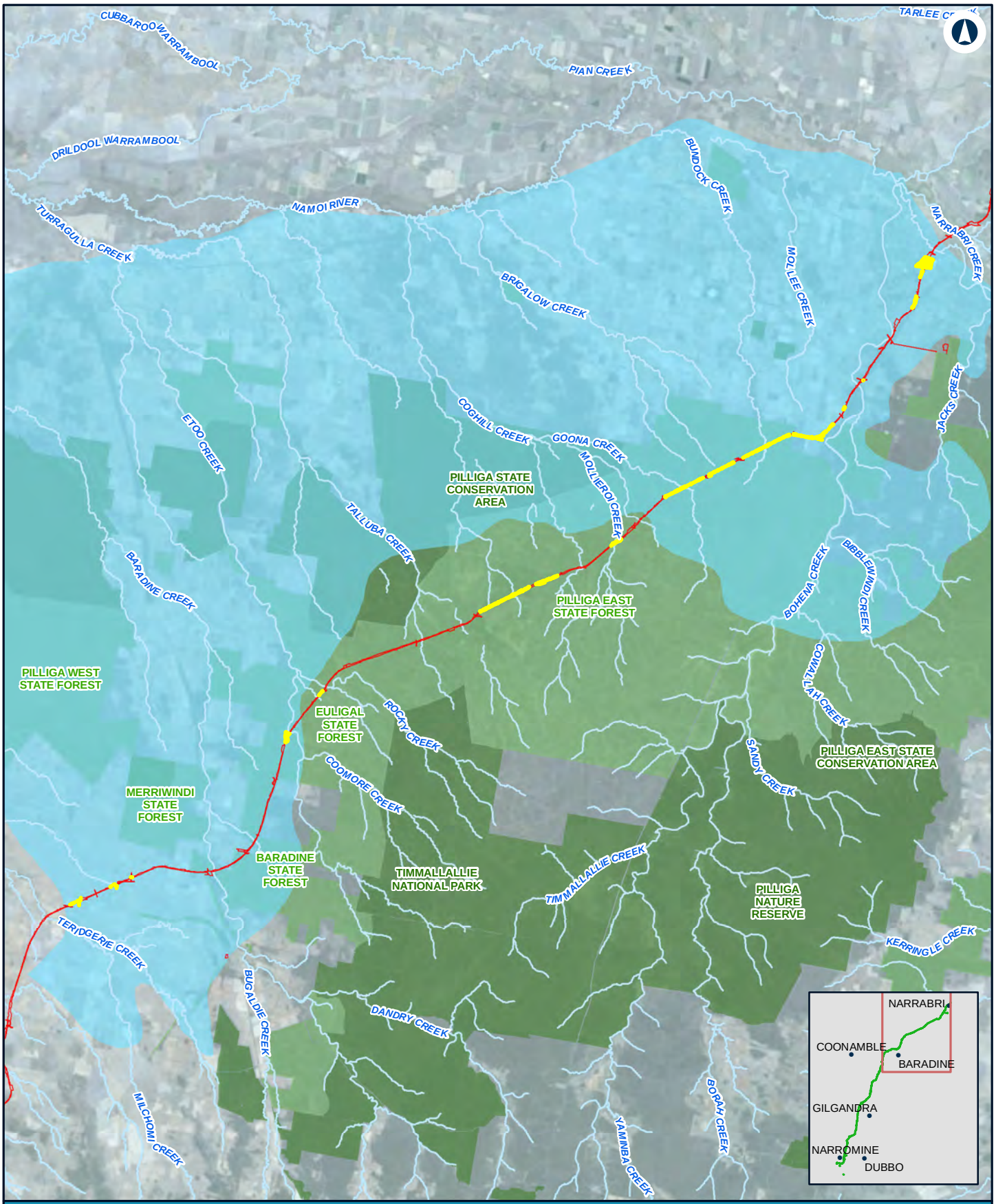

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Pine Donkey Orchid *(Diuris tricolor)* species polygon

IBRA subregion

- Pilliga Outwash

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Table I5 *Lepidium aschersonii* (Spiny Peppercress)

Lepidium aschersonii (Spiny Peppercress)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	338.8 hectares
Breeding requirements	• Flowers from spring to autumn (OEH, 2019b). • Plants in the Narrabri population have been observed producing abundant seed, and as the species is believed to be short-lived and large numbers of plants were present at the site, *Lepidium aschersonii* appears to be successfully reproducing (OEH, 2019b). • Populations have been known to immediately disappear following inundation by flooding, reappearing several seasons later. An apparent increase in numbers during drought conditions has also been observed. The species is reported to be salt and submergence tolerant and also grows well under dry conditions (OEH, 2019b; Carter, 2010).
Habitat requirements	Found on ridges of gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmanii*) and Grey Box (*Eucalyptus microcarpa*). In the south has been recorded growing in Bull Mallee (*Eucalyptus behriana*). Often the understorey is dominated by introduced plants. The species grows as a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter. (OEH, 2019b).
Habitat in the CIZ	Species habitat lies primarily in the south and north of the study area. Despite having a variable structural requirement, the clay soils are located predominantly to the south of the Pilliga (eSPADE, 2020). All PCTs are located to the south of the study area with the exception of PCT 256. PCT 256 is located within the Pilliga State Forest. Previous observations have been made within the locality primarily to the north of the Pilliga State Forest around Narrabri. Isolated observations have also been made south of the study area.
Known populations	Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Also known from the West Wyalong in the south of the State. Records from Barmedman and Temora areas are likely to be no longer present. Approximately 50 percent of the total Lepidium aschersonii recorded for Australia occurs in NSW. Recorded population sizes vary from 18 to 5000+ plants. Plant numbers decrease with increasing overstorey density, and plants were not found where the Brigalow canopy cover exceeded about 60 percent. The species is often described as a “weed” where it dominates paddocks. (OEH, 2019b).
Survey requirements	Survey months: November to April

***Lepidium aschersonii* (Spiny Peppercress)**	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCS accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 10 (Pilliga) and Segment 11 (Pilliga to Narrabri), where no access is possible and species is assumed present due to presence of associated PCTs. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: known – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – Yes (assumed present) for some parts and No (surveyed) for some parts where accessed Pilliga Outwash: known – Yes (assumed present) for some parts and No (surveyed) for some parts where accessed Liverpool Plains: known –No (surveyed) for some parts where accessed Northern Basalts: known – Not in BAM-C case
Species polygon vegetation zones and subregions	**Pilliga**

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No – surveyed some areas. Yes – assumed present some areas (no access)

Lepidium aschersonii (Spiny Peppercress)	
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	Yes – assumed present (no access)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests – 398 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests – 404 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)

Pilliga Outwash

Vegetation zone	Habitat
Brigalow - Belah open forests / woodland – 35 (Good)	No – surveyed (not recorded)
Brigalow - Belah open forests / woodland – 35 (DNG)	No – surveyed (not recorded)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – assumed present (no access)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Yes – surveyed (not recorded)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (DNG)	No – surveyed some areas. Yes – assumed present some areas (no access)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests – 398 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	No – surveyed some areas. Yes – assumed present some areas (no access)

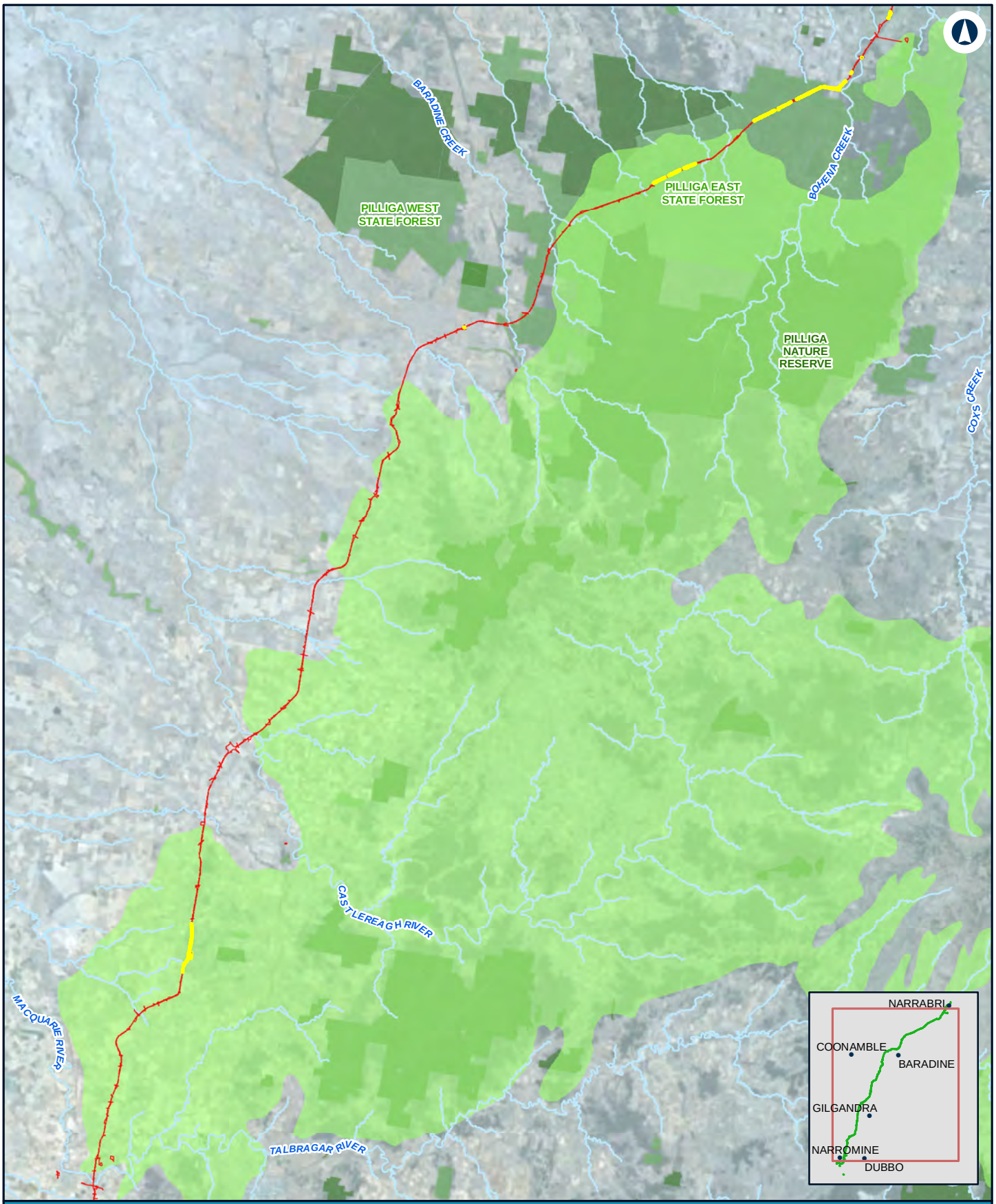
Lepidium aschersonii (Spiny Peppercress)

Liverpool Plains

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	Surveyed – not recorded

Northern Basalts

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	Surveyed – not recorded



NARROMINE TO NARRABRI Flora Species Polygons - Spiny Peppercress - Pilliga MAP 1 OF 3

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Spiny Peppercress *(Lepidium aschersonii)* species polygon

IBRA subregion

- Pilliga

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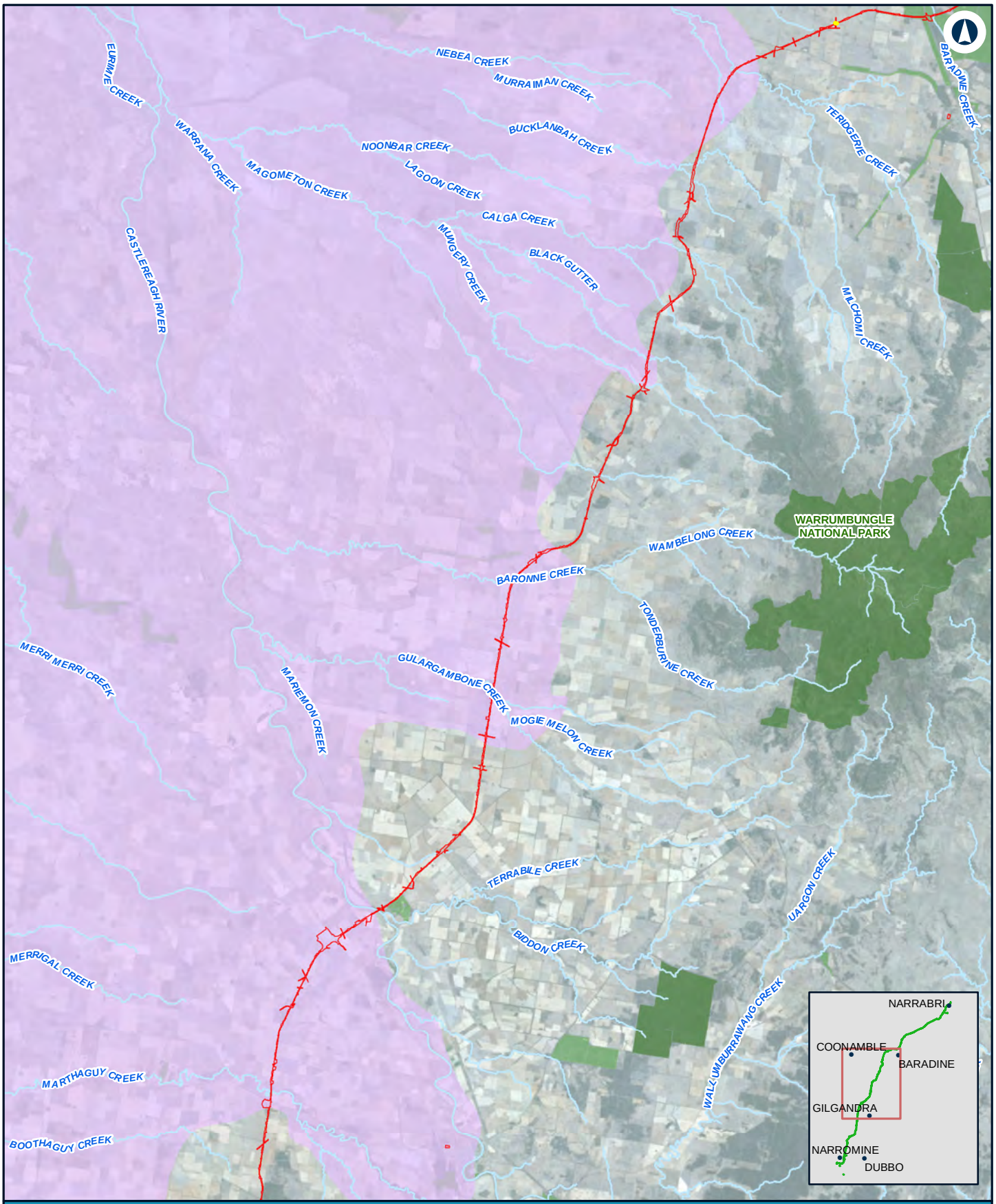

NARROMINE TO NARRABRI Flora Species Polygons - Spiny Peppercress - Castlereagh-Barwon MAP 2 OF 3

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:419,300
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Spiny Peppercress *(Lepidium aschersonii)* species polygon

IBRA subregion

- Castlereagh-Barwon

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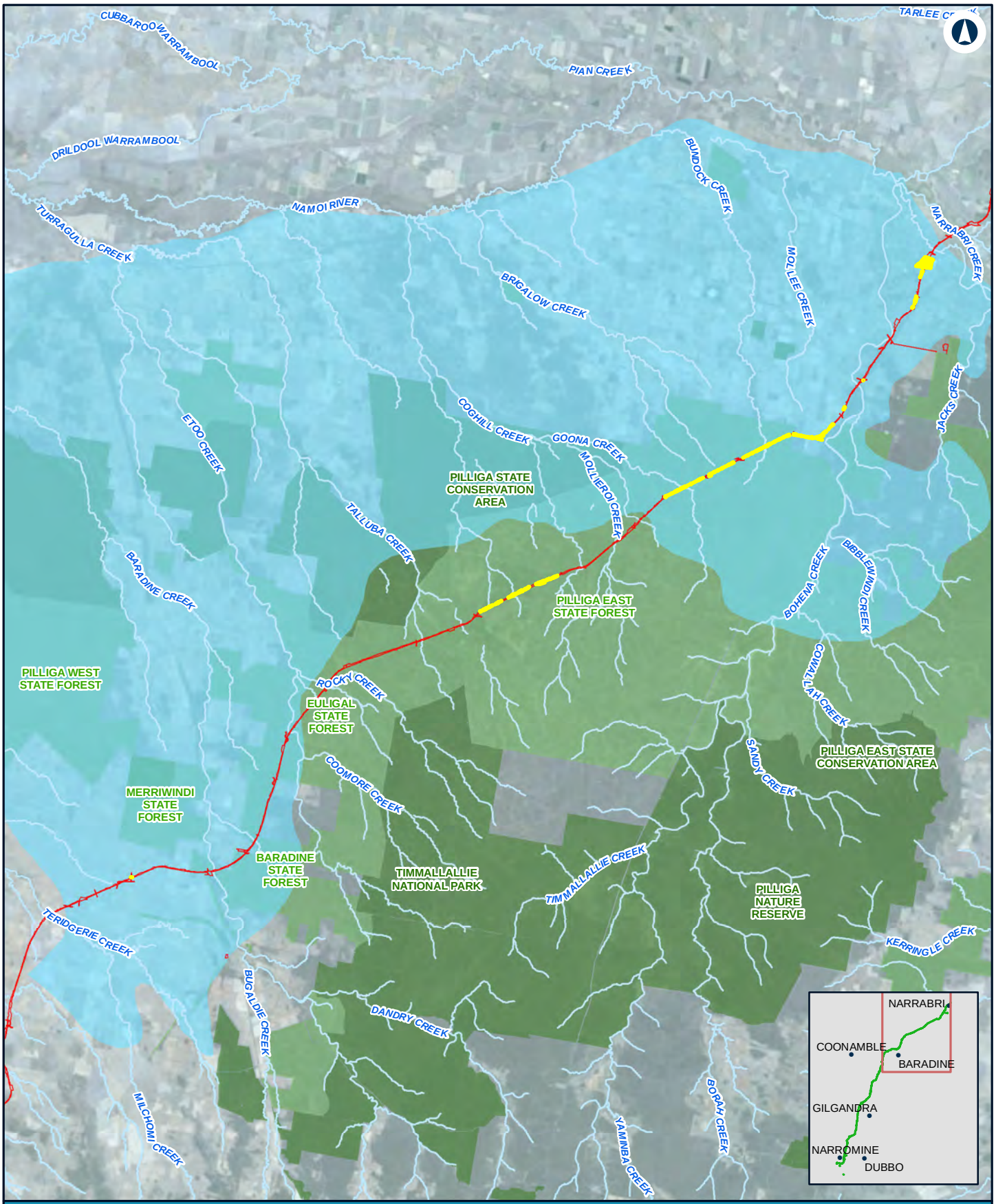

NARROMINE TO NARRABRI Flora Species Polygons - Spiny Peppercress - Pilliga Outwash MAP 3 OF 3

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Spiny Peppercress *(Lepidium aschersonii)* species polygon

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

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Table I6 *Lepidium monoplocoides* (Winged Peppercress)

Lepidium monoplocoides (Winged Peppercress)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Endangered
Species polygon area	175.8 hectares
Reproduction requirements	Flowers from late winter to spring, or August to October (OEH 2020b)
Habitat requirements	• Associated with seasonally moist-waterlogged sites and heavily fertile soils (OEH 2019b). • Predominant vegetation is generally an open woodland dominated by Allocasuarina luehmannii (Bulloak) and/or eucalypts, particularly Eucalyptus largiflorens (Black Box) or Eucalyptus populnea (Poplar Box). Field layer of surrounding woodland is dominated by tussock grasses (OEH 2020b). • Occurs in periodically flooded and waterlogged habitats, does not tolerate grazing disturbance, and is commonly recorded in a wetland-grassland community comprising *Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma* and *Pycnosorus globosus*, on waterlogged grey-brown clay. (Also recorded from a *Maireana pyramidata* shrubland) (OEH 2020b). • Highly dependent on seasonal conditions with generally small concentrated sites and seasonal variation causing the number of plants to vary (OEH 2020b).
Habitat in the CIZ	Habitat within the study area lies primarily within the area of the grassland and open woodlands south west of Narrabri within Segment 11 in vegetation communities generally dominated by red gum species occurring in moist or waterlogged sites. There is similar habitat in Segment 3 that may also provide potential habitat for the species but could not be accessed during suitable survey months. The species does not tolerate grazing disturbance, which reflects the habitat within the study area being restricted to land not used for agriculture.
Known populations	Within the Pilliga region known from the north western boundary of Pilliga CCAZ3 state conservation area and a large population east of Yarrie Lake (OEH 2019b).
Survey requirements	Survey months: September to December (formerly November to February up to EIS exhibition) Survey: use seed-heads to identify. Survey about one month after significant rain. Plants emerge about one month after rain and only persist for a few months. (OEH 2019b). Mostly restricted to seasonally moist sites

***Lepidium monoplocoides* (Winged Peppercress)**	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists– flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days- targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species in October and November 2020, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions and restricted access likely to have affected growth and detectability. However, some suitable habitat areas previous mapped within the exhibited EIS species polygon were able to be surveyed in suitable survey conditions in November 2020. Assumed to occur in areas not able to be accessed in this time and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCS accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability, and in similar habitat in Segment 3 (Narrabri West multi-function compound). Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan-Macquarie: predicted – In BAM-C (No – surveyed) Castlereagh Barwon: known – Yes (assumed present) for some parts and No (surveyed) for some parts where accessed Pilliga: not present – Not in BAM-C case Pilliga Outwash: known – Yes (assumed present) for some parts and No (surveyed) for some parts where accessed Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case

Lepidium monoplocoides (Winged Peppercress)

Species polygon vegetation zones and subregions

Bogan Macquarie

Vegetation zone	Habitat
Poplar Box - Belah woodland on clay-loam soils – 56 (Good)	Yes – surveyed (not recorded)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded)
Mixed box eucalypt woodland on low sandy-loam – 248 (Good)	Yes – surveyed (not recorded)

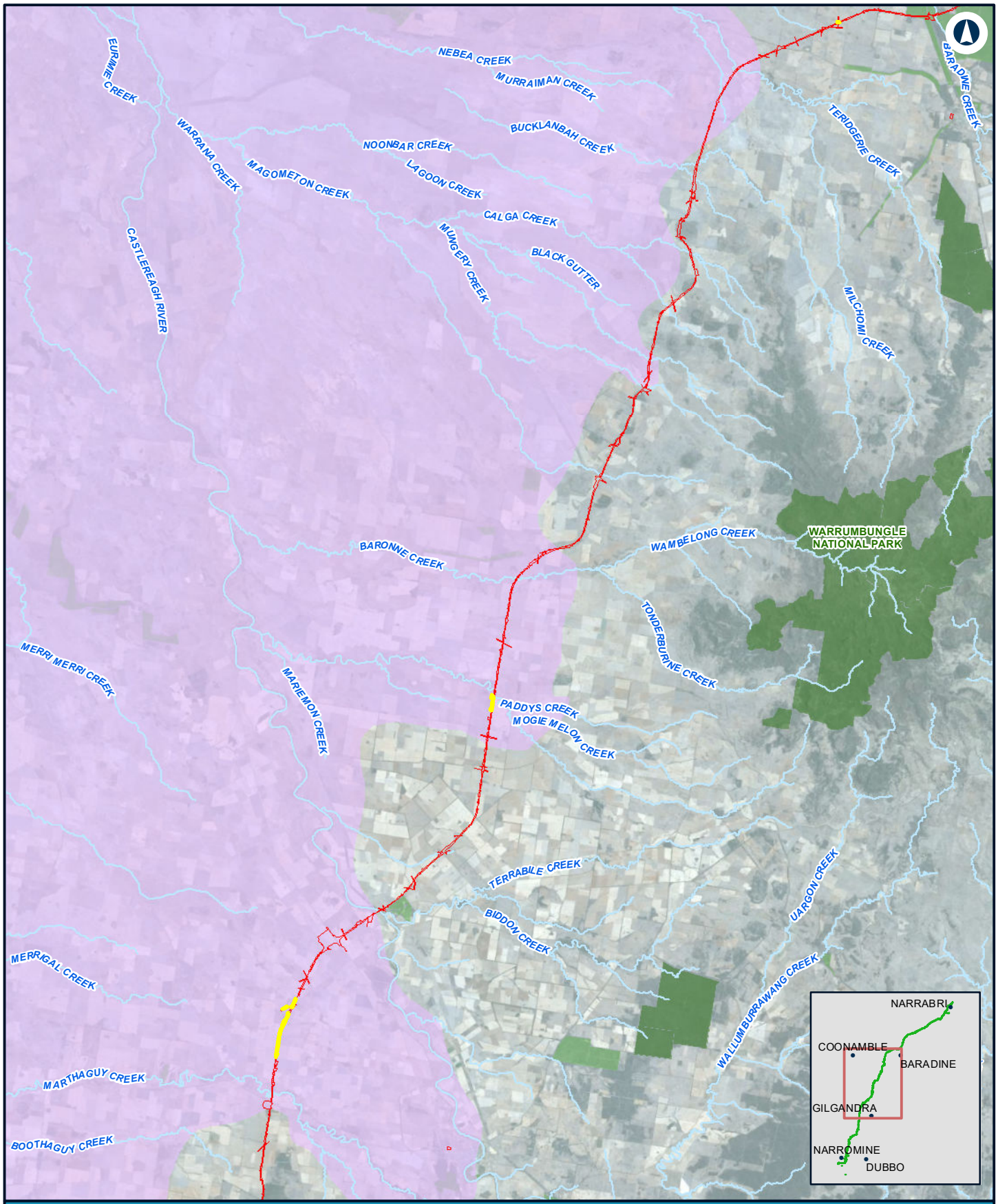
Castlereagh-Barwon

Vegetation zone	Habitat
Poplar Box - Belah woodland on clay-loam soils – 56 (DNG)	Assumed present – no access in some areas. No – surveyed in some areas.
Poplar Box - Belah woodland on clay-loam soils – 56 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Assumed present – no access in some areas. No – surveyed in some areas.
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Poplar Box grassy woodland on alluvial clay-loam soils – 244 (Good)	Yes – surveyed (not recorded)

Pilliga Outwash

Vegetation zone	Habitat
River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Assumed present based on buffer of previous records and limited access
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Assumed present – no access in some areas. No – surveyed in some areas.
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (DNG)	Assumed present – no access in some areas. No – surveyed in some areas.
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.

***Lepidium monoplocoides* (Winged Peppercress)**		
	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	Yes – surveyed (not recorded)
	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (DNG)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI Flora Species Polygons - Winged Peppercress - Castlereagh-Barwon MAP 1 OF 2

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 15/08/2022 Paper: A4
Author: JacobsGHD Scale: 1:418,500
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Winged Peppercress *(Lepidium monoplocoides)* species polygon

IBRA subregion

- Castlereagh-Barwon

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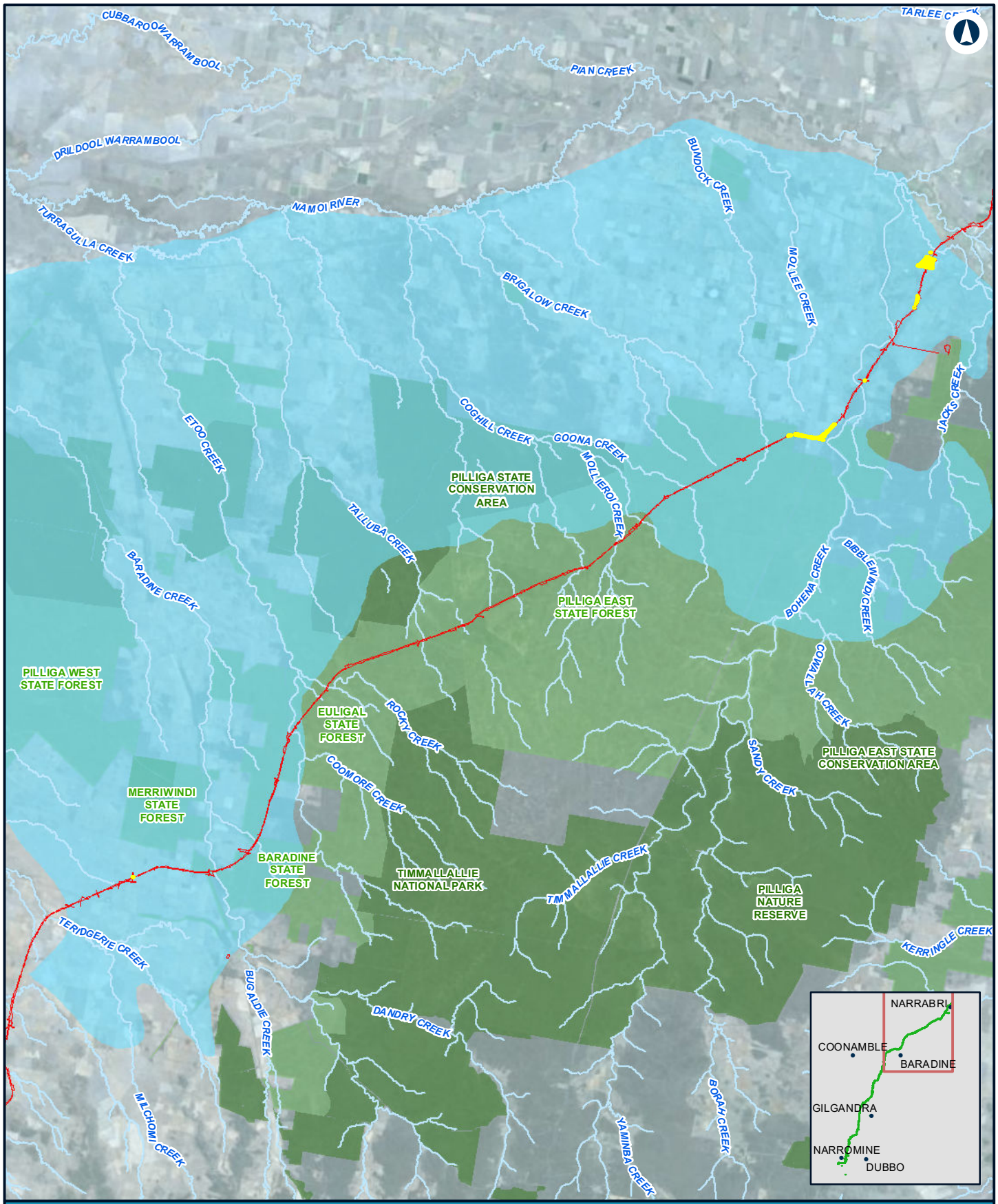

NARROMINE TO NARRABRI Flora Species Polygons - Winged Peppercress - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 15/08/2022 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- Winged Peppercress *(Lepidium monoplocoides)* species polygon

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

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Table I7 *Polygala linariifolia* (Native Milkwort)

Polygala linariifolia (Native Milkwort)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	263.2 hectares
Reproduction requirements	Small groups of flowers appear in spring-summer, and are bluish purple, yellowish or occasionally white. The flattened fruit capsule is a broad oblong with a narrow wing, and the seeds are black with white hairs. (OEH 2020b)
Habitat requirements	• Sandy soils in dry eucalypt forest and woodland with a sparse understorey. The species has been recorded from the Inverell and Torrington districts growing in dark sandy loam on granite in shrubby forest of *Eucalyptus caleyi, Eucalyptus dealbata* and *Callitris*, and in yellow podsolic soil on granite in layered open forest • In the Pilliga area, this species has been recorded in Fuzzy Box woodland, White Cypress Pine-Bulloak - Ironbark woodland, Rough-barked Apple riparian forb-grass open forest, and Ironbark - Brown Bloodwood shrubby woodland. • Other associated species include Eucalyptus trachyphloia, Eucalyptus sphaerocarpa, Angophora floribunda, Angophora leiocarpa, Tristania suaveolens, Allocasuarina torulosa and Wahlenbergia species in the understorey. • Recent surveys in the Pilliga area observed significant declines in populations over autumn and winter, apparently the result of *P. linariifolia* increasing with the previous summer's high rainfall then declining under below-average conditions (OEH 2020b).
Habitat in the CIZ	Species habitat lies primarily within the Pilliga State Forest and extends to the south. This species habitat is dependent on sandy soils which are prevalent in the Pilliga. Suitable potential habitat includes vegetation communities with a sparse understorey that are often quite shrubby. Previous observations have been made within the locality of the study area, including within the Pilliga State Forest. Suitable potential habitat and associated PCTs occurs in the Pilliga forests and some parts north of the Pilliga.
Known populations	North from Copeton Dam and the Warialda area to southern Queensland; also found on the NSW north coast near Casino and Kyogle, and there is an isolated population in far western NSW near Weebah Gate, west of Hungerford (OEH 2020b).
Survey requirements	Survey months: October to February Native Milkwort is an annual or perennial herb about 20 centimetres high with a woody tap root and more-or-less upright branches. Its leaves are up to 3.5 centimetres long, variable in shape but usually oval, and often broader towards the tips. They have a short point at the tip and are dull in texture as they are sparsely covered in short hairs. Small groups of flowers appear in spring-summer, and are bluish purple, yellowish or occasionally white. The flattened fruit capsule is a broad oblong with a narrow wing, and the seeds are black with white hairs.

***Polygala linariifolia* (Native Milkwort)**	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species in October and November 2020, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present. Surveys prior to the EIS being exhibited were undertaken during drought conditions in which the detection of the species may have been inhibited.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required for those areas where access was possible in the right seasonal survey months. Where no access was possible (either private property or remote areas), the species is assumed to occur and a species polygon has been prepared for the entire vegetation zone within the inaccessible areas. Some of these areas will be targeted during further survey effort in autumn 2022. *Polygala linariifolia* was not observed during targeted surveys for the species in areas where access was available. In areas where no access was possible and associated PCTs occur, the species was assumed to occur. All species polygons for *Polygala linariifolia* are assumed present (no access). Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: predicted – No (surveyed) Pilliga: known – No (surveyed) and Yes (assumed present) Pilliga Outwash: known. No (surveyed) and Yes (assumed present) Liverpool Plains: known – Not in BAM-C case Northern Basalts: known – Not in BAM-C case

Polygala linariifolia (Native Milkwort)

Species polygon vegetation zones and subregions

Castlereagh-Barwon

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Yes – surveyed (not recorded)

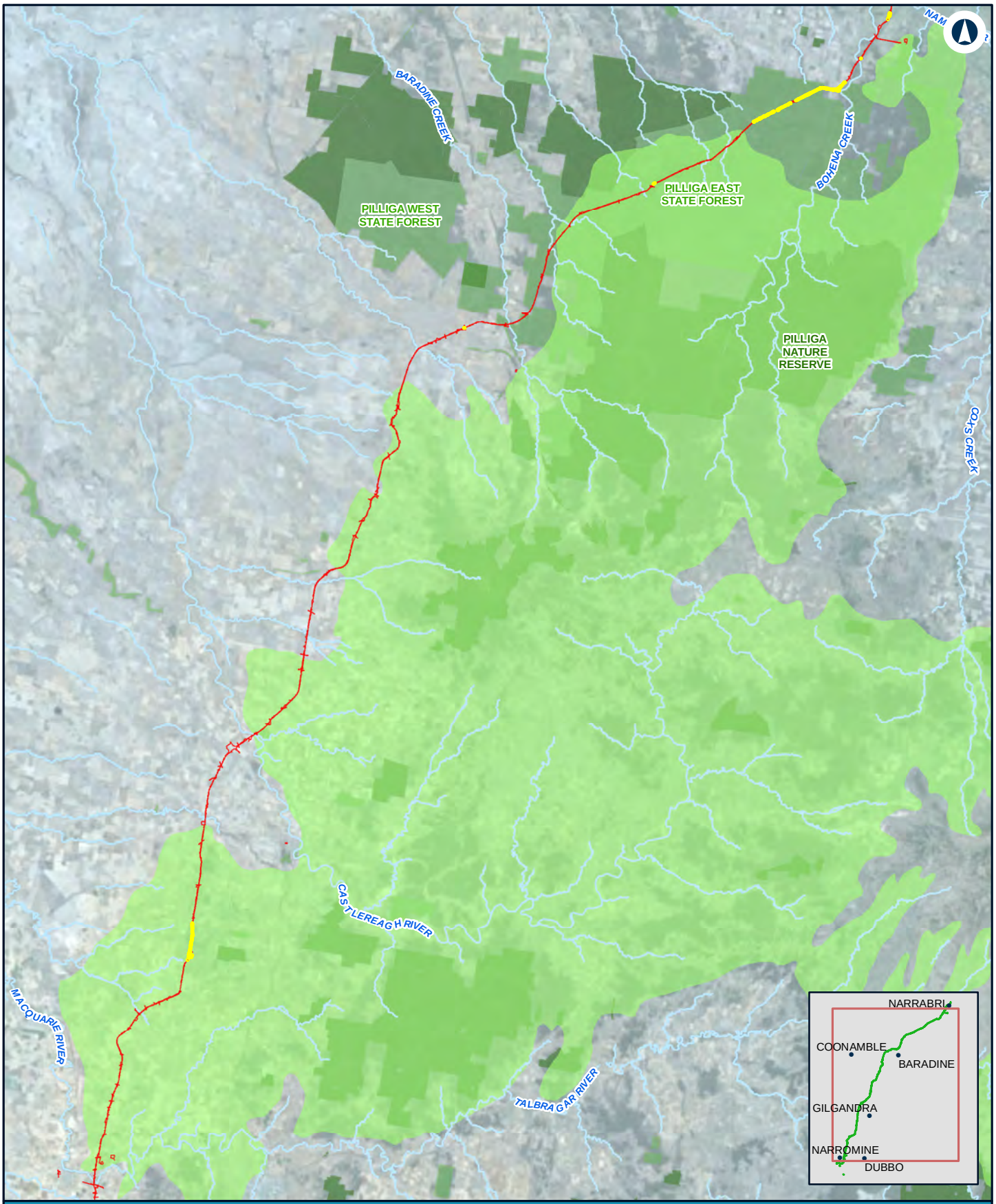
Pilliga

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Surveyed – not recorded in some areas. Assumed present in some areas
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Surveyed – not recorded in some areas. Assumed present in some areas
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (DNG)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded)
White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Yes – surveyed (not recorded)
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Yes – surveyed (not recorded)
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Yes – surveyed (not recorded)
White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (not recorded)

Polygala linariifolia (Native Milkwort)

Pilliga Outwash

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Surveyed – not recorded in some areas. Assumed present in some areas
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Surveyed – not recorded in some areas. Assumed present in some areas
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	Surveyed – not recorded in some areas. Assumed present in some areas
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (DNG)	Surveyed – not recorded in some areas. Assumed present in some areas
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest - 398 – (Good)	Surveyed – not recorded in some areas. Assumed present in some areas
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Surveyed – not recorded in some areas. Assumed present in some areas
White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	No – no suitable habitat present – in caravan park site in town limits
White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No – no suitable habitat present – in caravan park site in town limits



NARROMINE TO NARRABRI Flora Species Polygons - *Polygala Linarifolia* - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:914,600
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Polygala Linarifolia* species polygon

IBRA subregion

- Pilliga

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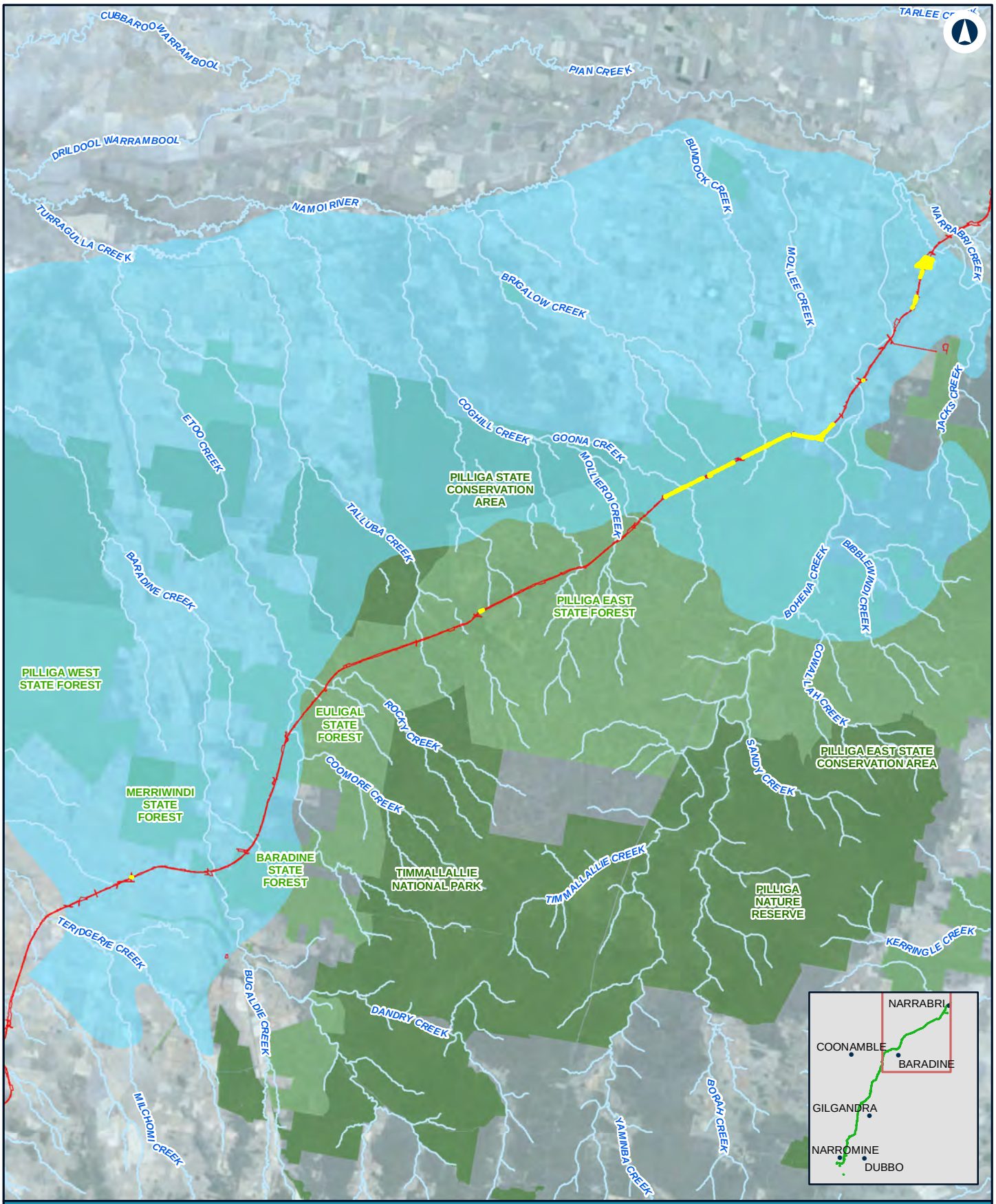

NARROMINE TO NARRABRI Flora Species Polygons - *Polygala Linarifolia* - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Polygala Linarifolia* species polygon

IBRA subregion

- Pilliga Outwash

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Table I8 *Pomaderris queenslandica* (Scant Pomaderris)

***Pomaderris queenslandica* (Scant Pomaderris)**	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	9.1 hectares
Reproduction requirements	Small creamy yellow flowers appear during spring-summer (OEH 2019b).
Habitat requirements	Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks (OEH 2019b).
Habitat in the CIZ	Species potential habitat in the CIZ occurs within the Pilliga State Forest and extends to the south, just north of Narromine. The species required shrubby eucalypt woodland habitat, which can be found throughout the Pilliga and in the southern sections of the study area. The species is also likely to occur within these habitats near creeks, which are found throughout the study area. The species was not observed during targeted surveys and it considered not to occur within the CIZ in areas where access was available and seasonally surveyed. Habitat assumed to occur in areas where no access available and associated PCTs occur.
Known populations	Widely scattered but not common in north-east NSW and in Queensland. It is known from several locations on the NSW north coast and a few locations on the New England Tablelands and North West Slopes, including near Torrington and Coolata (OEH 2019b).
Survey requirements	Survey months: All months. Flowers are useful to identify, as easily confused with *P. intermedia*, however species can be distinguished by leaf morphology – *P. intermedia* generally has a much larger leaf compared to *P. queenslandica* (OEH 2019b). Scant Pomaderris is a medium-sized shrub two to three metres tall. The stems are whitish with tiny star-shaped hair clusters. The leaves are oval to narrow elliptical, 2.5 to 7 centimetres long and 10 to 25 millimetres wide. They are shiny on the top and woolly underneath. The small creamy yellow flowers appear during spring-summer.
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches

***Pomaderris queenslandica* (Scant Pomaderris)**	
	• October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys • March 2022: six ecologists over nine days – targeted flora searches. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year and despite being readily detectible. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present. However, the species is assumed present in some locations on private property where no access was possible.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required for those areas where access was possible. Where no access was possible, the species is assumed to occur and a species polygon has been prepared for the entire vegetation zone within the inaccessible areas. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: known – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – No (surveyed) and Yes (assumed present) Pilliga Outwash: known – No (surveyed) and Yes (assumed present) Liverpool Plains: known – No (surveyed) Northern Basalts: known – Not in BAM-C case
Species polygon vegetation zones and subregions	**Pilliga**

Vegetation zone	Habitat
River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest – 398 (Good)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded)
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests – 404 (Good)	Yes – surveyed (not recorded)
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Yes – surveyed (not recorded)

Pomaderris queenslandica (Scant Pomaderris)	
White Mallee - Dwyer's Red Gum mallee heath on sands – 414 (Good_Fire_Affected)	Yes – surveyed (not recorded)
White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (not recorded)
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Yes – surveyed (not recorded)
White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (not recorded)

Pilliga Outwash

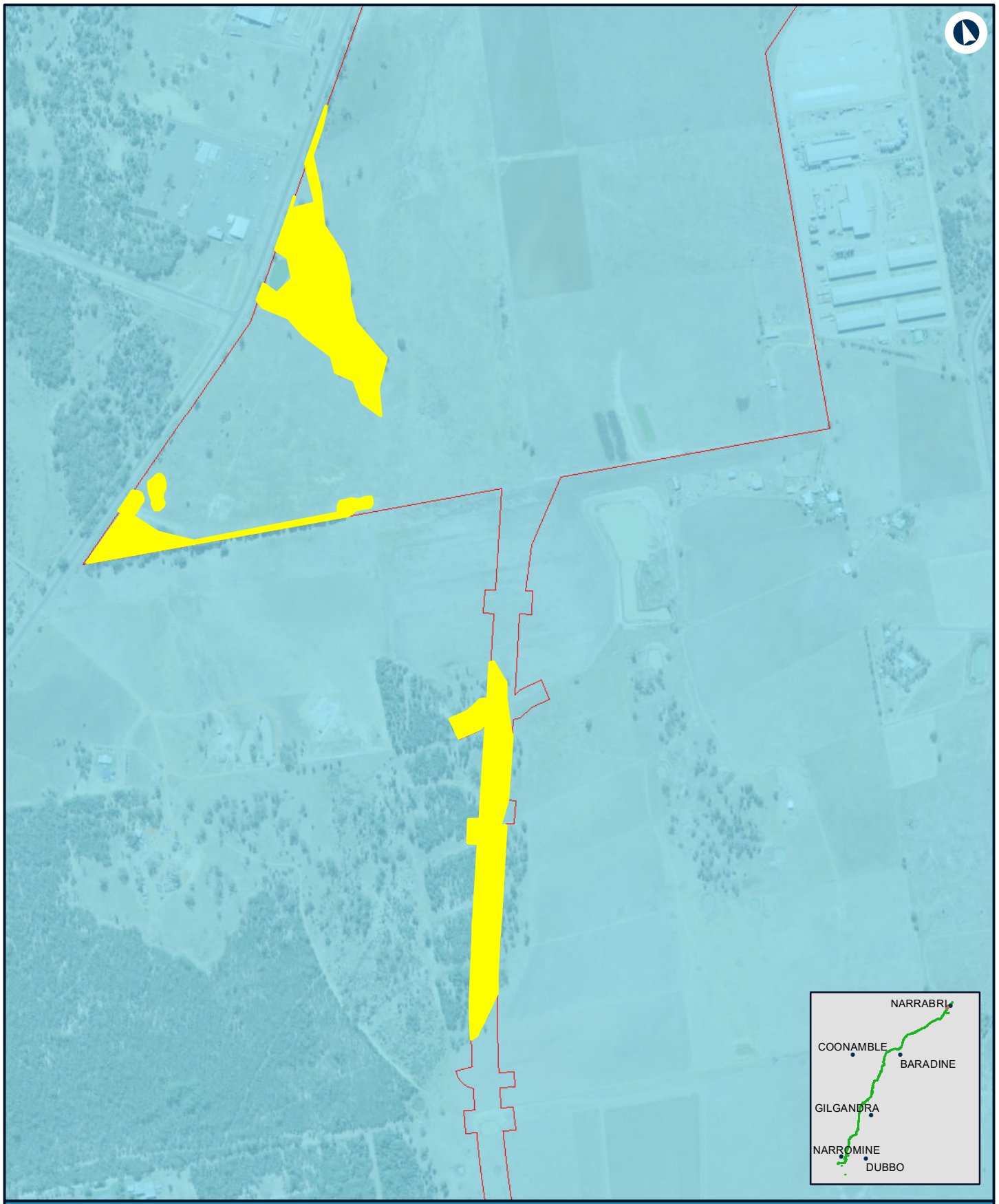
Vegetation zone	Habitat
River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Yes – surveyed (not recorded)
River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Yes – surveyed (not recorded)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (DNG)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest – 398 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest – 398 (Mod_shrubs_removed)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded)
Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions – 411 (Good)	Yes – surveyed (not recorded)
White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Yes – surveyed (not recorded)
White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (DNG)	Yes – surveyed (not recorded)

***Pomaderris queenslandica* (Scant Pomaderris)**

White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Yes – surveyed (not recorded)

Liverpool Plains

Vegetation zone	Habitat
River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Yes – surveyed (not recorded)
Derived Copperburr shrubland of the NSW northern inland alluvial floodplains – 168 (Good)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI Flora Species Polygons - *Pomaderris Queenslandica* MAP 1 OF 1

0 0.1 0.2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 9/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:10,000
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

Construction impact zone

Pomaderris Queenslandica species polygon

IBRA subregion

Pilliga Outwash

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Table I9 *Pterostylis cobarensis* (Greenhood Orchid)

Pterostylis cobarensis (Greenhood Orchid)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	442.6 hectares
Breeding requirements	• Flowers from September to November. Vegetative reproduction is not common in this group of Greenhoods, but some species may form more than one dropper annually. Plants are deciduous and die back to the large, underground tubers after seed release (Harden, 1993 in Threatened Species Scientific Committee, 2013). New rosettes are produced following soaking autumn and winter rains (OEH, 2019b). • Pollinated by the males of small gnats which are attracted to the flower by some pseudosexual perfume (OEH, 2019b).
Habitat requirements	• Habitats are eucalypt woodlands, open mallee or Callitris shrublands on low stony ridges and slopes in skeletal sandy-loam soils (OEH, 2019b). • Associated species include Eucalyptus morrisii, E. viridis, E. intertexta, E. vicina, Callitris glaucophylla, Geijera parviflora, Casuarina cristata, Acacia doratoxylon, Senna spp. and Eremophila spp. (OEH, 2019b). • The group includes some of the most drought tolerant orchids in Australia. Survival strategies include the large tuberoids which store moisture, the overlapping rosette leaves which trap moisture and direct it to the root zone, and the tendency to grow in sites of litter accumulation and near rocks where run-off is concentrated (OEH, 2019b). • *Pterostylis cobarensis* occurs as frequent to abundant plants sometimes occasional in usually very localised populations (OEH, 2019b).
Habitat in the CIZ	• Habitat within the study area lies primarily within the Pilliga State Forest. This is due to the shrubby, low slopes on sandy soils of which this species distribution is characteristic. PCTs which reflect this species habitat requirements include: • 394- Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions • This vegetation type is located within the study area throughout the Pilliga State Forest. Previous observations have been made within the wider locality of the study area.
Known populations	Recorded from Bourke, Nyngan, Cobar, Nymagee, Warren, Gilgandra, Narrabri, Coonabarabran districts. Recorded from a number of reserves and state forests, including Mutawintji, Gundabooka, Culgoa, Warrumbungles National Parks, Quanda, Yathong Nature Reserves, Mt Grenfell Historic Site and Bimbilwindi and Pilliga East State Forests. There are also records from the Darling Downs district of Queensland. (OEH, 2019b)

***Pterostylis cobarensis* (Greenhood Orchid)**	
Survey requirements	Survey months: October Use flowers to locate and identify. Rosette growth and flowering dependent on soaking rains in autumn and winter. Plants are deciduous and die back to the large, underground tubers after seed release or in dry weather, and become undetectable (OEH, 2019b).
Survey effort	Flora surveys were conducted in the following months in the study area: • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species in March 2019 and September to November 2020, as well as opportunistic observations while undertaking other survey types.
Survey results	About 499 individual plants were recorded at multiple locations in the Pilliga forests. Individuals were recorded in varying locations, including rising up out of ephemeral creeks and in flat shrubby woodlands on alluvial soils as well as shrubby communities on sandy soils. Recorded in Segment 10. Assumed present in some parts of Segment 8, 10 and 11.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCS accountable officers. Targeted survey effort throughout the Pilliga identified this species in almost all parts of the Pilliga forests and consequently, most PCTs within the Pilliga have ben included within the species polygon for this species. The species was not recorded in the same PCTs outside the Pilliga during appropriate survey conditions in spring 2020 and the species polygon is confined only to the Pilliga forests segment. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: known – In BAM-C. No (surveyed) Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – Yes (recorded) Pilliga Outwash: known – Yes (recorded) Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case

Pterostylis cobarensis (Greenhood Orchid)

Species polygon vegetation zones and subregions

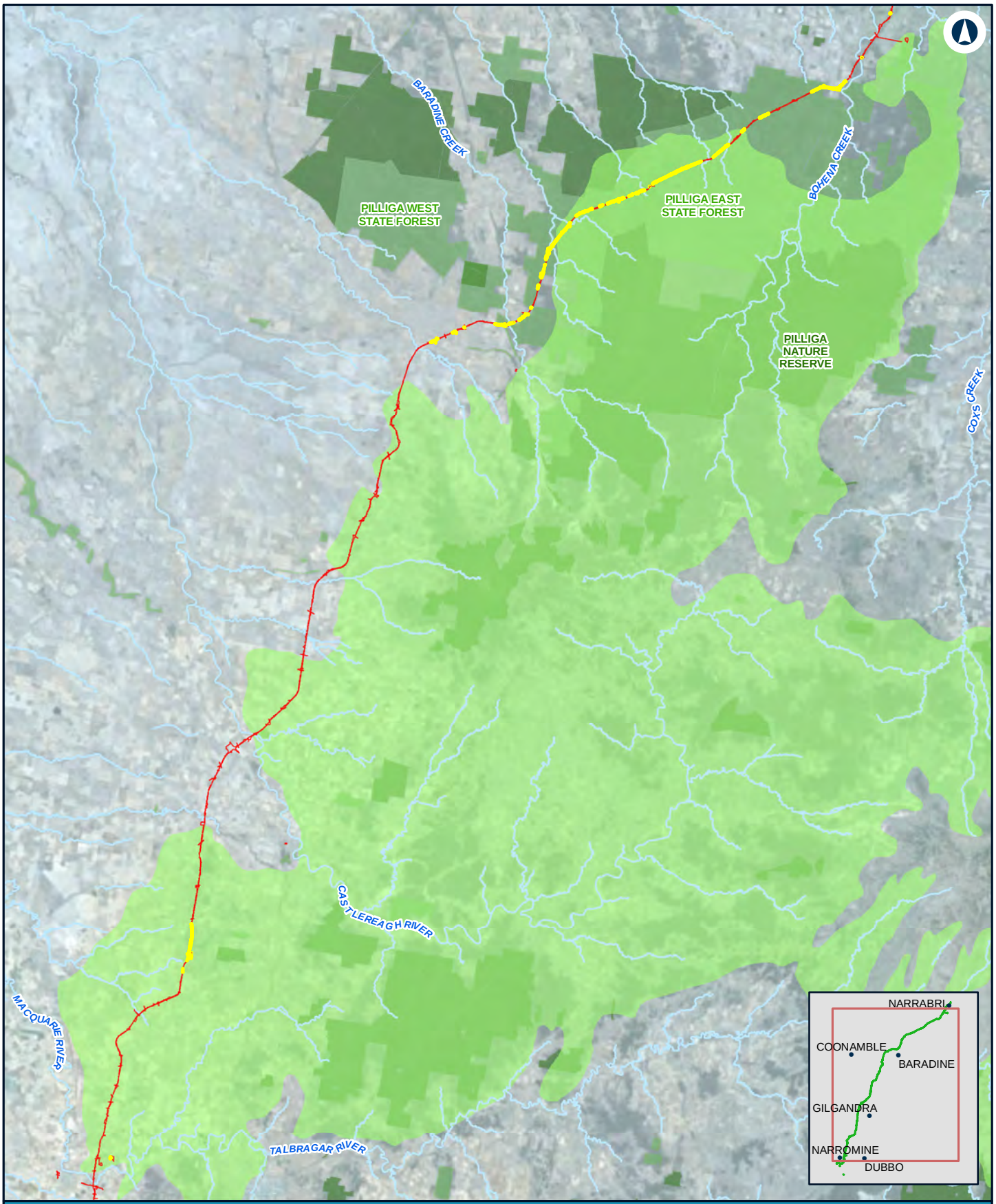
Bogan-Macquarie – Associated PCTs and habitat surveys

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Surveyed – not recorded
Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region – 255 (Good)	Surveyed – not recorded

Pilliga

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (present)
Broombush - wattle very tall shrubland – 141 (Good)	Yes – surveyed (present)
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) - 202 – (Good)	Yes – assumed present (no access)
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	Yes – assumed present
Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region – 255 (Good)	Surveyed – not recorded
Green Mallee tall mallee woodland – 256 (Good)	Yes – surveyed (present)
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Yes – surveyed (present)
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Yes – surveyed (present) and Yes – assumed present (no access)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (present)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (present)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion – 398 (Good)	Yes – surveyed (present) and Yes – assumed present (no access)

Pterostylis cobarensis (Greenhood Orchid)		
	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Yes – surveyed (present)
	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Yes – surveyed (present)
	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Yes – surveyed (present)
	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Yes – surveyed (present)
	Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Yes – surveyed (not recorded)
	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (present)
	Pilliga Outwash	
	Vegetation zone	Habitat
	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (present)
	Broombush - wattle very tall shrubland – 141 (Good)	Yes – surveyed (present)
	Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils – 148 (Good)	Yes – surveyed (not recorded)
	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Yes – surveyed (present) and Yes – assumed present (no access)
	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (present)
	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion – 398 (Good)	Yes – surveyed (present) and Yes – assumed present (no access)
	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (present)



NARROMINE TO NARRABRI Flora Species Polygons - *Pterostylis cobarensis* - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Pterostylis cobarensis* species polygon

IBRA subregion

- Pilliga

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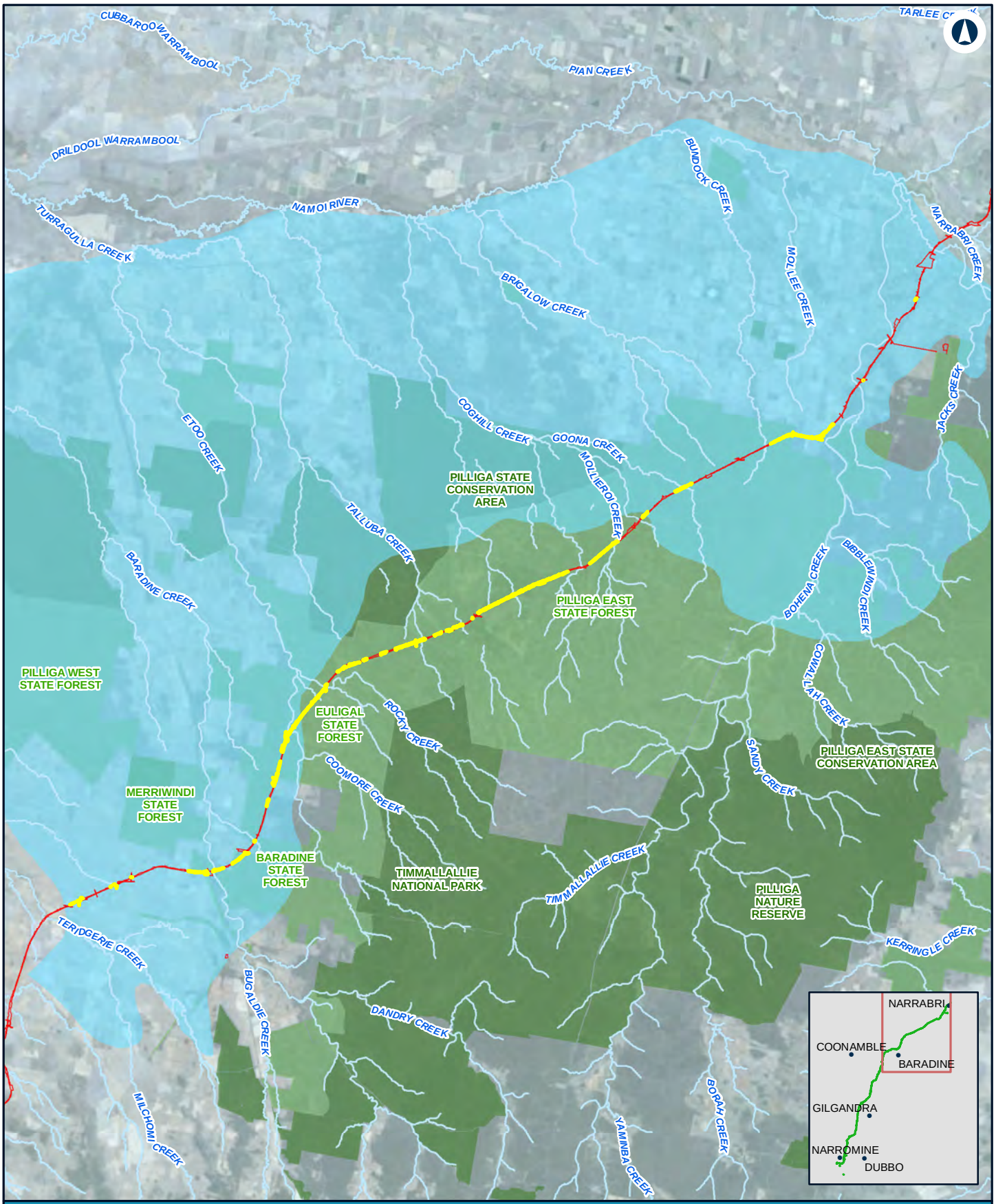

NARROMINE TO NARRABRI Flora Species Polygons - *Pterostylis cobarensis* - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Pterostylis cobarensis* species polygon

IBRA subregion

- Pilliga Outwash

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Table I10 *Swainsona murrayana* (Slender Darling Pea)

Swainsona murrayana (Slender Darling Pea)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	50.1 hectares
Breeding requirements	• Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains (OEH 2019b). • One study on the Murray Valley Plain, in northern Victoria, found that the Slender Darling-pea was only pollinated by *Trichocolletes maximus*, a solitary, ground nesting bee. The bee may fare poorly during extended drought and the Slender Darling-pea may be susceptible to reproductive failure if this specialist pollinator declined (Morgan & Williams 2015). • Copious flowers and abundant quantities of seed can be produced under favourable conditions (NSW SC 2008b).
Habitat requirements	• The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams (OEH, 2019b) • Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated (OEH 2019b). • The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated (OEH 2019b)
Habitat in the CIZ	Species habitat lies primarily where the study area extends beyond the Pilliga State Forest including its outskirts. This species habitat is dependent on clay soils which are prevalent to the south of the study area. Grassy woodlands and derived grasslands are also located within this extent and provide potential habitat for the species. PCT 35, which provides suitable potential habitat, occurs to the north, whilst the remaining vegetation communities occur to the south of the study area. Previous observations have been made within the locality of the study area, with a small number being located within the Pilliga State Forest. *Swainsona murrayana* was not observed during targeted surveys for the species and it considered not to occur within the CIZ in areas that were accessed. Where associated PCTs occur and no access was possible, the species is assumed to occur.
Known populations	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree (OEH 2019b). In NSW, *Swainsona murrayana* occurs in the central western slopes, the Western Division, and the Riverina area (DECC 2005; CPBR 2008 in Threatened Species Scientific Committee 2008a)
Survey requirements	Survey months: September

***Swainsona murrayana* (Slender Darling Pea)**	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists– flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days- targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys Surveys included targeted searches for the species in September 2020, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present (September 2020). Surveys prior to the EIS being exhibited were undertaken during drought conditions in which the detection of the species may have been inhibited. Assumed to occur in remote areas of the Pilliga away from access tracks. These areas are assumed present and some private properties.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required for those areas where access was possible. Where no access was possible (either private property or remote areas), the species is assumed to occur and a species polygon has been prepared for the entire vegetation zone within the inaccessible areas. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: predicted – In BAM-C. No (surveyed) Castlereagh Barwon: known – No (surveyed) and Yes (assumed present) Pilliga: known – No (surveyed) and Yes (assumed present) Pilliga Outwash: predicted – No (surveyed) Liverpool Plains: known – No (surveyed) Northern Basalts: known – No (surveyed)

Swainsona murrayana (Slender Darling Pea)

Species polygon vegetation zones and subregions

Bogan Macquarie

Vegetation zone	Habitat
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Yes – surveyed (not recorded)
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Yes – surveyed (not recorded)
Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW – 248 (Good)	Yes – surveyed (not recorded)
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion – 599 (Good)	Yes – surveyed (not recorded)

Pilliga

Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	Yes – surveyed (not recorded)
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Yes – surveyed (not recorded)
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Yes – surveyed (not recorded)
Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions – 55 (Good)	Yes – surveyed (not recorded)
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Surveyed – not recorded. Paddock trees in other locations
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	No survey – assumed presence (no access)
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	Surveyed – not recorded in some areas. Assumed present in some areas

Swainsona murrayana (Slender Darling Pea)

Pilliga Outwash

Vegetation zone	Habitat
Brigalow - Belah open forests / woodland on alluvial often gilgaied clay – 35 (Good)	Yes – surveyed (not recorded)
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Yes – surveyed (not recorded)

Castlereagh-Barwon

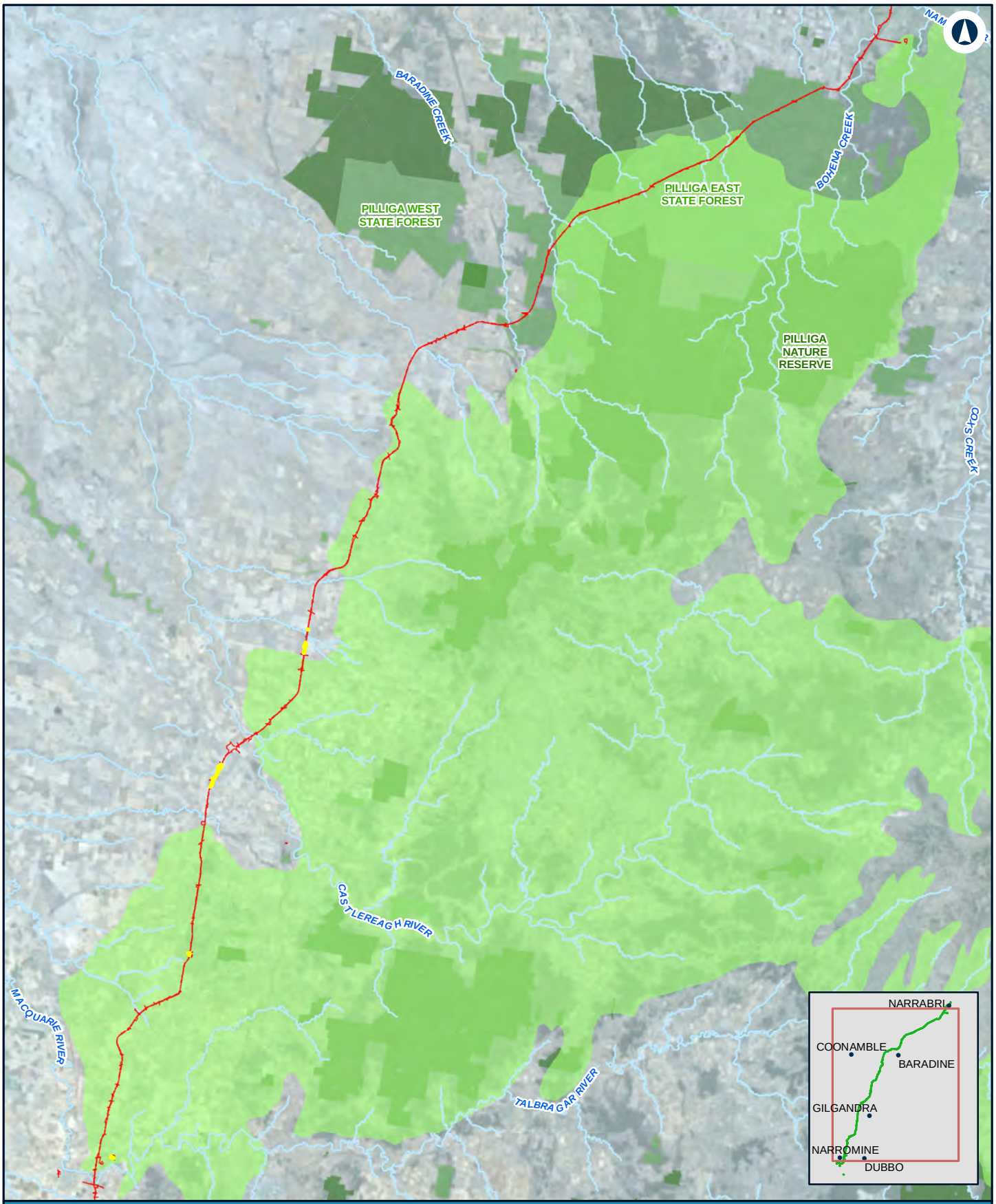
Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (DNG)	Assumed present – no access in some areas. No – surveyed in some areas.
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	Yes – surveyed (not recorded)
Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion – 444 (Good)	Yes – surveyed (not recorded)

Liverpool Plains

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	Yes – surveyed (not recorded)
Derived Copperburr shrubland of the NSW northern inland alluvial floodplains – 168 (Good)	Yes – surveyed (not recorded)

Northern Basalts

Vegetation zone	Habitat
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI Flora Species Polygons - *Swainsona Murrayana* - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:914,600
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Swainsona Murrayana* species polygon

IBRA subregion

- Pilliga

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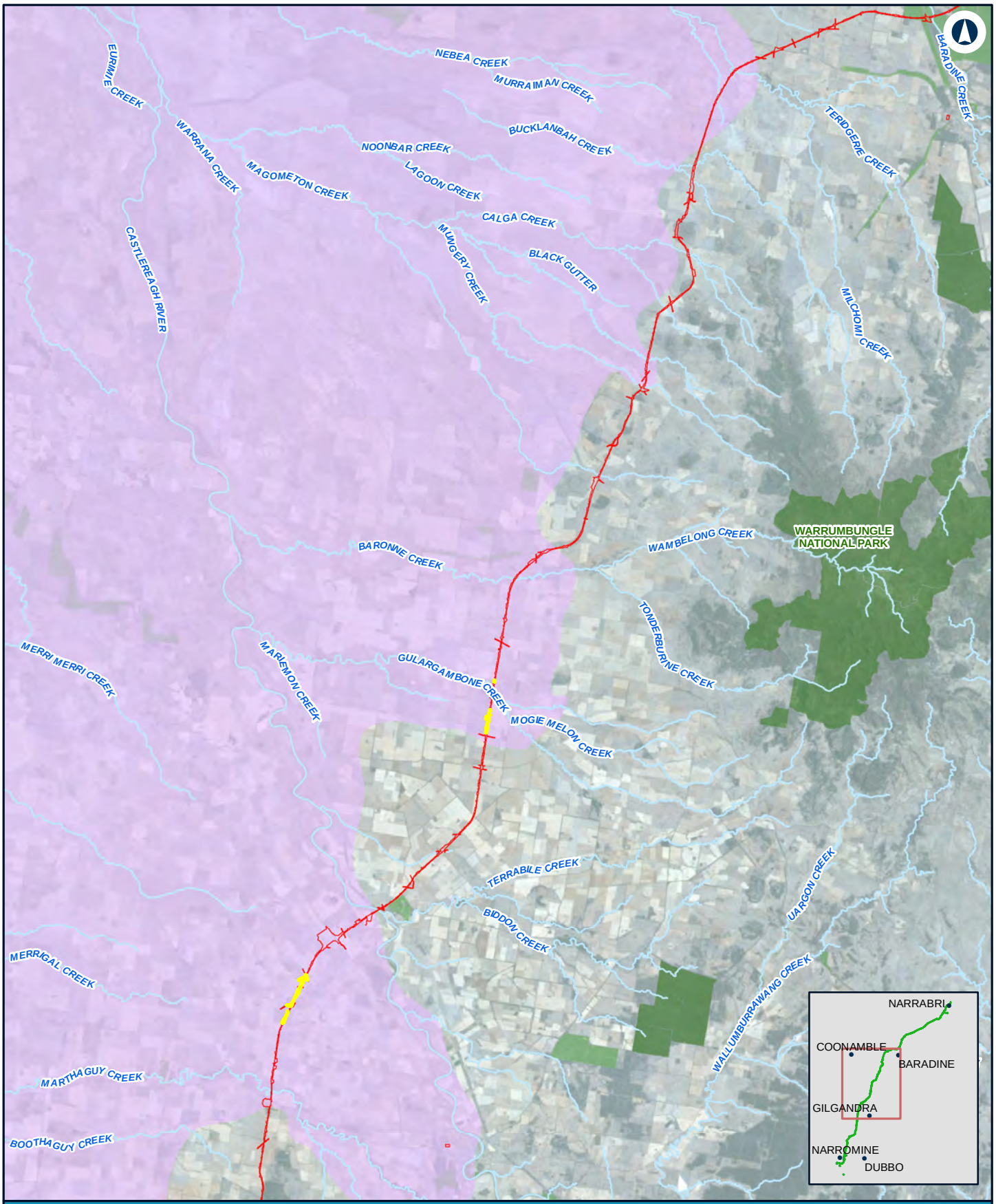

NARROMINE TO NARRABRI Flora Species Polygons - *Swainsona Murrayana* - Castlereagh-Barwon MAP 2 OF 2

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:420,100
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Swainsona Murrayana* species polygon

IBRA subregion

- Castlereagh-Barwon

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Table I11 Swainsona *sericea* (Silky Swainson-pea)

Swainsona sericea (Silky Swainson-pea)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	78.9 hectares
Reproduction requirements	Regenerates from seed after fire (OEH 2019b)
Habitat requirements	• Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes (OEH 2019b). • Sometimes found in association with cypress-pines *Callitris* spp (OEH 2019b). • Habitat on plains unknown (OEH 2019b).
Habitat in the CIZ	Species habitat in the CIZ lies primarily within the Pilliga State Forest and extends to the south, just north of Narromine. This species habitat is generally within eucalypt box-gum woodlands and native grasslands, and in association with *Callitris* species, habitats that are found in the study area. The species was not observed during targeted surveys and it considered not to occur within the CIZ in areas where access was available and seasonally surveyed. Habitat assumed to occur in areas where no access available and associated PCTs occur.
Known populations	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland (OEH 2019b).
Survey requirements	Survey months: September to November Survey months differ based on location. Survey Oct - Nov on Monaro. Survey Sep - Oct in the Riverina (OEH 2019b). The Silky Swainson-pea is a prostrate or erect perennial, growing to 10 centimetres tall. The stems and leaves are densely hairy. The leaves are up to 7 centimetres long, composed of 5 to 13 narrow, pointed leaflets, each up to 15 millimetres long. The purple pea-shaped flowers are to 11 millimetres long, and are held in groups of up to eight flowers, on a stem to 10 centimetres tall. The spring flowers are followed by hairy pods, up to 17 millimetres long.

***Swainsona sericea* (Silky Swainson-pea)**	
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species during September to November 2020, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required for those areas where access was possible. Where no access was possible (either private property or remote areas), the species is assumed to occur and a species polygon has been prepared for the entire vegetation zone within the inaccessible areas. Some of these areas will be targeted during further survey effort in prior to construction.
Relevant IBRA subregions	Inland Slopes: known – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – No (surveyed) and Yes (assumed present) Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: known – No (surveyed)

Swainsona sericea (Silky Swainson-pea)

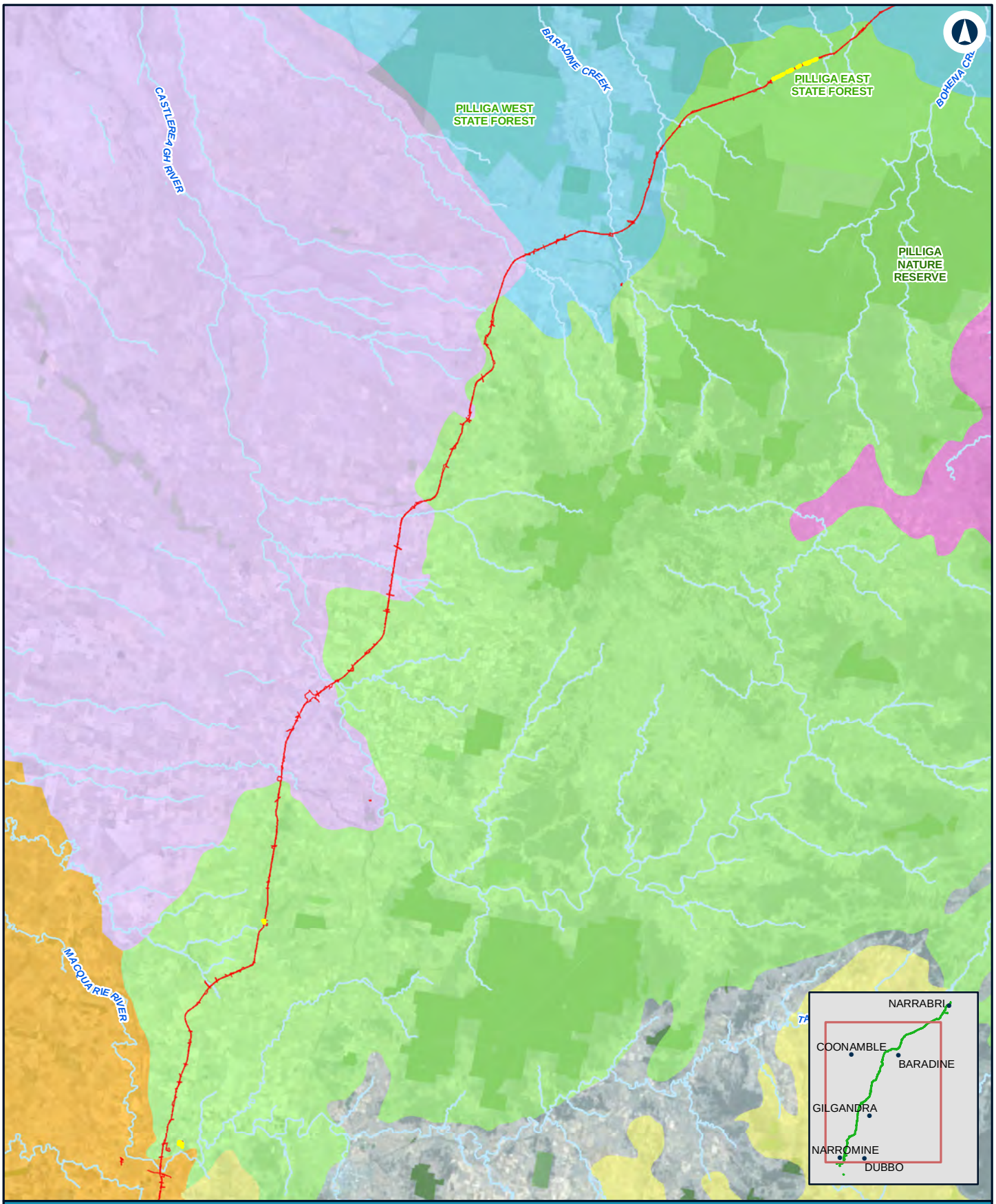
Species polygon vegetation zones and subregions

Pilliga

Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	Yes – surveyed (not recorded)
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	Yes – surveyed (not recorded)
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	Assumed present – no access
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest – 398 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Surveyed – not recorded
White Mallee - Dwyer's Red Gum mallee heath on sands – 414 (Good, fire effected)	Surveyed – not recorded

Northern Basalts

Vegetation zone	Habitat
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Surveyed – not recorded



NARROMINE TO NARRABRI Flora Species Polygons - *Swainsona Sericea* MAP 1 OF 1

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:837,000
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Swainsona Sericea* species polygon
- Pilliga
- Pilliga Outwash

IBRA subregion

- Bogan-Macquarie
- Castlereagh-Barwon
- Inland Slopes
- Liverpool Plains

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Table I12 *Tylophora linearis*

Tylophora linearis	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Endangered
Species polygon area	37.9 hectares
Breeding requirements	Flowers in spring, with flowers recorded in November or May with fruiting probably two to three months later (OEH 2019b)
Habitat requirements	• Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla and Allocasuarina luehmannii (OEH 2019b). • Also grows in association with Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum species and Casuarina species (OEH 2019b).
Habitat in the CIZ	Species habitat lies primarily within the south-western section of the Pilliga State Forest in the study area. It also extends further south of the forest. The study area within the Pilliga State Forest is characteristic of dry open forest which is suitable for this species. Previous observations have been made within the locality primarily within the Pilliga State Forest, however previous observations have also been made to the south of the study area.
Known populations	Known from eight localities in the Dubbo, Mt Crow areas and 'Myall Park' near Glenmorgan in Queensland. Also conserved in Goobang National Park, Eura, Goonoo and Pilliga West State Forest and Coolbaggie Nature Reserve (Threatened Species Scientific Committee, 2008c). Majority of records occur in the central western region. Records from Goonoo, Pilliga West, Pilliga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. (OEH 2019b).
Survey requirements	Survey months: October to May Survey: Use flowers and fruit to locate and identify. Easily confused with other climbers when not in flower or fruit. General: Has the ability to resprout after fire unless fires are recurring. (OEH 2019b)

Tylophora linearis	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists– flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days- targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys • March 2022: six ecologists over nine days – targeted flora searches . Surveys included targeted searches for the species in October and November 2020, and March 2022, as well as opportunistic observations while undertaking other survey types. Surveys in March 2022 were conducted in conjunction with surveys for *Bertya opponens* and *Pomaderris queenslandica*. Six people undertook targeted searches in parallel transects, with details searches conducted within survey circles. Given the relative ease of identifying the shrub species if present, staff also focussed on searching for twiners/subshrubs, and there is conserved a limited change of a false negative during this survey period.
Survey results	Three individual plants were recorded in the Pilliga forests, primarily in the south-western section. Individuals were recorded at two locations within dry shrubby woodland dominated by *Acacia* species and Narrow-leaved Ironbark on sandy soils. A high proportion of White Cypress Pine is also present in these areas. Recorded and assumed present in parts of Segment 10 and assumed present in parts of Segment 11.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCS accountable officers. Targeted survey effort throughout the Pilliga identified this species in one location in the Pilliga forests and therefore associated PCTs that provide potential habitat for the species in these areas of the Pilliga have been included within the species polygon for this species. Further targeted survey in March 2022 reduced the area of assumed presence. The species was not recorded in the same PCTs outside the Pilliga during appropriate survey conditions in spring 2020 and the species polygon is confined mostly to the Pilliga forests segment and some small no access sections north of the Pilliga on private property.
Relevant IBRA subregions	Inland Slopes: known – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh Barwon: predicted – No (surveyed) Pilliga: known – Yes (recorded) Pilliga Outwash: known – Yes (recorded/assumed present) for some parts and No (surveyed) for some parts where accessed Liverpool Plains: known – Not in BAM-C case Northern Basalts: known – Not in BAM-C case

Tylophora linearis

Species polygon vegetation zones and subregions

Castlereagh-Barwon

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded)
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Yes – surveyed (not recorded)
Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Yes – surveyed (not recorded)

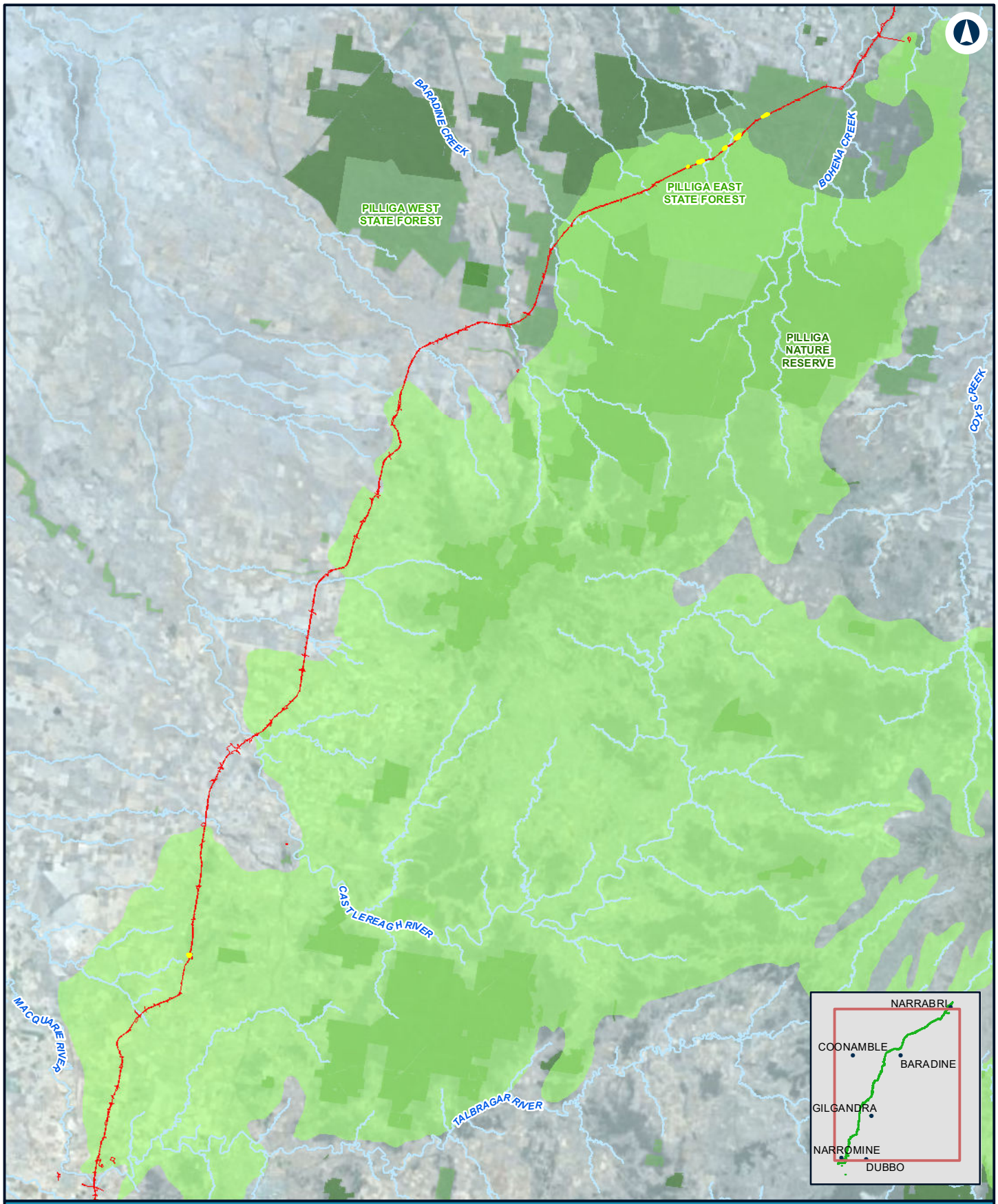
Pilliga

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Yes – surveyed (not recorded) and yes assumed present for some areas
Broombush - wattle very tall shrubland – 141 (Good)	Yes – surveyed (present)
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga) – 202 (Good)	Yes – assumed present
Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open – 398 (Good)	Yes – surveyed (not recorded) and yes assumed present for some areas
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded)
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests – 404 (Good)	Yes – surveyed (not recorded)
White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Yes – surveyed (not recorded)
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Yes – surveyed (not recorded)
White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Yes – surveyed (not recorded)
White Box - White Cypress Pine shrub grass hills woodland – 435 (Good)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	Yes – surveyed (not recorded)

Tylophora linearis	
White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills 589 (Good)	Yes – surveyed (not recorded)
White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Yes – surveyed (present)
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Yes – surveyed (not recorded)

Pilliga Outwash

Vegetation zone	Habitat
Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Surveyed – not recorded and yes assumed present for some areas
Broombush - wattle very tall shrubland – 141 (Good)	Yes – surveyed (not recorded)
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (Good)	Surveyed – not recorded and yes assumed present for some areas
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open – 398 (Good)	Surveyed – not recorded and yes assumed present for some areas
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open – 398 (Mod_shrubs_removed)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Surveyed – not recorded and yes assumed present for some areas
White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest – 473 (Good)	Yes – surveyed (not recorded)
White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI Flora Species Polygons - *Tylophora linearis* - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 15/08/2022 Paper: A4
Author: JacobsGHD Scale: 1:911,100
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

Construction impact zone

Tylophora linearis species polygon

IBRA subregion

Pilliga

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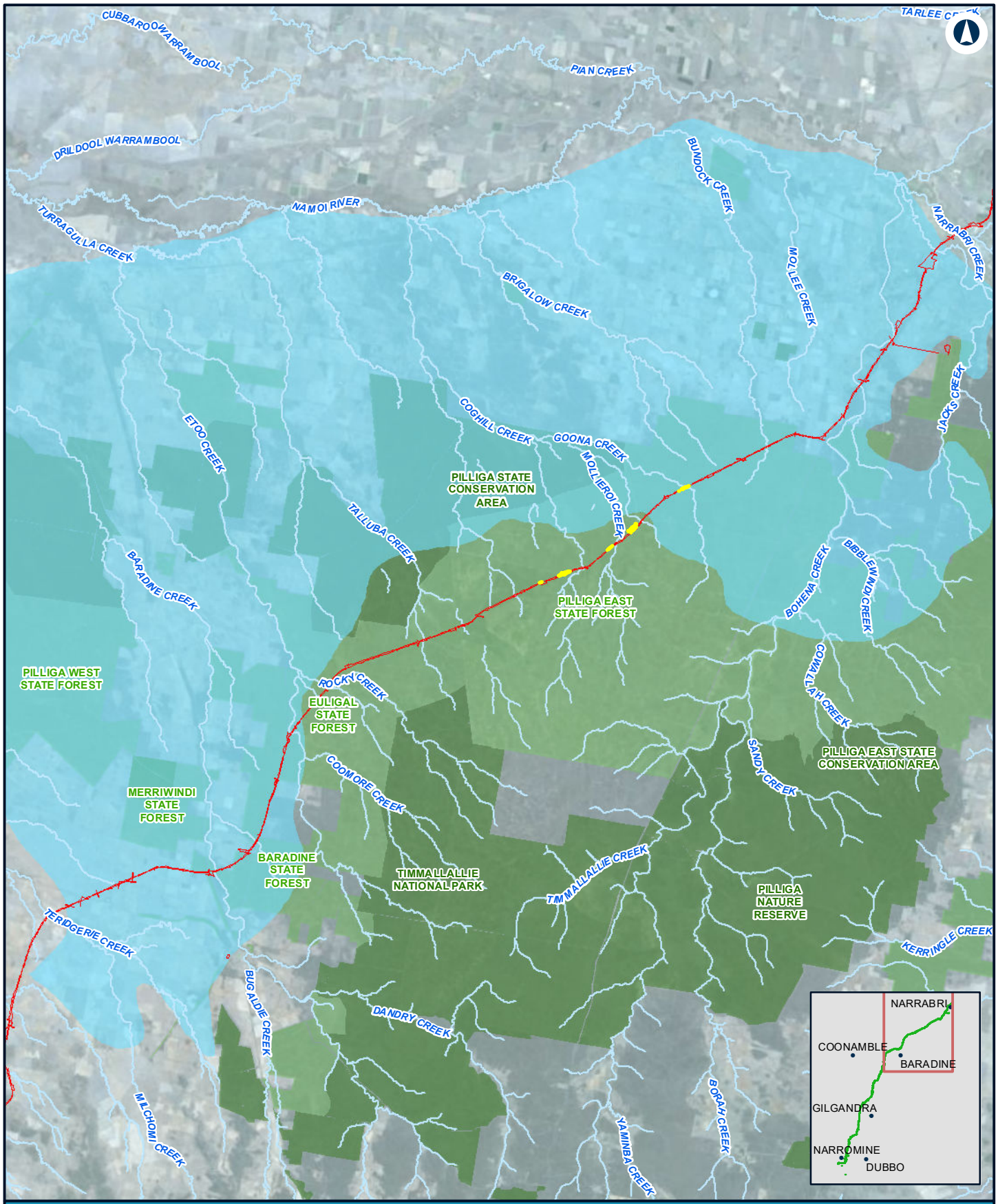

NARROMINE TO NARRABRI Flora Species Polygons - *Tylophora linearis* - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 15/08/2022 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Tylophora linearis* species polygon

IBRA subregion

- Pilliga Outwash

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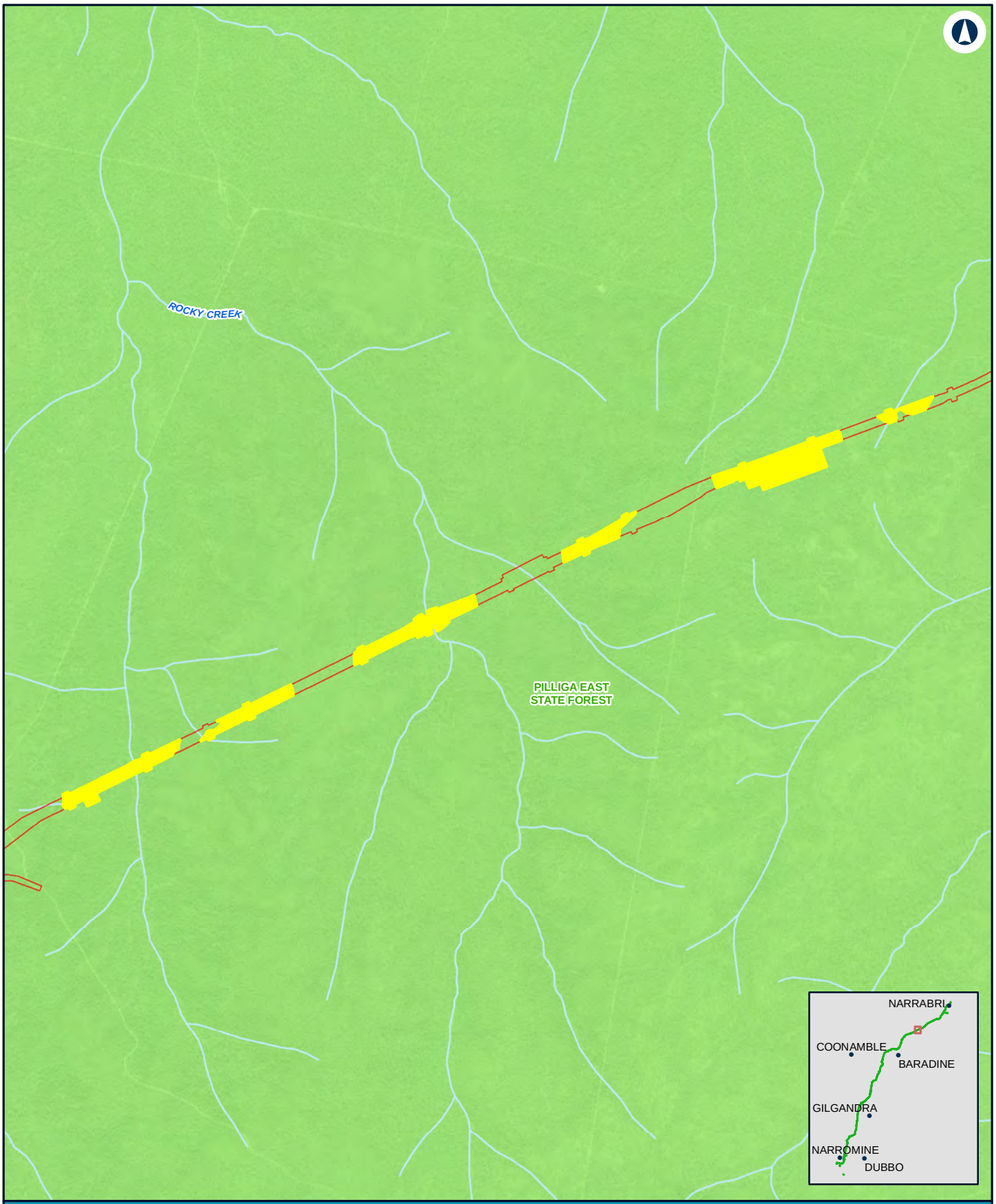
Table I13 *Zieria ingramii* (Keith's Zieria)

***Zieria ingramii* (Keith's Zieria)**	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	48.6 hectares
Habitat requirements	• Grows in dry sclerophyll forest on light sandy soils. All known populations have been recorded in *Eucalyptus-Callitris* woodland or open forest with a shrubby to heathy understorey (OEH 2020b). • Mostly from gentle slopes in red-brown and yellow-brown sandy loams, often with a rocky surface (OEH 2020b). • Associated and understorey species include *Eucalyptus crebra, E. fibrosa, E. dwyeri, E. beyeriana, E. microcarpa, Callitris endlicheri, Allocasuarina diminuta, A. distyla, A. verticillata, Leptospermum divaricatum, L. parvifolium, Acacia triptera, Acacia gladiiformis, Acacia brownii, Grevillea floribunda, G. triternata, Hakea decurrens, Boronia glabra, Philotheca salsolifolia, Leucopogon attenuatus, Melaleuca uncinata, M. erubescens, Kunzea parvifolia, Calytrix tetragona, Brachyloma daphnoides, Melichrus urceolatus, Cassinia aculeata, Dodonaea viscosa subsp. spatulata, D. peduncularis, D. heteromorpha, Dillwynia sericea, Hibbertia riparia, Dampiera lanceolata, Dianella longifolia, Prostanthera* species and *Goodenia* species (OEH 2020b).
Reproduction requirements	• Flowering time is in spring and plants bear fruit in summer. Plants can produce flowers and fruits any time between July and March (OEH 2020b). • Grows only in small localised populations within the north-east and central areas of Goonoo SCA. Population sizes vary from 6 to 80 individuals. The age structure within populations may be even and single-aged or uneven and multi-aged (OEH 2020b).
Habitat in the CIZ	All known recent records of the species occur in small localised populations within Goonoo State Conservation Area, which is over 35 kilometres to the east of the study area at the closest point to agricultural land in the proposal site. The species is not known to occur outside these populations. However there are some limited areas of habitat in shrubby areas of the Pilliga, which have been burnt though this is not recent fire. The species was not observed during targeted surveys and it considered not to occur within the CIZ in areas where access was available and seasonally surveyed areas. Habitat assumed to occur in areas where no access available and associated PCTs occur in the Pilliga forests.
Known populations	• Known predominately from Goonoo SCA, about 40 kilometres north-east of Dubbo. An old record exists from a locality east of Mogriguy on the Mendooran Road, however searches of the area have not relocated the species (OEH 2020b). • One record also occurs within Kings Plains National Park, 48 kilometres south of Inverell (OEH 2020b).

***Zieria ingramii* (Keith's Zieria)**	
Survey requirements	Survey months: September to February Use flowers to locate despite its distinctive 3-foliate leaves. Species germinates after fire and is most easily identifiable after disturbance. Sometimes confused with *Zieria aspalathoides* (OEH 2020b).
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required for those areas where access was possible. Where no access was possible (remote areas), the species is assumed to occur and a species polygon has been prepared for the entire vegetation zone within the inaccessible areas of the Pilliga forests. Some of these areas will be targeted during further survey effort in autumn 2022 to better quantity impacts on this species.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – No (surveyed) and Yes (assumed present) Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case

Zieria ingramii (Keith's Zieria)	
Species polygon vegetation zones and subregions	**Pilliga**

Vegetation zone	Habitat
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Assumed present – no access in some areas. No – surveyed in some areas.
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded)
Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Yes – surveyed (not recorded)
White Mallee - Dwyer's Red Gum mallee heath – 414 (Good, fire effected)	Yes – surveyed (not recorded)



NARROMINE TO NARRABRI

Flora Species Polygons - *Zieria Ingramii*

MAP 1 OF 1

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-21 Paper: A4
Author: JacobsGHD Scale: 1:40,000
Data Sources: OEH; Basemap layers: NSWSS

LEGEND

- Construction impact zone
- *Zieria Ingramii* species polygon

IBRA subregion

- Pilliga

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Candidate flora species surveyed but not recorded and no species polygon prepared

Table I14 *Bertya opponens* (Coolabah Bertya)

Bertya opponens	(Coolabah Bertya)
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	True
EPBC Act Status	Vulnerable
Species polygon area	No polygon
Breeding requirements	The yellow-brown flowers appear during July and August and are followed by rounded seed capsules 8 to 9 millimetres long which contain two to three seeds. (OEH 2020b)
Habitat requirements	• Flowering time is July and August, although seed formation can commence as early as July, especially in Jacks Creek State Forest. • The disturbance agents of fire and mechanical disturbance appear to trigger germination and/or suckering in Coolabah Bertya. The most appropriate time interval between disturbance events is not known. • Coolabah Bertya occurs in a range of habitats including stony mallee ridges and cypress pine forest on red soils. The wide variation in habitat type between the populations makes the identification of critical habitat very difficult. Consideration of disturbance regimes and grazing management are probably more important to the survival of populations in the long term. • Associated species at Jacks Creek State Forest include *Eucalyptus chloroclada, Callitris glaucophylla* and *Eucalyptus fibrosa*. • Each population of Coolabah Bertya has a slightly different age structure, ranging from senescent to a similar number of juveniles and adults (OEH 2020b). • The response of the Coolabah Bertya to fire is not known. The Coolabah population had not been disturbed by fire for at least 25 years and perhaps 40 years (NPWS 2002). Another population that existed on a property approximately 50 kilometres further west of Coolabah as recently as 1982, but a decade of continual drought in the area, followed by a large bushfire, may have contributed to the demise of the population (L. Miller pers. comm. In NPWS 20020). Kangaroo River State Forest is burnt on a 3-5 year burn cycle at an intensity high enough to remove fine fuel loads (Coffs Harbour Management Area EIS 1995). The burn is broad scale and is not controlled within compartment boundaries. The last recorded fire in the compartment that contains the Coolabah Bertya population was in November 1994. Although the population itself is confined to a rock outcrop and is not burnt, burning the surrounding area may have prevented expansion of the Bertya population by eliminating any seedlings or suckers that do appear (NPWS 2002).

Bertya opponens	(Coolabah Bertya)
Habitat in the CIZ	Previously known from within the proposal site near Bohena Creek (Segment 11), however repeat surveys have not located any individuals. PCTs at this location included: • 148 – Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion • 399 – Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion. Potential habitat is also present in a number of other woodland types in the Pilliga and Pilliga Outwash subregions (see PCT associations below).
Known populations	This plant is currently known from only four scattered sites in central and western NSW: one from private property near Coolabah in western NSW and two to the south of Narrabri on the North West Slopes, including the largest population in Jacks Creek State Forest. The five individuals previously recorded near the Bohena Creek rest area were not able to be located, despite multiple surveys between 2018 and 2020, and it is assumed this population no longer occurs. The fourth population was known from private property near Cobar but this population has not been seen since 1982 and is possibly now extinct (OEH 2020b). Plant densities have been recorded as follows for populations near Narrabri: • In Jacks Creek State Forest the species occurs in densities of up to 24 plants per 100 m^2 (2,400 per hectare), and may total in excess of five million individuals (NPWS 2002). There is limited disturbance at the site, other than by apiarists clearing small areas for sites and the construction and maintenance of fire-breaks. There is prolific regrowth of plants following grading of the fire break adjacent to Jacks Creek State Forest. • At Narrabri Coal Mine, the greatest density of plants was observed along track edges, clearings and within the dense regrowth woodland in the proposed offset site. Density estimations ranged from close to one plant per square metre along track edges in regrowth woodland to less than one plant per 100 square metres in selectively cleared woodland. Densities were mapped for the following categories: 100/ha, 400/ha, 800/ha, 3000//ha and 7000/ha, with the site averaging 1,929/ha. (Ecological 2019). Other than noting that the highest densities occurred along track edges, there is little other description of the disturbances present in the various areas that resulted in the different densities. • An estimated 25,939 individuals were recorded in approximately six hectares of vegetation (4,330 per hectare) that would be impacted by the Narrabri Underground Mine State 3. This species was recorded as single plants but more commonly as patches of plants of varying size and age. The population extends into the adjacent Jacks Creek State Forest (Whitehaven Coal 2020, AMBS 2020).
Survey requirements	Survey months: All months. Coolabah Bertya is a slender shrub to four metres tall. It may be multi-stemmed or have a single trunk up to 70 to 90 millimetres in width. The branches and stems are densely covered with whitish to brown intertwined hairs. The thick leaves are smooth and dark green above and covered in velvety hairs below and are mostly arranged in pairs along the stems. The leaves measure 10 to 80 millimetres long by 5 to 25 millimetres wide and the margins are curved under. The yellow-brown flowers appear during July and August and are followed by rounded seed capsules 8 to 9 millimetres long which contain two to three seeds.

Bertya opponens	(Coolabah Bertya)
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys. • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys • March 2022: six ecologists over nine days – targeted flora searches Surveys included targeted searches for the species during all survey periods, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period despite multiple survey attempts to relocate the known record within the proposal site. No longer assumed to occur near the existing record at Bohena Creek.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH 2017). Given that the population at Bohena Creek was not able to be located despite multiple surveys between 2018 and 2020 it is assumed this population no longer occurs. This portion of the species polygon has been removed following advice provided by BCS in November 2021. Areas of presumed presence in the Pilliga forest were removed following detailed targeted surveys in March 2022.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – No (surveyed) Pilliga Outwash: known. No (surveyed) Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case

Bertya opponens	**(Coolabah Bertya)**
Species polygon vegetation zones and subregions	

Pilliga

Vegetation zone	Habitat
Green Mallee tall mallee woodland – 256 (Good)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest - 398 – (Good)	Yes – surveyed (not recorded)
White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Yes – surveyed (not recorded)
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Yes – surveyed (not recorded)

Pilliga Outwash

Vegetation zone	Habitat
Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland – 148 (DNG)	Yes – surveyed (not recorded)
Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest - 398 – (Mod_shrubs_removed)I	Yes – surveyed (not recorded)
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest - 398 – (Good)	Yes – surveyed (not recorded)
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Yes – surveyed (not recorded)

Table I15 Senecio *garlandii* (Woolly Ragwort)

Senecio garlandii (Woolly Ragwort)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	No polygon prepared
Habitat requirements	Woolly Ragwort occurs on sheltered slopes of rocky outcrops (OEH 2018).
Reproduction requirements	Flowering occurs in spring (OEH 2018).
Habitat in the CIZ	No suitable habitat in the Construction Impact Zone. No sheltered slopes or rocky outcrops. Known and potential habitat fort the species is located to the south of the study area.
Known populations	This daisy is found between Temora, Bethungra and Albury and possibly Burrinjuck near Yass. The largest populations are at The Rock and Mt Tabletop (and surrounds). There is a single population in Victoria at Chiltern (OEH 2018).
Survey requirements	Survey months: All months Woolly Ragwort is a many-branched perennial herb or shrub growing to 1.2 metres tall. It has woolly stems, and large leaves, which are also woolly below, to 15 centimetres long and 8 centimetres wide, with toothed edges. The leaves are stalkless and clasp the stem. The numerous small yellow flower-heads are clustered in sprays. It is readily detectable if present.
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.

***Senecio garlandii* (Woolly Ragwort)**	
Survey results	Species was not observed during any survey period despite being able to be detected during all months of the year. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present. No suitable habitat in the form of sheltered slopes or rocky outcrops are present in the construction impact zone and adjacent areas.
Species polygon guidance and justification	Species was not recorded during suitable conditions to detect the species if present. No suitable habitat is present in the CIZ.
Relevant IBRA subregions	Inland Slopes: known – No (surveyed) Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: not present – Not in BAM-C case Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case
Species polygon vegetation zones and subregions	**Inland Slopes**

Vegetation zone	Habitat
Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185	Yes – surveyed (not recorded) poor quality, existing quarry site

Table I16 *Swainsona plagiotropis* (Red Darling-pea)

***Swainsona plagiotropis* (Red Darling-pea)**	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	No polygon prepared
Reproduction requirements	• Flowering is from August to November, with fruit maturing in November. The species is a perennial, but the lifespan is unknown (OEH 2018). • Plants die back over summer and remain dormant over several months as a subterranean woody root. When temperatures drop and sufficient rains have fallen towards autumn end, the roots begin to resprout. Growth is slow over the cold winter months, but by September plants have produced considerable foliage and buds begin to flower. Most flowers successfully develop into pods, containing an average of 20 seeds. By the beginning of November plants are rapidly maturing and the aerial foliage begins to die back (OEH 2018). • As with most other hard-seeded pea species, it is likely to require fire, prolonged wet conditions or soil disturbance to break the water-impermeable testa of the seed and allow germination. The large numbers present at Jerilderie 18 months after a fire and after two successive wet seasons support this hypothesis. Light grazing also reduces grass cover, maintaining an open sward and allowing sufficient inter-tussock space for germination and establishment (OEH 2018).
Habitat requirements	• Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils (OEH 2018). • Recorded from roadsides, rail reserves, stock routes and areas of lightly grazed unimproved pasture comprising *Rytidosperma*, *Enteropogon acicularis* and *Austrostipa* grassland communities (OEH 2018). • Associated species include Austrostipa aristiglumis, A. nodosa, A. setacea, Homopholis proluta, Chloris truncata, Austrodanthonia caespitosa, A. duttoniana, Enteropogon acicularis, Hordeum spp., Lolium rigidum, Rhodanthe corymbiflora, Calotis scabiosifolia, Microseris lanceolata and Chrysocephalum apiculatum (OEH 2018). • Some form of disturbance (for example, light grazing at appropriate times, occasional soil disturbance or periodic fire) appears to be necessary to reduce competition and enhance seedling growth of *Swainsona plagiotropis* within grassy swards (OEH 2018).

Swainsona plagiotropis (Red Darling-pea)	
Habitat in the CIZ	There is limited suitable grassland habitat in the area of potential habitat for the species at the very southern end of the study area. Potential habitat includes grasslands dominated by *Rytidosperma* and *Austrostipa* species, and *Enteropogon acicularis*. The central and northern sections of the study area are outside the known distribution of the species. The species was not observed during targeted surveys and it considered not to occur within the CIZ.
Known populations	Occurs in the upper Murray River valley in the south-western plains of NSW and into Victoria. Most NSW records are from the Jerilderie area, with possible collections from the Louth-Bourke area and a disjunct record in the north-western plains from Buttabone Stud Park 35 kilometres NW of Warren. Also rare in Victoria, restricted to a few sites in the central north, mostly between Bendigo and the Murray River south of Echuca (OEH 2018).
Survey requirements	Survey months: September. Red Darling Pea is a small prostrate forb to about 15 centimetres high, with densely white-downy stalks. Leaves composed of 13 to 25 narrow leaflets, each 10 to 5 millimetres long and 1 to four millimetres wide. Flowers reddish-purple or bright red, pea-like with a prominent upwardly-curved keel petal. Pod hairy, 15 to 25 millimetres long.
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required. All areas of potential habitat for the species were surveyed. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: known – In BAM-C. No (surveyed) Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: not present – Not in BAM-C case Pilliga Outwash: not present – Not in BAM-C case

***Swainsona plagiotropis* (Red Darling-pea)**	
	Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case
Species polygon vegetation zones and subregions	**Bogan-Macquarie** Vegetation zone: Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good) Habitat: Yes – surveyed (not recorded)

Table I17 *Desmodium campylocaulon* (Creeping Tick-trefoil)

***Desmodium campylocaulon* (Creeping Tick-trefoil)**	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	No polygon prepared
Reproduction requirements	Flowers summer and autumn (OEH 2019b).
Habitat requirements	• Creeping Tick-Trefoil is confined to clay soils, usually with *Astrebla* and *Iseilema* species (OEH 2019b). • In NSW *Desmodium campylocaulon* grows on cracking black soils in the Narrabri, Moree and Walgett local government areas (OEH 2019b). • Associated species include *Acacia harpophylla, Astrebla pectinata* and *Sorghum, Dichanthium* and *Panicum* species (OEH 2019b). • The species is said to be hardy, but grazed where sheep have regular access. Plants are strongly stoloniferous and well-cropped by cattle (OEH 2019b).
Habitat in the CIZ	Suitable habitat in the CIZ is limited to grassland areas around Gilgandra and Narrabri with clay soils. Potential habitat is confined to grasslands dominated by Windmill Grass on alluvial plains. The species was not observed during targeted surveys and it considered not to occur within the CIZ.

***Desmodium campylocaulon* (Creeping Tick-trefoil)**	
Known populations	Occurs chiefly in the Collarenebri and Moree districts in the north-western plains of NSW. Also occurs in the Northern Territory and Darling Downs district of south-eastern Queensland (OEH 2019b).
Survey requirements	Survey months: December to April. May also flower September to November in a good year. *Desmodium campylocaulon* is a prostrate twining herb or erect perennial forb to one metre high, stems long and stout, covered with hooked hairs. Leaves with three leaflets, each lance-shaped, 2-10 centimetres long and 5-20 millimetres wide. Flowers pea-like and numerous, pink or bluish, about 6 millimetres long. Pod saw-like, 15-20 millimetres long, composed of 3-6 segments, downy when young, membranous and slightly net-veined, swollen when ripe but not splitting at maturity.
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year. Targeted surveys were conducted for the species after the exhibited EIS in suitable conditions to be detected if present.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required. All areas of potential habitat for the species were surveyed. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: known – Not in BAM-C case Castlereagh-Barwon: not present – No (removed from BAM-C) Pilliga: not present – Not in BAM-C case Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: known – Not in BAM-C case Northern Basalts: known – No (surveyed)

***Desmodium campylocaulon* (Creeping Tick-trefoil)**	
Species polygon vegetation zones and subregions	**Castlereagh Barwon**

Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	No suitable habitat present. No cracking black soils. Proposal on eastern edges of this subregion
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat present. No cracking black soils. Proposal on eastern edges of this subregion

Northern Basalts

Vegetation zone	Habitat
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Yes – surveyed (not recorded)

Table I18 *Homopholis belsonii* (Belson's Panic)

***Homopholis belsonii* (Belson's Panic)**	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	No polygon prepared
Reproduction requirements	• Flowering occurs February–May (Sharp & Simon 2001) and possibly November–December as fruiting has been recorded in February (Leigh et al. 1984). • The exact viability time for seeds is not known. However, initial trials have indicated that it germinates readily without the need for a dormancy period (Menkins 1998; Trémont and Whalley 1993a). • Dispersal of seed occurs when the panicle dries after seed formation and breaks off in the wind. The wind causes the panicle to migrate forward in a continuous rolling motion until an obstacle is encountered (Menkins 1998). Menkins (1998) suggests that the seed is then discarded with the further drying of the panicle (DEE 2020).
Habitat requirements	• Grows in dry woodland (eg Belah) often on poor soils, although sometimes found in basalt-enriched sites north of Warialda and in alluvial clay soils (OEH 2019b). • Occurs at elevations from 200 metres to 520 metres ASL. (Threatened Species Scientific Committee 2008) • Occurs in Brigalow Belt South Bioregion on rocky hills supporting *Eucalyptus albens* (White Box), in *Geijera parviflora* (Wilga) woodland, flat to gently undulating alluvial areas supporting *Casuarina cristata* (Belah) forest and soil and plant communities of *Eucalyptus populnea* (Poplar Box) (Threatened Species Scientific Committee 2008). • Generally found among fallen timber at the base of trees or shrubs or along the bottom of netting fences (Threatened Species Scientific Committee 2008d).
Habitat in the CIZ	Species habitat lies primarily in the north of the study area near Narrabri, with potential habitat in the area around Gilgandra. Vegetation communities with alluvial clay soils that have the potential to support the species are found within these areas. Potential habitat within the Northern Basalts subregion was excluded based on consultation with BCS. The species was not observed during targeted surveys and it considered not to occur within the CIZ.
Known populations	It occurs on the northwest slopes and plains of NSW, mostly between Wee Waa, Goondiwindi and Glen Innes. It also occurs in Queensland, mainly in the Brigalow Belt South bioregion. (OEH 2019b)

***Homopholis belsonii* (Belson's Panic)**	
Survey requirements	Survey months: December to April Use flowers to locate. Species grows under shrubs and trees and can be easily overlooked. May prefer slightly modified environments (OEH 2019b).
Survey effort	Flora surveys were conducted in the following months: • September 2018: five days, two ecologists – rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, four ecologists – flora plot surveys and threatened flora searches • March 2019: four ecologists over 10 days – flora plot surveys and threatened flora searches • September 2019: three ecologists over 10 days – targeted flora searches and flora plot surveys • September 2020: two ecologists over eight days – targeted flora searches • October 2020: two ecologists over eight days – targeted flora searches • November 2020: six ecologists over five days – targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Species was not observed in any survey period despite targeted surveys during an appropriate time of the year.
Species polygon guidance and justification	The species was not recorded during suitable conditions to detect the species if present and therefore no species polygon is required. All areas of potential habitat for the species were surveyed where appropriate. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: predicted – Removed from BAM-C case based on BCS consultation Pilliga: not present – Not in BAM-C case Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: known – No (removed from BAM-C case)

Homopholis belsonii (Belson's Panic)

Species polygon vegetation zones and subregions

Castlereagh-Barwon

Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (DNG)	No suitable habitat – Species excluded based on consultation with BCS
Western Rosewood - Wilga – Wild Orange - Belah low woodland – 145 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion – 444 (Good)	No suitable habitat – Species excluded based on consultation with BCS

Northern Basalts

Vegetation zone	Habitat
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box - Belah woodland on clay-loam soils on alluvial plains on north central NSW – 56 (DNG)	No suitable habitat – Species excluded based on consultation with BCS

Candidate flora species excluded

Table I19 Platyzoma microphyllum (Braid Fern)

Platyzoma microphyllum (Braid Fern)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	Whilst this species has a limited geographic distribution in NSW it is a partnership species (ie <10 percent of total abundance/distribution in NSW) that is not listed nationally. Therefore, it is not considered a candidate species for a SAII (OEH, 2018).
EPBC Act Status	Vulnerable
Species polygon area	None
Reproduction requirements	• Fertile plants of *Platyzoma microphyllum* have been recorded throughout most of the year (OEH, 2018). • Populations can form tussocks or colonies up to several metres across; in NSW the fern forms very localised and clumped populations (OEH, 2018).
Habitat requirements	• Grows in sandy or swampy soils, or in clay soils adjacent to streams and lagoons and subject to periodic flooding (OEH, 2018). • Recorded in NSW at Bruxner Highway growing as one localised patch in deep sandy soil, with *Leptospermum* species, *Brachyloma daphnoides* and Lomandra species (OEH, 2018). • The fern was growing at Bebo State Forest in *Angophora* and *Callitris* woodland in sandy soil, and a very open sunny position also in sandy soil (OEH, 2018). • Other associated species include Hakea dactyloides, Brachyloma daphnoides, Jacksonia scoparia, Xylomelum cunninghamii and Calytrix tetragona (OEH, 2018).
Habitat in the CIZ	This species has been excluded as a candidate species due to its known distribution occurring outside the study area. There are no records of the species in the locality or known populations in the region, with the only known records in NSW located in the Yetman district, over 170 kilometres north-east of the northern end of the CIZ. The species is therefore unlikely to occur in the CIZ.
Known populations	• Recorded in NSW only in the Yetman district. The species is widespread across northern Australia, from WA to the NT, eastern Qld and just into central-northern NSW (OEH, 2018).
Survey requirements	Survey months: All months. Fertile plants of *Platyzoma microphyllum* have been recorded throughout most of the year.
Survey effort	As this species was excluded from being a candidate species, no targeted surveys were conducted for the species.
Survey results	Species was not observed during any survey period and no targeted surveys were conducted.

Platyzoma microphyllum (Braid Fern)	
Species polygon guidance and justification	Species was not recorded during the survey period as no targeted surveys were required for this excluded species. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: predicted – Not in BAM-C case Pilliga: not present – Not in BAM-C case Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: known – Not in BAM-C case
Species polygon vegetation zones and subregions	There are no vegetation zones relevant for this excluded species.

Table I20 *Monotaxis macrophylla* (Large-leafed Monotaxis)

Monotaxis macrophylla (Large-leafed Monotaxis)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Habitat requirements	• Grows on rocky ridges and hillsides (OEH, 2019b). • The distribution and supposed rarity of *Monotaxis macrophylla* within NSW is related to the occurrence of fire. At least within NSW, the species has not been found in the absence of fire (OEH, 2019b). • There is a great diversity in the associated vegetation within NSW (less though in Queensland), encompassing coastal heath, arid shrubland, forests and montane heath from almost sea level to 1300 metres altitude (OEH, 2019b). • Many hundreds of plants have been observed growing with *Muehlenbeckia costata* on recently burnt rock outcrops. Plants are recorded as common but localised in populations. In the northern NSW sites, *Monotaxis macrophylla* was locally abundant on outcrops especially where burnt (OEH, 2019b).

***Monotaxis macrophylla* (Large-leafed Monotaxis)**	
Reproduction requirements	• *Monotaxis macrophylla* displays the properties of a fire ephemeral species in many ways. Germination is stimulated by the passage of fire, individual plants have a short life span, a large biomass is produced in a short period of time, flowering occurs shortly after germination, and populations do not persist in the absence of fire (OEH, 2019b). • Flowers in August. Plants have a short life span and do not seem to persist longer than six months. Plants germinate, attain heights of up to 50 centimetres and reach flowering stage within two to three months (OEH, 2019b).
Habitat in the CIZ	This species has been excluded as a candidate species due to there being no records within the locality and limited potential habitat in the study area. The nearest records of the species are over 40 kilometres to the east on the eastern boundary of the Pilliga State Forest. There is very limited rocky ridge and hillslope habitat in the study area. The species is therefore unlikely to occur in the CIZ.
Known populations	Large-leafed Monotaxis is recorded from several highly disjunct populations in NSW: eastern edge of Deua NP (west of Moruya), Bemboka portion of South East Forests National Park, Cobar area (Hermitage Plains), the Tenterfield area, south west of Boggabri on the western edge of Pilliga Nature Reserve and Woodenbong (near the Queensland border). It is also in Queensland. A recent record from the eastern spur of the Nandewar Range is in the Namoi catchment (OEH, 2019b).
Survey requirements	Survey months: August to February Survey within six months of disturbance or fire, if possible. Species is a short-lived annual, and will not be present unless a recent disturbance/fire event has occurred and triggered germination (OEH, 2019b).
Survey effort	Due to a lack suitable microhabitats on rocky ridges and hillsides within the proposal site that occur within known PCT associations this species was excluded from being a candidate species and no targeted surveys were conducted for the species.
Survey results	Species was not observed during any survey period and no targeted surveys were conducted due to a lack of suitable known PCT associations on rocky ridges and hillsides in the proposal site.
Species polygon guidance and justification	Species was not recorded during the survey period as no targeted surveys were required for this excluded species. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: not present – Not in BAM-C case Pilliga: known – No (removed) no suitable rocky ridges and hillside microhabitats associated with known PCTs Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case

Monotaxis macrophylla (Large-leafed Monotaxis)	
Species polygon vegetation zones and subregions	There are no vegetation zones relevant for this excluded species within the proposal site.

Table I21 *Digitaria porrecta* (Finger Panic Grass)

Digitaria porrecta (Finger Panic Grass)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Reproduction requirements	• Flowering season is summer or late summer from mid-January to late February, with seeds maturing and falling from the plant soon after. • *Digitaria porrecta* is a perennial tussock-forming grass that can vegetatively reproduce (OEH, 2019b).
Habitat requirements	• In NSW, the most frequently recorded associated tree species are *Eucalyptus albens* and *Acacia pendula*. Common associated grasses and forbs in NSW sites include *Austrostipa aristiglumis, Enteropogon acicularis, Cyperus bifax, Hibiscus trionum* and *Neptunia gracilis* (OEH, 2019b). • Often found along roadsides and travelling stock routes where there is light grazing and occasional fire (OEH, 2019b). • Native grassland, woodlands or open forest with a grassy understorey, on richer soils (OEH, 2019b). • Fire, livestock grazing and trampling, and physical disturbance of habitat by road and farm machinery are types of disturbances known to occur in Digitaria porrecta sites. Field observations indicate that the grass does continue to persist in such habitats but the effect of the disturbances on the long term capability of the species to maintain a viable population is unknown.
Habitat in the CIZ	This species has been excluded as a candidate species due to there being no records within the locality. Records near Coonabarabran are over 25 years old and located over 30 kilometres to the east of the study area. There are two records about 10 kilometres to the north-west of Narrabri located along road reserves.
Known populations	Finger Panic Grass occurs in NSW and Queensland. In NSW it is found on the North West Slopes and Plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran. It largely occurs on private land (OEH, 2019b).

***Digitaria porrecta* (Finger Panic Grass)**	
Survey requirements	Survey months: January to February Use flowers to identify. Survey mid-January to late February. Seeds mature and fall from the plant soon after flowering (OEH, 2019b).
Survey effort	As this species was excluded from being a candidate species, no targeted surveys were conducted for the species as no known or predicted vegetation zones or habitats occur in the proposal site for this species.
Survey results	Species was not observed during any survey period and no targeted surveys were conducted.
Species polygon guidance and justification	Species was not recorded during the survey period as no targeted surveys were required for this excluded species. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: known – Removed from BAM-C case based on BCS consultation Pilliga: known – No (removed) no suitable known PCTs Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: known – Removed from BAM-C case based on BCS consultation Northern Basalts: known – Removed from BAM-C case based on BCS consultation
Species polygon vegetation zones and subregions	Castlereagh-Barwon

Vegetation zone	Habitat
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion – 27 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW – 56 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW – 56 (DNG)	No suitable habitat – Species excluded based on consultation with BCS
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion – 444 (Good)	No suitable habitat – Species excluded based on consultation with BCS

Digitaria porrecta (Finger Panic Grass)	

Liverpool Plains

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	No suitable habitat – Species excluded based on consultation with BCS

Northern Basalts

Vegetation zone	Habitat
Belah woodland on alluvial plains and low rises – 55 (Good)	No suitable habitat – Species excluded based on consultation with BCS
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat – Species excluded based on consultation with BCS

Table I22 *Sida rohlenae* (Shrub Sida)

Sida rohlenae (Shrub Sida)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Reproduction requirements	Flowers appear in spring and summer (OEH, 2020b).
Habitat requirements	• Shrub Sida grows on flood-out areas, creek banks and at the base of rocky hills (OEH, 2020b). • NSW specimens have been found along roadsides in hard red loam to sandy-loam soils. The species can become locally abundant and is often more common in disturbed sites (OEH, 2020b).
Habitat in the CIZ	This species has been excluded as a candidate species due to there being no records within the locality and a limited area of mapped known habitat in the study area. The nearest records of the species are over 50 kilometres to the west of Narrabri and

***Sida rohlenae* (Shrub Sida)**	
	from over 20 years ago. Within the area of mapped habitat where the species may occur there are limited flood-out areas and rocky hills to provide potential habitat for the species. The species is therefore unlikely to occur in the CIZ.
Known populations	Shrub Sida has a limited distribution in Queensland, the Northern Territory, South Australia and Western Australia. In NSW it has been recorded south of Enngonia, south of Bourke and north-west of Coonamble with one collection north of Bourke which is likely to have been transported from Queensland (OEH, 2020b).
Survey requirements	Survey months: September to February Flowering and fruiting across whole distribution should occur between Sep - Feb. Survey multiple times over the specified months if not found during the first survey (OEH, 2020b).
Survey effort	As this species was excluded from being a candidate species, no targeted surveys were conducted for the species.
Survey results	Species was not observed during any survey period and no targeted surveys were conducted as no known or predicted vegetation zones or habitats occur in the proposal site for this species.
Species polygon guidance and justification	Species was not recorded during the survey period as no targeted surveys were required for this excluded species. Therefore, no species polygon was required.
Relevant IBRA subregions	Inland Slopes: not present – Not in BAM-C case Bogan Macquarie: not present – Not in BAM-C case Castlereagh-Barwon: predicted. Removed from BAM-C due to lack of suitable habitats Pilliga: not present – Not in BAM-C case Pilliga Outwash: not present – Not in BAM-C case Liverpool Plains: not present – Not in BAM-C case Northern Basalts: not present – Not in BAM-C case
Species polygon vegetation zones and subregions	**Castlereagh-Barwon**

Vegetation zone	Habitat
Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Lack of suitable microhabitats
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW – 56 (Good)	Lack of suitable microhabitats
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW – 56 (DNG)	Lack of suitable microhabitats

***Sida rohlenae* (Shrub Sida)**		
	Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion – 88 (Good)	Lack of suitable microhabitats
	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – 244 (Good)	Lack of suitable microhabitats

Table I23 Homoranthus darwinioides (Fairy Bells)

Homoranthus darwinoides (Fairy Bells)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Reproduction requirements	Flowers appear in spring or from March to December (OEH, 2020b).
Habitat requirements	• Fairy Bells grow in various woodland habitats with shrubby understoreys, usually in gravelly sandy soils (OEH, 2020b). • Landforms the species has been recorded growing on include flat, sunny ridge tops with scrubby woodland, sloping ridges, gently south-facing slopes, and a slight depression on a roadside with loamy sand (OEH, 2020b).
Habitat in the CIZ	This species has been excluded as a candidate species due to there being no records within the locality and a very restricted distribution of the species within the subregion. The nearest records of the species are over 30 kilometres to the south-east of Gilgandra in the Goonoo State Conservation Area, with the only other records of the species within the subregion located over 140 kilometres to the east near Merriwa. Within the area of mapped habitat where the species may occur there is limited ridge and slope habitat that the species is generally associated with to provide potential habitat for the species. All 87 records of the species within the subregion occur within Goonoo State Conservation Area, with the exception of three. The species is therefore unlikely to occur in the CIZ.
Known populations	The species is Rare in the 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 Musswellbrook to Goonoo SCA. The species has been collected from Lee's Pinch, south-west of Merriwa, but not relocated at its original locality north of Mt Coricudgy above the headwaters of Widden Brook (OEH, 2020b).
Survey requirements	Survey months: March to December Flowers sporadically between March to December. Survey multiple times throughout the year if not flowering when initially surveyed (OEH, 2020b).
Survey effort	As this species was excluded from being a candidate species, no targeted surveys were conducted for the species.
Survey results	As this species was excluded from being a candidate species, no targeted surveys were conducted for the species.
Species polygon guidance and justification	Species was not recorded during the survey period as no targeted surveys were required for this excluded species. Therefore, no species polygon was required.

***Homoranthus darwinoides* (Fairy Bells)**	
Relevant IBRA subregions	Inland Slopes – not present – Not in BAM-C case Bogan Macquarie – not present – Not in BAM-C case Castlereagh-Barwon – not present – Not in BAM-C case Pilliga – not present – predicted. Removed from BAM-C due to lack of suitable habitats Pilliga Outwash – not present – Not in BAM-C case Liverpool Plains – not present – Not in BAM-C case Northern Basalts – not present – Not in BAM-C case
Species polygon vegetation zones and subregions	**Pilliga**

Vegetation zone	Habitat
Broombush - wattle very tall shrubland – 141 (Good)	Lack of suitable microhabitats on flat plain and previously burnt.
Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Lack of suitable microhabitats and existing borrow pit site.
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion – 746 (Good)	Lack of suitable microhabitats and site already mostly cleared by landholder.

Candidate fauna species that require a species polygon

Table I24 Barking Owl

Barking Owl (*Ninox connivens*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only)
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	258.4 ha
Breeding requirements	• Nesting generally occurs during mid-winter and spring. Laying tends to occur in August, and fledging in November (EES 2019b). • Living or dead trees with hollows greater than 20 centimetre diameter and greater than four metres above the ground (EES 2019b). • Nest trees are usually located near watercourses or wetlands (Higgins 1999). • Kavanagh et al. (1995) described the species' preferred habitat as primarily open woodland or semi-cleared land near creeks and rivers, particularly with one or more species of red gums, that contain a number of large trees for nesting and roosting. • Debus (1997) notes that the Barking Owl has narrow roosting requirements, roosting in dense riparian trees. • In the Pilliga, the pattern of records closely followed the distribution of the non-commercial box *Eucalyptus albens, E. pilligaensis, E. populnea* forests and woodlands, which are mainly restricted to the extensive clay and sand flats that characterise landscapes in the Pilliga Outwash. These are areas of higher soil nutrient status and increased plant productivity and higher prey numbers compared with the low sandstone ridges of the eastern and southern Pilliga (Milledge 2004). • Barking Owl territories in the Pilliga were estimated by Milledge (2004) by fitting a polygon of about 6000 hectares (based on Schedvin et al. 2001), which was consistent with current knowledge of Barking Owl home range size in similar forests and woodlands. These are mapped in the figure below (known populations).
Habitat requirements	• Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (eg in Acacia and Casuarina), or dense eucalypt canopy (EES 2019b). • Barking Owl records from the lower Macquarie floodplain region (Shelly 2006) and Darling Riverine Plains Bioregion (Gosper 2002) suggest a strong link to River Red Gum woodlands / forests. Debus (1997) notes that in non-coastal situations, the Barking Owl may be a more strictly riparian bird. • Requires very large permanent territories in most habitats due to sparse prey densities. Territories range from 30 to 200 hectares (EES 2019b). • Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch (EES 2019b).

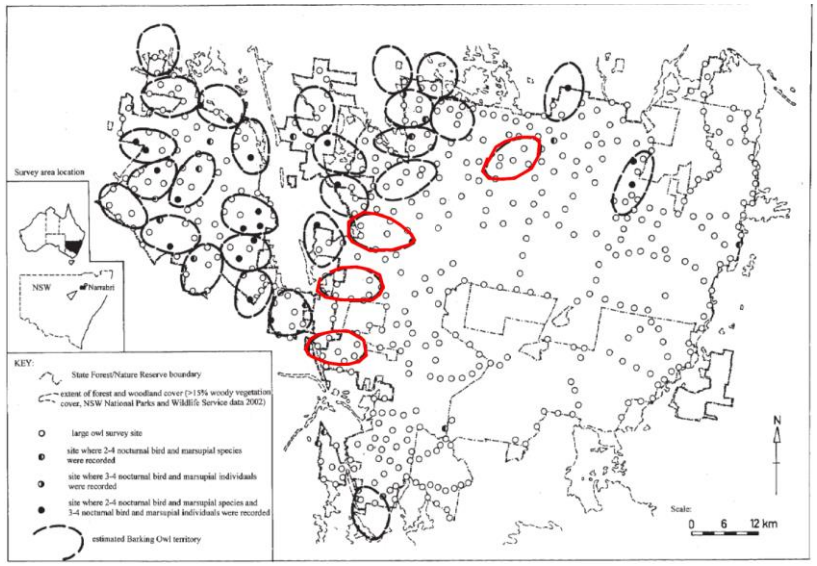
Barking Owl (*Ninox connivens*)	
	• In the Pilliga, diet biomass comprises 56 percent birds, 29 percent Sugar Gliders, with the remainder comprising other mammals and insects (Stanton 2011). Insects are likely to be an important seasonal diet item and occupy a large proportion of foraging effort (Stanton 2011). • On the western slopes of NSW large areas of forest on public land are likely to support populations of the Barking Owl, whereas small fragments on private land are unlikely to support this species (Debus 2001).
Habitat in the study area	• The main area of habitat for the Barking Owl in the proposal site is associated with the western and northern sections of the Pilliga. Potential breeding habitat is present along creek lines that are crossed by the proposal in this area. Large, hollow-bearing River Red Gums and Blakely's Red Gums are present in these locations. • Potential breeding and foraging habitat is also present along the Namoi River, Castlereagh River and Macquarie River. • Based on the distribution of records (EES 2019a), the Barking Owl is less likely to occur in small woodland patches or creek lines in agricultural land.
Known populations	**Pilliga forests** • Surveys in 2001 demonstrated that the Pilliga forests supported the largest Barking Owl population in southern Australia (EES 2019b). The survey for large owls in the Pilliga was conducted at 510 sites selected to give comprehensive coverage of the major blocks of forest and woodland in the area. These blocks were mostly contained within State Forests and the Pilliga Nature Reserve (Milledge 2004), and covered the N2N alignment and surrounding areas. • The population was found to occur in the western and northern parts of the Pilliga forests, and this distribution correlated with the distribution of the Pilliga outwash geology formation and negatively correlated with the occurrence of wildfires that typically affect areas underlain by the Pilliga Sandstone (Milledge 2004; Soderquist 2009). The location of the Barking Owl population in this area is likely linked to the more productive land associated with the Pilliga Outwash (Stanton 2011). • The pattern of Barking Owl records closely follows the distribution of the non-commercial box *Eucalyptus albens, E. pilligaensis, E. populnea* forests and woodlands, which are mainly restricted to the extensive clay and sand flats that characterise landscapes in the western and northern Pilliga compared with the low sandstone ridges of the eastern and southern Pilliga (Milledge 2004). • Debus (2002) recorded two pairs of Barking Owls in the Pilliga five kilometres apart in State Forest, on intermittently flowing creeks within extensive woodland. A fifth bird in the Pilliga was on the edge of the forest, near intermittent and permanent creeks on well-wooded private land, four kilometres from one of the pairs. • Forestry Corp provided the locations of three known nest trees that occur near the alignment in the Pilliga area. At one of these trees (Rocky Creek), a Barn Owl was observed. Known nest trees also occur at Etoo Creek and Baradine Creek. • The species has been recorded in various State Forests of the Pilliga: Yarrigan, Pilliga West and Cumbil/Euligal (E. M. Date in Debus 1997a); Cumbil/Euligal and Pilliga East (R. Kavanagh, C. Turbill, D. Paull, pers. comm. in Debus 2001). Breeding was recorded in Cumbil and Euligal State Forests in 1997 and 1998 (R. Kavanagh in Debus 2001). • Pilliga Scrub: well-wooded private land on Baradine Creek adjoining Merriwindi SE Kenebri (one survey point); Cumbil SF, Kenebri (two survey points). Overnight camp within one kilometre of Baradine Ck point. Both owl species previously reported in Pilliga Scrub (in 1990-96: Debus and Rose 1994; Debus 1997a). Masked Owl recorded at Baradine Creek site; pair of Barking Owls

Barking Owl (*Ninox connivens*)

recorded at each of the Cumbil SF sites (Etoo Creek near Aloes Well, and Cumbil Forest Creek). Also incidental record of a Barking Owl near the Baradine Creek site (Debus 2001).

Other areas

- NPWS (2003) notes that the Barking Owl has previously been recorded in the Narromine, Gilgandra, Coonamble and Coonabarabran and Narrabri local government areas. Records show most records are from the western Pilliga, other large forested areas, and along large rivers such as the Namoi River, Castlereagh River and Macquarie River. Few records are from cleared agricultural land (EES 2019a).
- The survey results of Debus (2001), particularly for the Pilliga forests, suggest that on the western slopes of NSW large areas of forest on public land are likely to support populations of both Barking and Masked Owls, whereas small fragments on private land are unlikely to support either species.
- In the Darling Riverine Plains bioregion Barking Owls are associated with major watercourses and wetland systems with riparian vegetation (Gosper 2002).
- Proximity to watercourses was found to be significantly correlated with sites at which the species was found in the Brigalow Belt bioregion, however the combination of variables related to rainfall, temperature and the amount of woody vegetation within a 10 kilometre radius had the highest explaining power (NPWS 2002).



Estimated Barking Owl distribution and territories from Milledge (2004), based on results of owl and prey surveys. Small circles denote survey locations. Darker, dashed circles denote territories. Territories in red are those intersected by the N2N alignment.

Barking Owl (*Ninox connivens*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – habitat assessments – no Pilliga surveys) • November 2018 (10 days, two ecologists – habitat assessments, eight nights of nocturnal surveys along the alignment) – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – trapping and bird surveys in the Pilliga) • March 2019 (5 nights, two zoologists – nocturnal surveys in the Pilliga, including call playback) • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, one night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga) • June 2020 (two ecologists, two days and one night in the Gilgandra area) • November 2020 (2 nights in the Pilliga and Bohena Creek) • July 2021 (1 night in the Narromine area, two ecologists) • July 2021 (4 nights in the Pilliga and one night in the Bohena Creek area, two ecologists) • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, two ecologists). Diurnal surveys included habitat assessments and searches for signs of nesting at large hollow-bearing trees along creek lines (eg whitewash, feathers, owl pellets). Nocturnal surveys were conducted at various locations along the alignment in November 2018, August 2019 and September/October 2019 and included spotlighting and call playback for the Barking Owl. Targeted nocturnal surveys were conducted in March in the Pilliga and included spotlighting and call playback for the Barking Owl. Call playback was limited during winter to limit possible disruption of nesting. Spotlighting was also conducted in the Pilliga and Bohena Creek area on five nights in July 2021 in conjunction with the thermal drone surveys. Four known nest tree locations in the vicinity of the alignment were provided by Forestry Corp in March 2019. One was outside the alignment (about one kilometre), and two appeared to be within a few metres of each other. The nest trees in close proximity to the alignment were inspected during diurnal surveys for signs of occupation. At one of these locations a Barn Owl was observed, and may be using the hollow previously used by the Barking Owl.
Survey results	Two Barking Owls were possibly recorded during surveys in November 2020. An owl was observed flying along Coes Creek Road following call playback at nearby Rocky Creek, and observers were swooped by an owl following call playback at Etoo Creek. Neither was observed in detail, however the close proximity to the call playback makes it likely these were Barking Owls. Feathers collected were identified by the Australian Museum as Boobook. Other owls recorded included the Southern Boobook (*Ninox novaeseelandiae*) at various locations (Macquarie River at Narromine, Ewenmar Creek near Collie Road, Kickabil Creek at Gilmours Road, Leeches Creek Road south-west of Gilgandra, and various locations in the Pilliga), and the Eastern Barn Owl (*Tyto javanica*) in the Pilliga and north of Narrabri in agricultural land.

Barking Owl (*Ninox connivens*)	
Species polygon guidance	Habitat constraints: Hollow-bearing trees (living or dead trees with hollows greater than 20 centimetre diameter and greater than four metres above the ground). Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). **Polygon** Where any known nest tree(s) occurs on site (eg known from existing data, studies or other documented evidence), a species polygon providing a circular buffer with a 100 metre radius should be drawn around the known nest tree(s). In addition, or where there are no known nest trees on site, assessors should apply the following process: 1. Look for signs of breeding on site as follows; suitable habitat AND (a) presence of male and female OR (b) calling to each other (duetting) OR (c) find nest. 2. Where signs of breeding on site are present, potential nest trees should be identified. Potential nest trees are living or dead trees with hollows greater than 20 centimetre diameter and greater than four metres above the ground. 3. Where potential nest trees are identified on site then, night monitoring at the identified potential nest locations for a minimum of two nights should be undertaken to detect the presence of any owl of this species using a potential nest tree or demonstrating behaviour focussed on a potential nest tree (eg investigating the hollow or roosting within 10 metres). DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements). 4. If monitoring of potential nest trees detects this owl species using, or demonstrating behaviour focussed on the trees (eg investigation of the hollow or roosting within 10 metres) on site, the species polygons should be drawn around those trees (ie the identified potential nest trees where any owl of this species is observed using or focussing behaviour around the tree). The species polygons should be circular in shape and must include a buffer radius of 100 metres around each tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for male roosts, feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. The species uses paddock trees to extend foraging area from intact woodland. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear, and the nest tree is already located near the edge of the wooded area. **Further advice (BSM-3054)** Further advice from BCS was requested regarding mapping breeding habitat for dual credit bird species where presence is assumed, and the polygons have been updated with reference to the advice provided.

Species polygon justification	Three known breeding sites were identified in close proximity to the alignment in the Pilliga forests by Forestry Corp. Barking Owls were recorded near two of these sites in the November 2020 surveys. While detailed surveys did not identify any additional nest trees, it is assumed additional breeding territories would be impacted given the size and location of the proposal. Breeding habitat is mapped in areas associated with major watercourses in the southern portion of the study area, as Gosper (2002) notes that in the Darling Riverine Plains bioregion Barking Owls are associated with major watercourses and wetland systems, Debus (1997) notes that the Barking Owl has narrow roosting requirements, roosting in dense riparian trees, and Kavanagh et al (1995) describes preferred habitat in inland areas as being associated with riparian areas. Riparian corridors where surveys have been conducted and the species not recorded have been excluded from the species polygon. The Barking Owl is also known to breed in large expanses of forest, with a large population known from the Pilliga. The main distribution in the Pilliga forests is association with the Pilliga Outwash subregion as this has high productivity, higher density of prey and fewer fires (Milledge 2004, Stanton 2011). Forestry records of Barking Owl nests near the alignment are located along major creeks (Baradine Creek, Etoo Creek and Rocky Creek), however Milledge (2004) found higher incidence of records in *Eucalyptus albens, E. pilligaensis, E. populnea* forest types. Records of Barking Owls during surveys for the proposal were near Etoo Creek and Rocky Creek. Milledge (2004) assumed home ranges were around 6000 hectares in the Pilliga. Based on the above information, a number of potential breeding polygons have been located along the alignment, with a particular focus on the Pilliga Outwash portion of the Pilliga forests, and to a lesser degree the Pilliga subregion portion of the forest. Breeding habitat is considered to be mainly associated with riparian areas (PCT 399) and Pilliga Box vegetation (PCT88) in the Pilliga forests. A higher density of breeding polygons are located in the western portion, where there is a higher incidence of these preferred vegetation types. Large expanses of ironbark forest are not considered breeding habitat unless it is associated with PCT 399 or PCT 88. Species polygons in the Pilliga forests are identified as follows: • All areas of PCT 399, plus a buffer of 500 metres either side of this PCT, to account for the linear nature of the alignment. This captures other PCTs that are associated with this species, but are not necessarily their preferred breeding habitat. • Areas of PCT 88. This allows for around 21 breeding territories along the alignment through the Pilliga forests, which is substantially more than estimated by Milledge (2004), whose mapping shows three possible territories being intersected by the proposal. It is noted that additional territories may fit within the gaps that were not detected, however the estimate here would likely still be higher than could be mapped if additional territories were found to be occupied. As such, based on the home range of 6,000 hectares and locations of suitable breeding habitat, the number of breeding areas mapped in the species polygon would be the maximum density for this species in the Pilliga. Even if each suitable breeding area was occupied, no additional breeding territories could be mapped. Outside the Pilliga, breeding habitat is likely to be associated with good quality riparian habitat associated with larger patches of vegetation, rather than small fragments (Gosper 2002; Debus 2001; Debus 2011; Kavanagh et al. 1995), with a preference for red gums (Gosper 2002; Kavanagh et al. 1995). Species polygons outside the Pilliga forests are identified as follows: • Habitat within 500 metres of a 3rd order stream or above with good connectivity to larger areas of vegetation, with riparian vegetation containing River Red Gums, Blakeley's Red Gum, or Poplar Box. Areas of suitable habitat identified above that were surveyed but not evidence of the species found are excluded from the species polygons.

Barking Owl (*Ninox connivens*)			
	All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: Yes – surveyed (habitat) Pilliga Outwash: Yes – surveyed (present) Pilliga: Yes – surveyed (present) Liverpool Plains: Yes – surveyed (habitat) Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan Macquarie	0	Crop and/or introduced grassland	No breeding habitat present
	36	River Red Gum tall to very tall open forest/woodland wetland (Good)	Associated PCT Suitable breeding habitat present in riparian vegetation, not recorded during targeted surveys
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland (Good)	Not associated PCT Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas, no connectivity to larger patches
	248	Mixed box eucalypt woodland (Good)	Associated PCT Suitable breeding habitat present in riparian vegetation, not recorded during targeted surveys
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills (Good)	Associated PCT

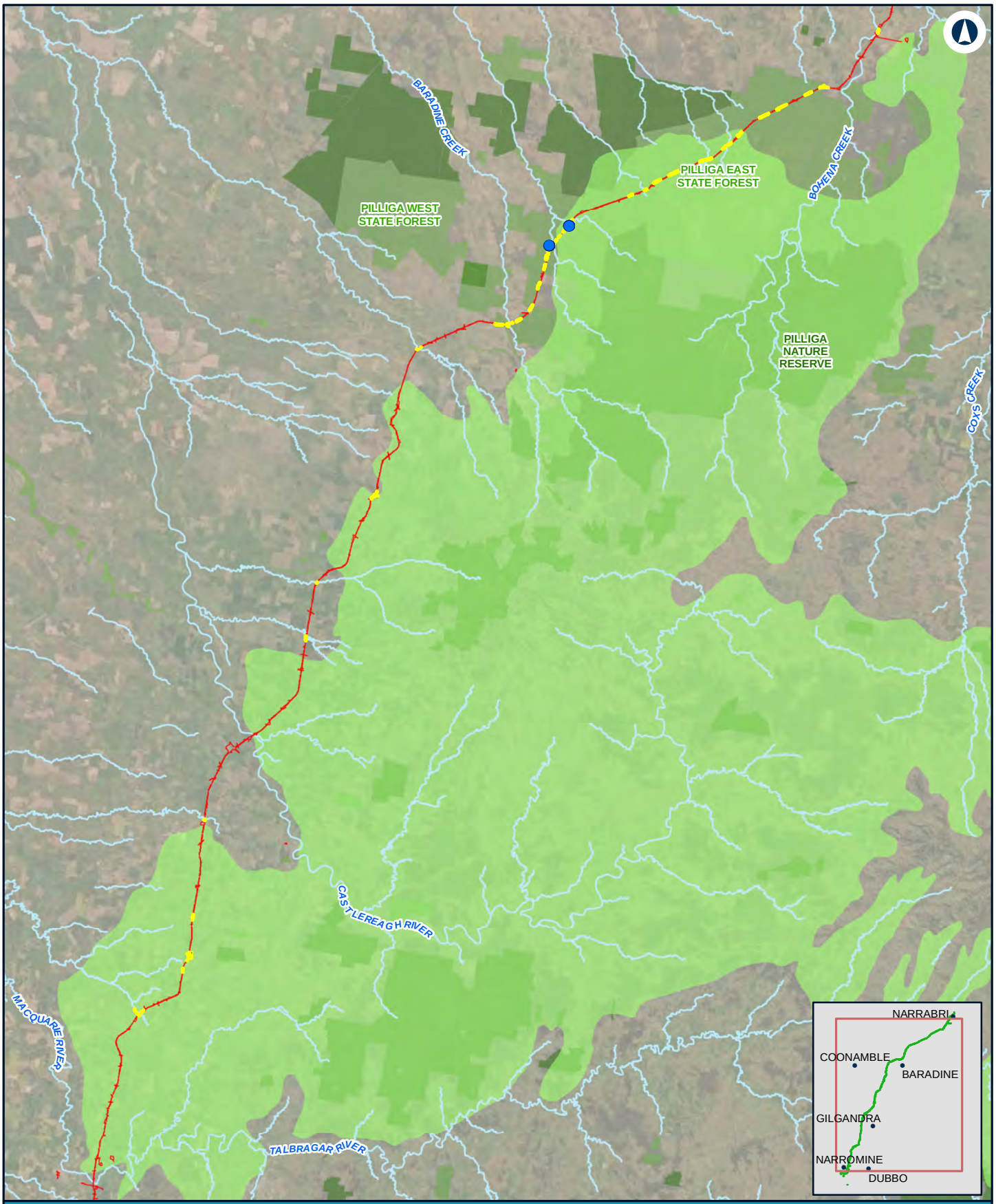
Barking Owl (*Ninox connivens*)			
			Suitable breeding habitat present in riparian vegetation, no connectivity to larger patches
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland – 56 (DNG)	Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable breeding habitat – lack of canopy
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Not suitable breeding habitat – lack of suitable hollows
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas

Barking Owl (*Ninox connivens*)			
Pilliga	0	Crop and/or introduced grassland – 0	No suitable nesting habitat – lack of canopy
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	No suitable nesting habitat – lack of canopy
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable nesting habitat – lack of canopy
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable nesting habitat – lack of canopy
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable nesting habitat – lack of canopy
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT No suitable nesting habitat – lack of hollow-bearing trees
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable nesting habitat – lack of canopy

Barking Owl (*Ninox connivens*)		
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
256	Green Mallee tall mallee woodland – 256 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Nesting habitat may occur if near riparian areas
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	No suitable nesting habitat – lack of canopy
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Nesting habitat may occur if near riparian areas

Barking Owl (*Ninox connivens*)			
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Nesting habitat may occur if near riparian areas
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
Pilliga Outwash	0	Crop and/or introduced grassland – 0	No suitable nesting habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	No suitable nesting habitat – lack of canopy
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable nesting habitat – lack of canopy
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	No suitable nesting habitat – lack of canopy
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	141	Broombush - wattle very tall shrubland – 141 (Good)	No suitable nesting habitat – lack of canopy
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Associated PCT No suitable nesting habitat – lack of hollow-bearing trees
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	No suitable nesting habitat – lack of canopy
	168	Derived Copperburr shrubland – 168 (Good)	No suitable nesting habitat – lack of canopy

Barking Owl (*Ninox connivens*)			
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Nesting habitat may occur if near riparian areas
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No suitable nesting habitat – lack of canopy
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	No suitable nesting habitat – lack of canopy
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Associated PCT Not suitable breeding habitat – canopy removed
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable nesting habitat – lack of canopy



NARROMINE TO NARRABRI Fauna Species Polygons - Barking Owl (Breeding) - Pilliga MAP 1 OF 3

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Barking Owl (Breeding) species polygon
- Barking Owl (Breeding) GHD record (November, 2020)

IBRA subregion

- Pilliga

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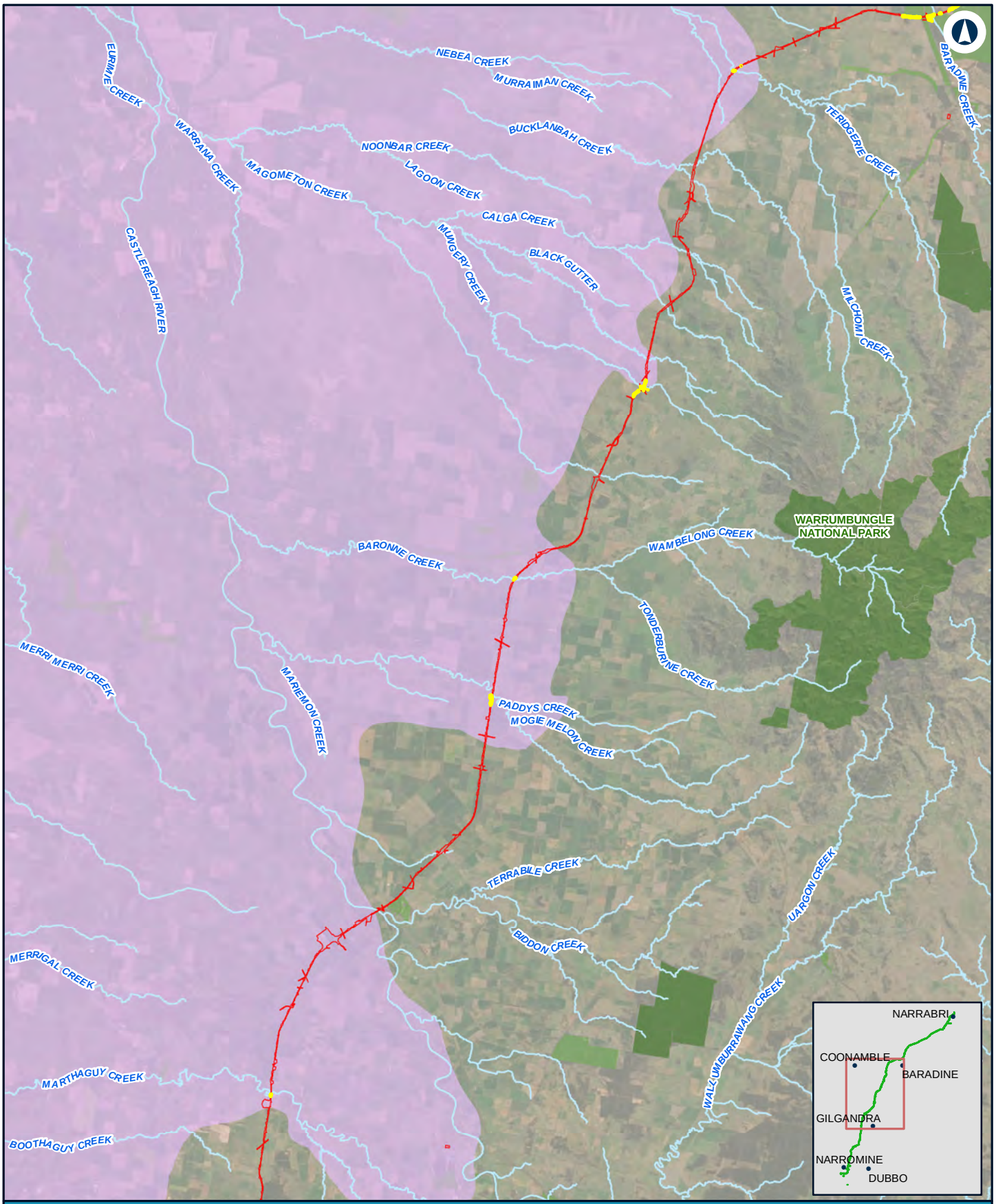

NARROMINE TO NARRABRI | Fauna Species Polygons - Barking Owl (Breeding) - Castlereagh-Barwon | MAP 2 OF 3

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:419,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Barking Owl (Breeding) species polygon

IBRA subregion

- Castlereagh-Barwon

INLAND RAIL ARTC

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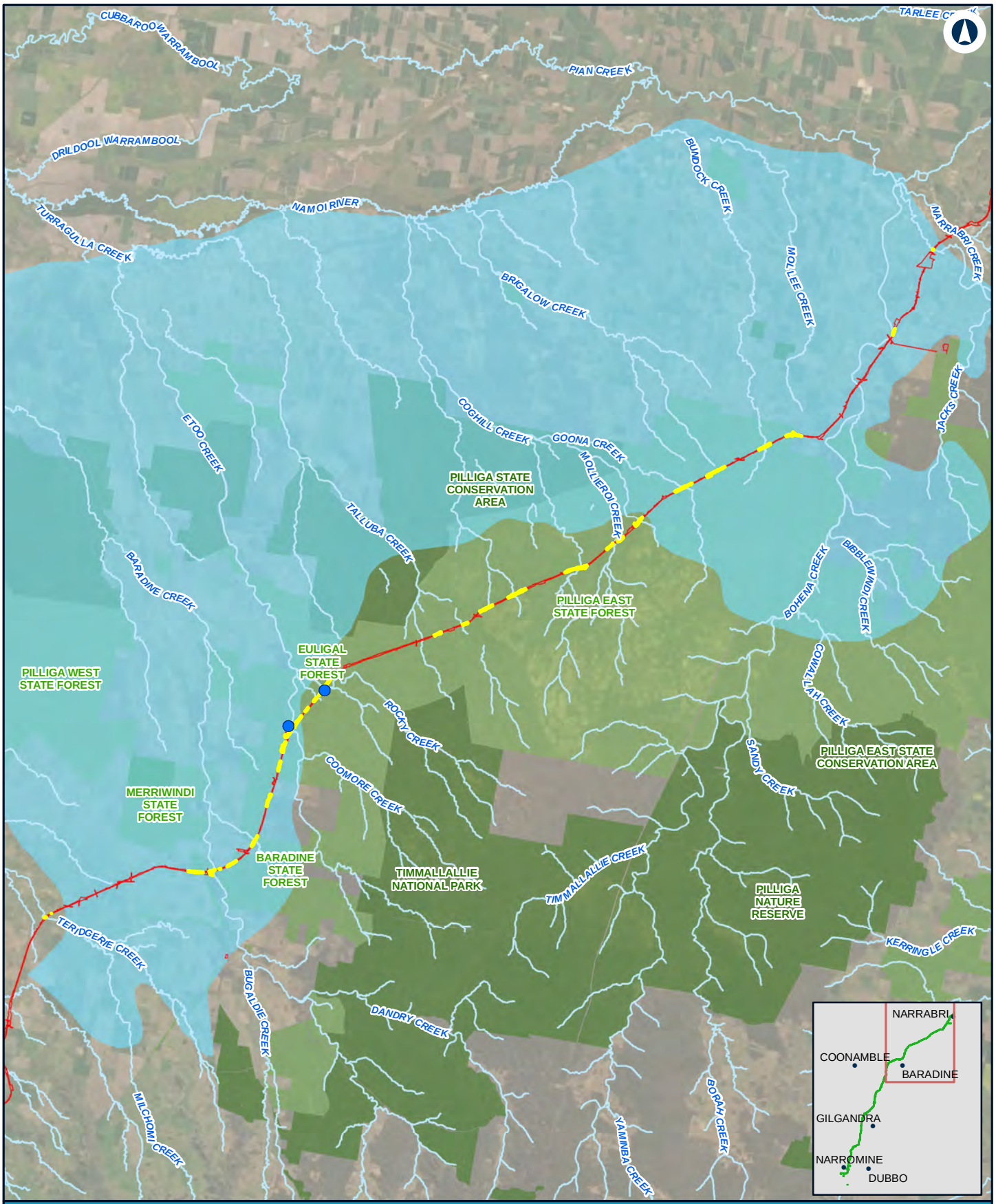

NARROMINE TO NARRABRI | Fauna Species Polygons - Barking Owl (Breeding) - Pilliga Outwash | MAP 3 OF 3

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Barking Owl (Breeding) species polygon
- Barking Owl (Breeding) GHD record (November, 2020)

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

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Table I25 Masked Owl

Masked Owl (*Tyto novaehollandiae*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only)
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	185.8 ha
Breeding requirements	• Debus and Rose (1994) note that Masked Owls are rare and localised around rich patches such as watercourses in inland areas of NSW. • Nesting occurs in old hollow eucalypts, live or dead but commonly live, in a variety of topographic positions from gully to upper slope, with hollows greater than 40 centimetres wide and greater than 100 centimetres deep; there is no relationship with distance to streams (DEC 2006). • Hollow entrances are at least three metres above ground, in trees of at least 90 centimetres diameter at breast height (DBH). The pair is faithful to a traditional nesting hollow, but may also use alternative hollows in the breeding territory in different years. (DEC 2006; Data from Schodde and Mason 1980; Kavanagh 1996; Kavanagh 2002; Kavanagh and Murray 1996; Mooney 1997; Higgins 1999). • Laying is irregular and unpredictable, occurring from late summer to spring but mostly March to July (DEC 2006). • Young et al (2021) found Masked Owl roost-sites in their study in Tasmania were typically associated with small watercourses, on the edges of large contiguous forest patches within a complex mosaic of forest and pasture. • Todd (2012), however, found that in Tasmania there was a higher likelihood of detecting Masked Owls in mature eucalypt forest (no clearing, limited previous logging activity) compared with forest edges. Similar results were found in forests of east Gippsland in Victoria (Bilney and l'Hotellier 2013).
Habitat requirements	• Habitat for this species is widespread throughout the dry eucalypt forests of the tablelands, western slopes and the undulating wet-dry forests of the coast. Optimal habitat includes an open understorey and a mosaic of sparse (grassy) and dense (shrubby) ground cover on gentle terrain (Kavanagh et al. 1995; Kavanagh 1997). • Roosting occurs in hollows in live or occasionally dead eucalypts; dense foliage in gullies; and caves or recesses in cliffs. Hollow sites can be in a variety of topographic positions, from gully to upper slope, and are also used as nest sites or have similar characteristics to those used for nesting (DEC 2006). • The Masked Owl is a specialist predator of terrestrial mammals, particularly native rodents (DEC 2006; Kavanagh 2002). Small dasyurids are also important prey in forests; introduced rodents and rabbits are important in disturbed areas. The diet is supplemented by bandicoots, arboreal mammals (Sugar Glider, Common Ringtail Possum), and some birds (DEC 2006).

Masked Owl (*Tyto novaehollandiae*)	
Habitat in the study area	• The main area of habitat for the Masked Owl in the proposal site is the Pilliga. Potential breeding habitat is present along creek lines that are crossed by the proposal in this area where large, hollow-bearing River Red Gums and Blakely's Red Gums are present. Large, hollow-bearing trees are a limited resource in other forest types in the Pilliga due to logging and fire. • Potential habitat also occurs in large remnants elsewhere in the alignment, such as along major creeklines or rivers where there is good connectivity. • Small remnants are assumed to provide breeding habitat for this species. • The Masked Owl lives in eucalypt forests and woodlands from the coast, where it is most abundant, to the western plains (Kavanagh 2002b). • Inland records for this species are sparse. Generally, the Masked Owl appears to be less common than the other two large owls in heavily-forested areas (DEC 2006). • Debus (2001) recorded the Masked Owl at only one or possibly two survey points (1-2%) of 110 points surveyed on the NW slopes, with one additional opportunistic record.
Known populations	**Pilliga** • Pilliga Scrub: well-wooded private land on Baradine Creek adjoining Merriwindi SE Kenebri (one survey point); Cumbil SF, Kenebri (two survey points). Overnight camp within one kilometre of Baradine Ck point. Both owl species previously reported in Pilliga Scrub (in 1990-96: Debus and Rose 1994; Debus 1997a). Masked Owl recorded at Baradine Creek site (Debus 2001). • The survey results of Debus (2001), particularly for the Pilliga forests, suggest that on the western slopes of NSW large areas of forest on public land are likely to support populations of both the Barking and Masked Owls, whereas small fragments on private land are unlikely to support either species. • The Pilliga forests and perhaps other large reserves and State Forests, supporting appropriate foraging and breeding habitat of open forest or woodland, seem likely to conain the only breeding populations of the Masked Owl (Debus 2001). • Its decline in western regions has also been attributed to the collapse of native mammal populations in the inland. In wetter forests, the abundance of this species may have been reduced by intensive logging (Kavanagh and Bamkin 1995). • Intensive logging of wood-production forests has the potential for removing nest sites and roost sites for owls, and den sites for prey species, unless these trees can be identified and protected. Intensive logging and other silvicultural practices such as timber stand improvement, change the age structure of the forest by removing many of the older, hollow-bearing trees resulting in the development of much younger stands containing as few as 10 percent of the original number of hollow trees (Gibbons and Lindenmayer 1997). • Occupancy by the Masked Owl appears to be greatly reduced in heavily logged forests (Kavanagh and Bamkin 1995; Kavanagh et al. 1995). • Few records of the Masked Owl are known from the region. These include one from Pilliga East State Forest and two from Pilliga West State Forest, one from the Warrumbungles and one from near Coonabarabran and four from Goonoo Goonoo State Forest (EES 2019a). • Date et al (2002) notes that the Masked Owl is a declining species in the Pilliga forests.

Masked Owl (*Tyto novaehollandiae*)	
	• Debus (2000) recorded the Masked Owl at one site in the Pilliga (1 percent of points), on a creek gorge on the boundary between well-wooded private land and State Forest. • In a survey of 510 sites in the north-western portion of the Pilliga forests, no Masked Owls were recorded (while at 92 sites Barking Owls were recorded) (Milledge 2004).
Survey requirements	May – August (breeding)
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – habitat assessments – no Pilliga surveys). • November 2018 (10 days, two ecologists – habitat assessments, eight nights of nocturnal surveys along the alignment) – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (10 days, four zoologists – diurnal surveys – trapping and bird surveys in the Pilliga). • March 2019 (5 nights, two zoologists – nocturnal surveys in the Pilliga, including call playback). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, one night in the Pilliga). • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga). • November 2020 (two ecologists, two nights in the Pilliga). • July 2021 (1 night in the Narromine area, two ecologists). • July 2021 (4 nights in the Pilliga and one night in the Bohena Creek area, two ecologists). • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, two ecologists). Diurnal surveys included habitat assessments and searches for signs of nesting at large hollow-bearing trees along creek lines (eg whitewash, feathers, owl pellets). Nocturnal surveys were conducted at various locations along the alignment in November 2018, August 2019 and September/October 2019 and included spotlighting and call playback for this species. Targeted nocturnal surveys were conducted in March in the Pilliga and included spotlighting and call playback for the Masked Owl. Call playback was limited during winter to minimise possible disruption of nesting.
Survey results	No Masked Owls were heard or observed during surveys. Feathers collected during surveys were identified by the Australian Museum as Southern Boobook. Based on habitat present at Rocky Creek and Etoo Creek, it is considered more likely that owls recorded were Barking Owls. Other owls recorded included the Southern Boobook (*Ninox novaeseelandiae*) at various locations (Macquarie River at Narromine, Ewenmar Creek near Collie Road, Kickabil Creek at Gilmours Road, Leeches Creek Road south-west of Gilgandra, and various locations in the Pilliga), and the Eastern Barn Owl (*Tyto javanica*) in the Pilliga and north of Narrabri in agricultural land.

Masked Owl (*Tyto novaehollandiae*)	
Species polygon guidance	Habitat constraints: Hollow-bearing trees (living or dead trees with hollows greater than 20 centimetres diameter). Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). Patch size selected is based on that fact that the species will use areas that are quite small, especially as foraging habitat but also as roosting habitat and occasionally as breeding habitat. Dead stags are especially popular for roosting/breeding habitat and are a limited resource due to natural attrition (EES 2020). **Polygon** Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer with a 100m radius around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for male roosts, feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear and the nest tree is already located near the edge of the wooded area. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements) (EES 2021). **Further advice (BSM-3054)** Further advice from BCS was requested regarding mapping breeding habitat for dual credit bird species where presence is assumed, and the polygons have been updated with reference to the advice provided.
Species polygon justification	No Masked Owls were recorded during surveys. Debus and Rose (1994) note that Masked Owls are rare and localised around rich patches such as watercourses in inland areas of New South Wales. The Brigalow Belt South biodiversity assessment supported this concept, with Masked Owls being found to be located, on average, within 285 metres of a watercourse (maximum distance: 531 metres, minimum distance: 54 metres). The Pilliga forests and perhaps other large reserves and State Forests, supporting appropriate foraging and breeding habitat of open forest or woodland, seem likely to contain the only breeding populations of the Masked Owl (Debus 2001). Based on the above information, a number of breeding polygons have been located along the alignment. Breeding habitat is likely to be associated with good quality riparian habitat associated with larger patches of vegetation, rather than small fragments (Gosper 2002; Debus 2001; Debus 2011; Kavanagh et al. 1995), with a preference for red gums in riparian areas (Gosper 2002; Kavanagh et al. 1995). The species is likely to occur in low densities in the Pilliga. Milledge (2004) recorded Barking Owls at 92 out 510 sites surveyed for nocturnal fauna in the Pilliga, but recorded no Masked Owls. Debus (2001) noted recording the species near Baradine Creek, on the edge of the Pilliga forests. 15 breeding territories have been mapped along the alignment through the Pilliga forests at areas where appropriate riparian vegetation is present. This number of breeding areas mapped in the species polygon would be the maximum density for this species in the Pilliga, given its extremely low densities. Even if each suitable breeding area was occupied, no

Masked Owl (*Tyto novaehollandiae*)			
	additional breeding territories could be mapped. Around 10 territories are mapped outside the Pilliga forests, all associated with suitable riparian habitat, and likely to be an overestimate of the number of resident individuals. Species polygons in the Pilliga forests are identified as follows: • All areas of PCT 399, plus a buffer of 500 metres either side of this PCT, to account for the linear nature of the alignment. This captures other PCTs that are associated with this species, but are not necessarily their preferred breeding habitat. Species polygons outside the Pilliga forests are identified as follows: • Habitat within 500 metres of a 3rd order stream or above with good connectivity to larger areas of vegetation, with riparian vegetation containing River Red Gums, Blakeley's Red Gum, or Poplar Box. Areas of suitable habitat identified above that were surveyed but not evidence of the species found are excluded from the species polygons. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: Yes – surveyed (habitat) Pilliga Outwash: Yes – surveyed (habitat) Pilliga: Yes – surveyed (habitat) Liverpool Plains: No – surveyed Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan Macquarie	0	Crop and/or introduced grassland	No breeding habitat present
	36	River Red Gum tall to very tall open forest/woodland wetland (Good)	Associated PCT Suitable breeding habitat present in riparian vegetation, not recorded during targeted surveys
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland (Good)	Not associated PCT Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Nesting habitat unlikely to occur away from riparian areas

Masked Owl (*Tyto novaehollandiae*)			
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas, no connectivity to larger patches
	248	Mixed box eucalypt woodland (Good)	Associated PCT Suitable breeding habitat present in riparian vegetation, not recorded during targeted surveys
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland (Good)	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills (Good)	Associated PCT Suitable breeding habitat present in riparian vegetation, no connectivity to larger patches
Castlereagh Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland – 56 (DNG)	Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable breeding habitat – lack of canopy
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Not suitable breeding habitat – lack of suitable hollows

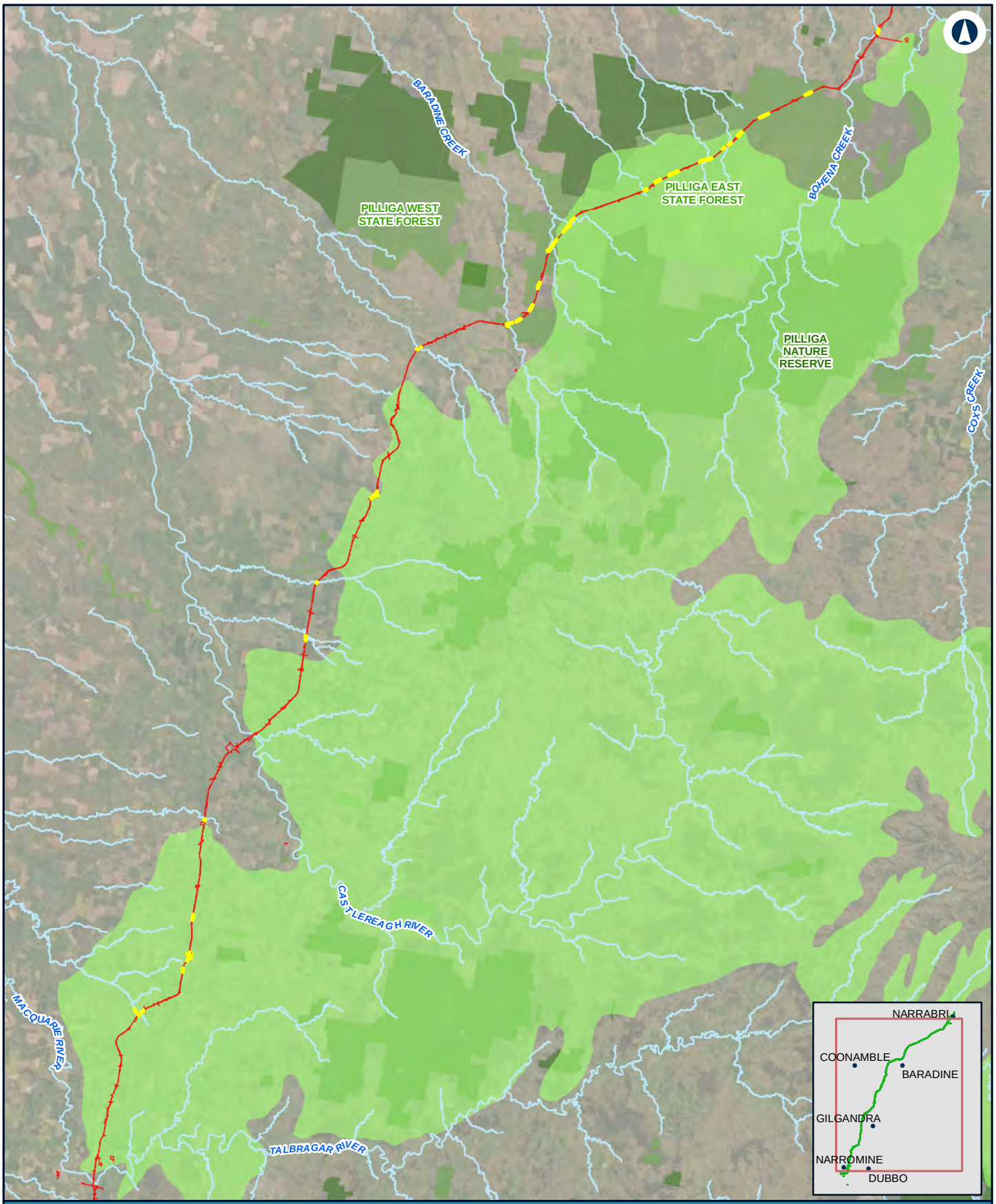
Masked Owl (*Tyto novaehollandiae*)			
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
Pilliga	0	Crop and/or introduced grassland – 0	No suitable nesting habitat – lack of canopy
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	No suitable nesting habitat – lack of canopy
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable nesting habitat – lack of canopy
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable nesting habitat – lack of canopy
	141	Broombush - wattle very tall shrubland – 141 (Good)	No suitable nesting habitat – lack of canopy

Masked Owl (*Tyto novaehollandiae*)		
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	No suitable nesting habitat – lack of hollow-bearing trees
168	Derived Copperburr shrubland – 168 (Good)	No suitable nesting habitat – lack of canopy
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Nesting habitat may occur if near riparian areas
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (DNG)	No suitable nesting habitat – lack of canopy
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Nesting habitat may occur if near riparian areas

Masked Owl (*Tyto novaehollandiae*)			
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Nesting habitat may occur if near riparian areas
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Nesting habitat unlikely to occur away from riparian areas
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
Pilliga Outwash	0	Crop and/or introduced grassland – 0	No suitable nesting habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Nesting habitat unlikely to be present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable nesting habitat – lack of canopy
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	No suitable nesting habitat – lack of canopy
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	141	Broombush - wattle very tall shrubland – 141 (Good)	No suitable nesting habitat – lack of canopy
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Associated PCT No suitable nesting habitat – lack of hollow-bearing trees

Masked Owl (*Tyto novaehollandiae*)			
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	No suitable nesting habitat – lack of canopy
	168	Derived Copperburr shrubland – 168 (Good)	No suitable nesting habitat – lack of canopy
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Nesting habitat may occur if near riparian areas
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No suitable nesting habitat – lack of canopy
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	No suitable nesting habitat – lack of canopy
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Nesting habitat may occur if near riparian areas
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not suitable breeding habitat – canopy removed

Masked Owl (*Tyto novaehollandiae*)			
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable nesting habitat – lack of canopy



NARROMINE TO NARRABRI Fauns Species Polygons - Masked Owl (Breeding) - Pilliga MAP 1 OF 3

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Masked Owl (Breeding) species polygon

IBRA subregion

- Pilliga

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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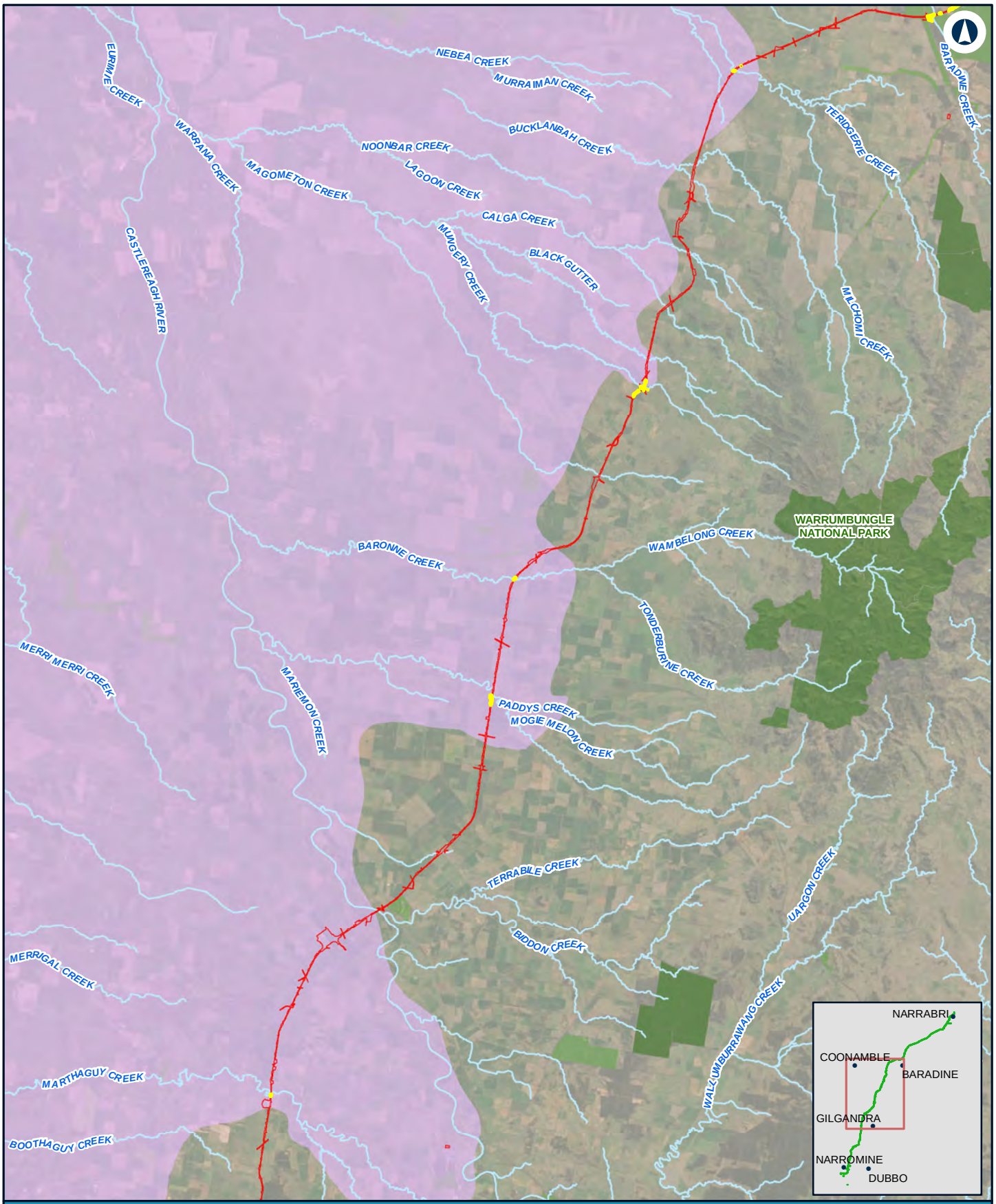

NARROMINE TO NARRABRI | Fauns Species Polygons - Masked Owl (Breeding) - Castlereagh-Barwon | MAP 2 OF 3

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:419,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Masked Owl (Breeding) species polygon

IBRA subregion

- Castlereagh-Barwon

INLAND RAIL ARTC

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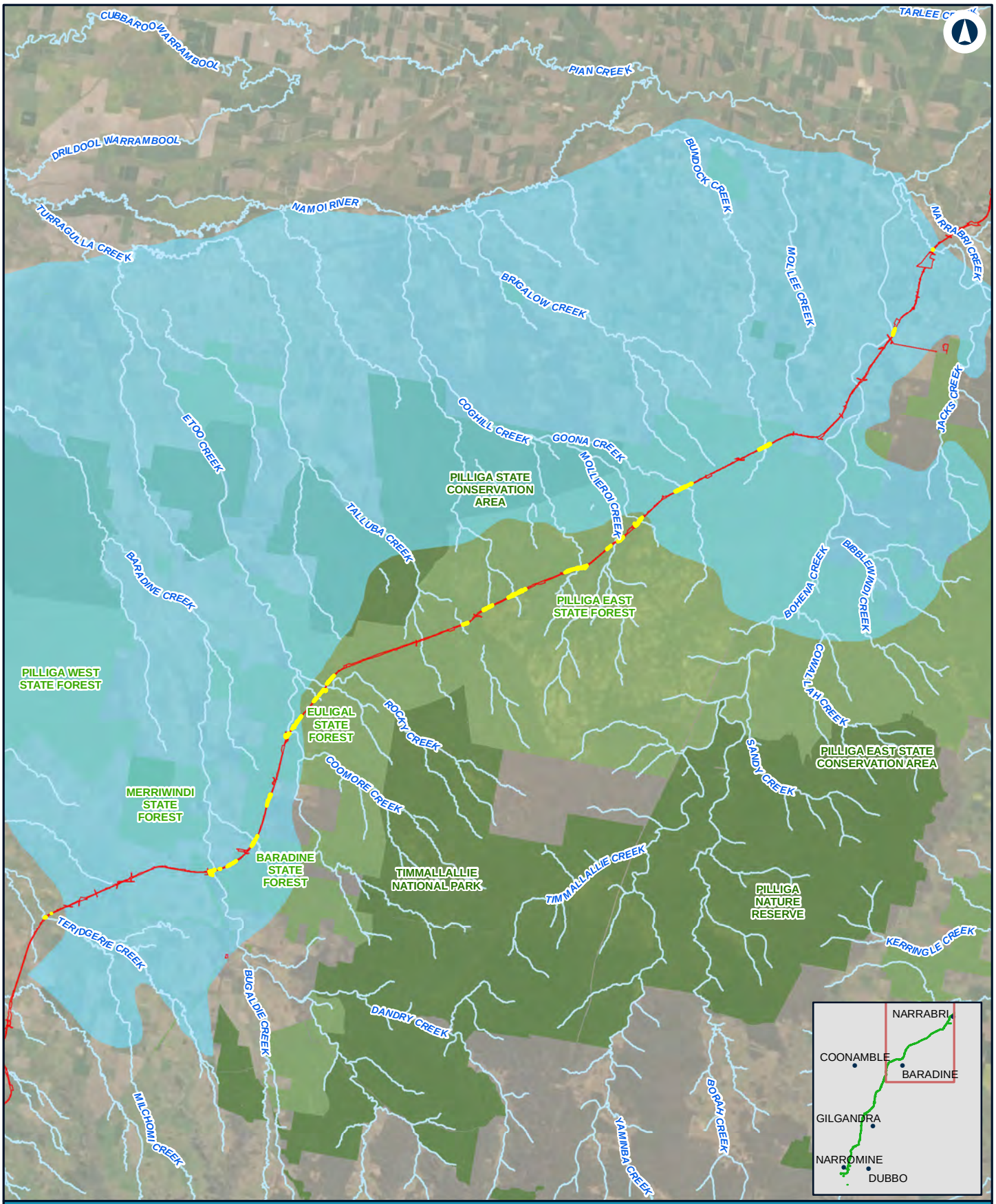

NARROMINE TO NARRABRI | Fauns Species Polygons - Masked Owl (Breeding) - Pilliga Outwash | MAP 3 OF 3

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Masked Owl (Breeding) species polygon

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

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Table I27 Glossy Black-cockatoo

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only) and ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	324.7 hectares
Breeding requirements	• Glossy Black-cockatoos prefer to nest in vertical spouts of senescent trees or stags (Cameron 2006). • In the Goonoo Forest, north of Dubbo (which has similar habitats to the Pilliga), nests were mainly located in *Eucalyptus crebra*, with low numbers in *E. nubila* and *E. blakelyi*. Nest trees were typically large, with 80 percent having a DBH >60 cm, with only one nest hollow (Cameron 2006). • Glossy Black-cockatoos tend to nest in the same areas as other nesting pairs. Because pairs prefer to nest close to one another, areas with a relatively high density of suitable nest hollows will be favoured for nesting (Cameron 2006). • Breeding hollows are about 26 centimetres wide and up to 1.4 metres deep (NSW Scientific Committee 2008). • The species may need larger patches and more intact landscapes for breeding (EES 2019b). • Most nests of the Kangaroo Island subspecies are within one kilometre of their primary feed tree species, and 200 metres of permanent water (Mooney and Pedler 2005). Roost sites are usually <1 kilometre from a reliable water source and, during the breeding season, tend to be within 30 metres of a nesting tree (Garnett et al. 1999). Cameron (2006) noted that he found most nests by following breeding birds from water points.
Habitat requirements	• Lives in coastal woodlands and drier forest areas, open inland woodlands, or timbered watercourses where its main food source, the casuarina (she-oak) is common. They prefer to live in rugged country, where extensive clearing has not taken place. Brigalow scrub or hilly rocky country containing casuarina species tend to be their preferred habitat in inland NSW (EES 2019b). • Feeds almost exclusively on the seeds of mature *Allocasuarina* and *Casuarina* trees (EES 2019b). • In inland locations, its key food species include *A. verticillata* (Drooping Sheoak) and *Casuarina cristata* (Belah); also *A. inophloia* (Stringybark Sheoak), *A. diminuta, A. gymnanthera*, and sometimes *A. leuhmannii* (Buloke) (NSW Scientific Committee 2008a). • Although the Glossy Black-Cockatoo is highly mobile and can disperse tens of kilometres, or commute up to 12 kilometres between the nest and feeding areas, most movements appear to be local (Higgins 1999). Commute distances are not well known for inland populations. • The Glossy Black-Cockatoo requires shallow, free-standing water for daily drinking (Glossy Black Conservancy 2010).

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
Habitat in the study area	• Large areas of foraging habitat are present in the Pilliga forests and associated vegetation to the north. • Pairs of Glossy Black-cockatoos would nest in hollow-bearing trees along creek lines in the Pilliga forests. • Limited habitat for the species is present in the remainder of the study area given the lack of extensive forested areas outside of the Pilliga.
Known populations	• Most of the Glossy Black-Cockatoo's population now exists in state forests and NSW National Park Estate. The species is data deficient for the purpose of assessing population recovery (if any) in NSW (NSW Scientific Committee 2008). • Populations are known from the Pilliga, Goonoo Forest and other larger forests in the wider region. Few records are known from predominantly cleared land (EES 2019a). • The Pilliga Forest Bird Watchers group regularly conduct surveys of the Glossy Black-cockatoo. A survey in 2014 recorded 231 individuals in the Pilliga. Higher numbers (200 individuals at one dam) had been recorded prior to that when the area was not in drought (ABC 2014). The report noted that 35 of the 80 dams in the Pilliga had water during the 2014 survey, and Glossy Black-cockatoos were observed at 15 dams (ABC 2014). • There are few records in predominantly cleared agricultural land. Where there are records, these tend to be associated with larger vegetated patches or riparian vegetation (EES 2019a).
Survey requirements	Survey months: January - September
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys – no Pilliga surveys). • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (10 days, four zoologists – diurnal bird surveys in the Pilliga, Bohena Creek and Gilgandra area). • March 2019 (5 days, two zoologists – afternoon/nocturnal surveys in the Pilliga). • August 2019 (5 days, two zoologists – diurnal surveys, one day in the Pilliga and day near Narrabri). • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga). • June 2020 (two ecologists, two days and one night in the Gilgandra area). • November 2020 (five days, one zoologist, two days in the Pilliga/Bohena Creek area). • July 2021 (2 days in the Narromine area, two ecologists). • July 2021 (4 nights in the Pilliga and one night in the Bohena Creek area, two ecologists). • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, two ecologists) • March 2022 (9 nine days in the Pilliga, two ecologists). Surveys included searches for chewed cones in areas of food trees and listening for calls.

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
	The March 2019 surveys included one week in the Pilliga forests, with six zoologists conducting surveys, and a second week with two zoologists in the northern Pilliga and Bohena Creek area and two in the Gilgandra area. Five cameras were set in the Pilliga in late August 2019 and collected in late September 2019. One of these was set at a dam (Clay Foot Dam).
Survey results	Three pairs were observed flying overhead during surveys in the Pilliga and associated vegetation to the north in November 2018 and March 2019. Two pairs, two individuals and an area of chewed cones were recorded in the Pilliga during the March 2022 surveys. A group of three individuals was recorded at Clay Foot Dam in the Pilliga on the camera on one occasion, and two individuals on another occasion (during the same survey period). Little water was observed in dams near the alignment during surveys in 2018 and 2019. Water was present at Emu Tank in November 2018, but this dam was dry in March 2019. No water was observed in dams in Cumbil State Forest in March 2019. A small amount of water was present at the dam at Coxes Road near Rocky Creek in March 2019. Water was present at Clay Foot Dam in September 2019 when the individuals were recorded. No Glossy Black-cockatoos were recorded outside the Pilliga/Narrabri area during any of the many surveys conducted for the proposal, including surveys during the breeding season in August 2019, nor during surveys in August 2021 by bird specialist Dr Tony Saunders. No specific breeding habitat was identified in Bionet (EES 2020a) or Birdata (BirdLife Australia 2020) records.
Species polygon guidance	Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). Note that the species may need larger patches and more intact landscapes for breeding (EES 2020). **Polygon** 1. Assessors should look for signs of breeding on site as follows; (a) begging birds of any age or sex; or (b) lone adult males identified during the breeding season (April to August); or (c) an occupied nest. 2. Where signs of breeding on site are present, potential nest trees should be identified. Potential nest trees contain hollows that are; (i) at least eight metres above the ground; and (ii) in stems with a diameter of at least 30 cm; and (iii) hollow diameter is at least 15 cm; and (iv) stem angle is at least 45 degrees, and may be near-vertical or vertical. 3. Where potential nest trees are identified on site, monitor for this species during the breeding season (Apr-Aug) to confirm the presence of any actual nest trees on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
	4. If actual nest trees are confirmed on site, then the species polygons are to be drawn around those actual nest trees (ie trees that birds of the species are known to have used for nesting). The species polygons should be circular in shape and must include a buffer radius of 200 metres around each actual nest tree. The purpose of the buffer is to identify the essential area for breeding and minimise disturbance/avoid clearing for a development application, or conserve and improve habitat for a biodiversity stewardship agreement. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear, and the nest tree is already located near the edge of the wooded area (EES 2021). **Further advice (BSM-3054)** Further advice from BCS was requested regarding mapping breeding habitat for dual credit bird species where presence is assumed, and the polygons have been updated with reference to the advice provided.
Species polygon justification	Habitat constraints: Hollow-bearing trees (living or dead tree with hollows greater than 15cm diameter and greater than 5m above ground). Four groups (generally pairs) were observed during field surveys in the Pilliga forests to Bohena Creek area, however no nest trees were recorded during surveys in the nesting season. Based on the results of the 2014 surveys by the Pilliga Forest Bird Watchers group, up to 115 pairs of Glossy Black-cockatoos are assumed to occur in the Pilliga forests. No Glossy Black-cockatoos were recorded outside the Pilliga/Narrabri area during any of the many surveys conducted for the proposal, including surveys during the breeding season. As noted in the TBDC, larger patches and more intact landscapes are required for breeding. Given the lack of evidence of the species south of the Pilliga, and generally fragmented habitat, no breeding habitat is considered present. Where larger patches of vegetation are present that were not able to be accessed (eg south of Gilgandra), breeding habitat is assumed to be present. The species requires larger trees and large hollows for nesting. Because pairs prefer to nest close to one another, areas with a relatively high density of suitable nest hollows are favoured for nesting (Cameron 2006). Ironbarks have been found to be a favoured nest trees of the species near Dubbo (Cameron 2006). Based on the above information, Glossy Black-cockatoo nesting habitat has been predominantly identified in PCTs with ironbarks or red gums near waterbodies. The Glossy Black-cockatoo requires permanent water near nest sites. Garnett et al. (1999) noted nest trees are usually within 30 metres of a reliable water source, and most nests of the Kangaroo Island subspecies are within 200 metres of permanent water (Mooney and Pedler 2005). Given the species nests in aggregations near water in larger patches of forested habitat with high densities of hollow-bearing trees, breeding polygons have been mapped in a number of locations in the Narrabri and Pilliga area (where there are many records). Locations near Quanda and Kickabil have also been mapped to account for larger forested patches in a more rural landscape. Permanent water and a high density of hollow-bearing trees are a limiting factor in identifying suitable breeding habitat. It is likely that the areas identified in the species polygon represent a maximum occupied area of breeding habitat.

Glossy Black-cockatoo (*Calyptorhynchus lathami*)			
	Suitable nesting habitat has been identified as follows: • within 500 metres of permanent water sources (eg farm dams, 3rd order streams and above) • within 200 metres of 1st and 2nd order streams (as these are less likely to have permanent water) • and within larger patches of vegetation (ie the Pilliga forests and near Gilgandra), as this species requires large areas of connected habitat for breeding. Polygons have been excluded from the above categories as follows: • Where plot data has shown few large trees and/or hollows. • Areas of suitable habitat where surveys have been conducted. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.		
Relevant IBRA subregions	Inland Slopes: No – surveyed Bogan Macquarie: No – surveyed Castlereagh Barwon: Yes – surveyed (habitat) Pilliga Outwash: Yes – surveyed (present) Pilliga: Yes – surveyed (present) Liverpool Plains: No – surveyed Northern Basalts: Not in BAM-C case – not a candidate species		
Inland Slopes	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (DNG)	No suitable nesting habitat – lack of canopy
	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (Good)	Associated PCT Potentially suitable habitat for breeding, however no large patches of vegetation present in the area.
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	No breeding habitat present
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potentially suitable habitat for breeding
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potentially suitable habitat for breeding

Glossy Black-cockatoo (*Calyptorhynchus lathami*)			
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Potentially suitable habitat for breeding
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potentially suitable habitat for breeding
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT Potentially suitable habitat for breeding
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Potentially suitable habitat for breeding
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT Potentially suitable habitat for breeding
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable breeding habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (DNG)	No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potentially suitable habitat for breeding
	78	River Red Gum riparian tall woodland / open forest wetla – 78 (Good)	Associated PCT Potentially suitable habitat for breeding
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No breeding habitat present – lack of canopy trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potentially suitable habitat for breeding
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable breeding habitat – lack of suitable hollows

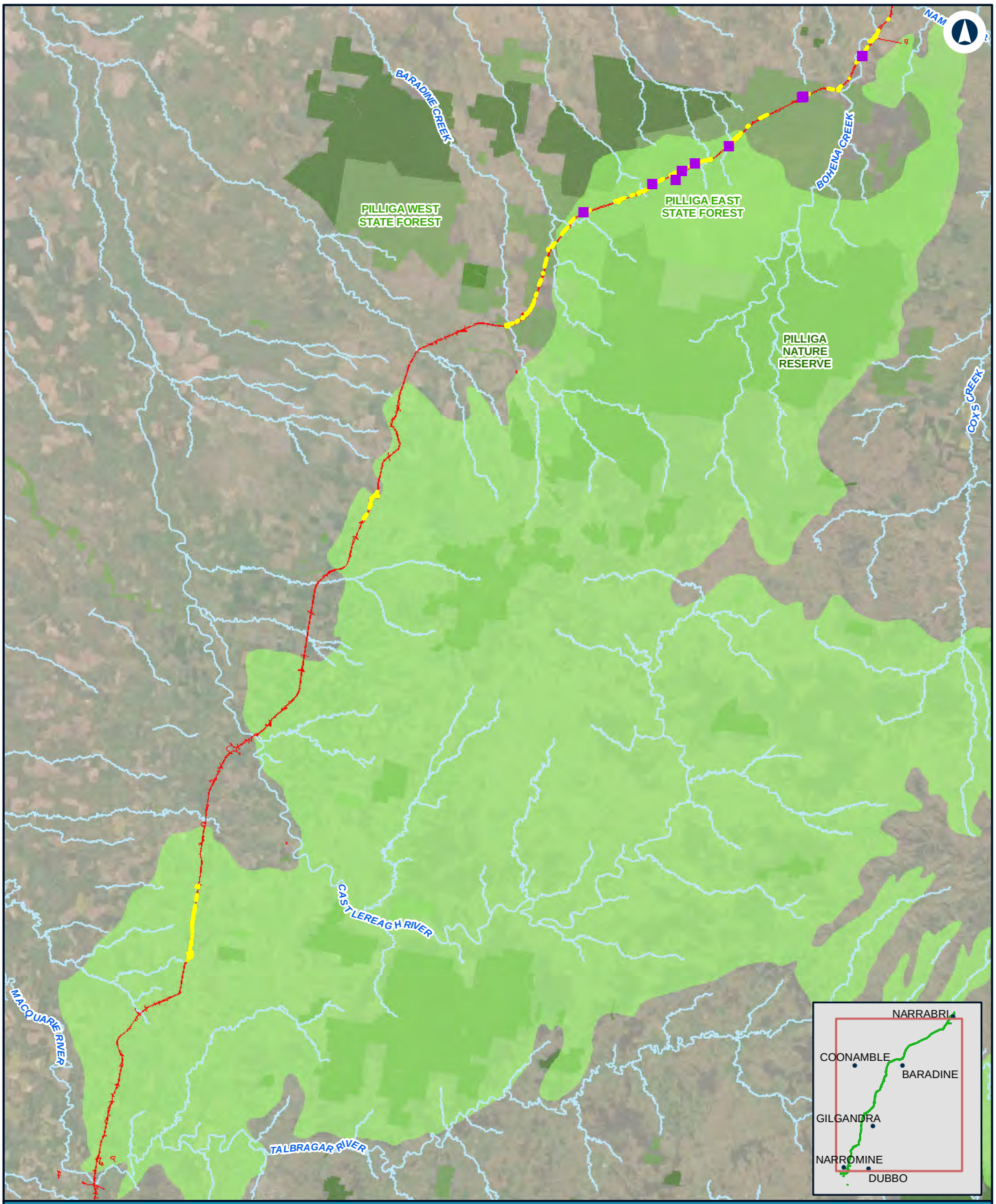
Glossy Black-cockatoo (*Calyptorhynchus lathami*)			
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Potentially suitable habitat for breeding
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potentially suitable habitat for breeding
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Suitable habitat for breeding
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potentially suitable habitat for breeding
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	No breeding habitat present – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No breeding habitat present – lack of canopy trees
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Potentially suitable habitat for breeding
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potentially suitable habitat for breeding
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable habitat for breeding
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potentially suitable habitat for breeding
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No breeding habitat present – lack of canopy trees
	141	Broombush - wattle very tall shrubland – 141 (Good)	Associated PCT No breeding habitat present – lack of hollow-bearing trees

Glossy Black-cockatoo (*Calyptorhynchus lathami*)		
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT No suitable nesting habitat present
168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Potentially suitable habitat for breeding
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Potentially suitable habitat for breeding
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potentially suitable habitat for breeding
255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Potentially suitable habitat for breeding
256	Green Mallee tall mallee woodland – 256 (Good)	Associated PCT No breeding habitat present – lack of suitable large trees
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat for breeding
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable habitat for breeding
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	No breeding habitat present – lack of canopy trees
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potentially suitable habitat for breeding
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Suitable habitat for breeding
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Potentially suitable habitat for breeding

Glossy Black-cockatoo (*Calyptorhynchus lathami*)			
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Suitable habitat for breeding
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Suitable habitat for breeding
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Potentially suitable habitat for breeding
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Potentially suitable habitat for breeding
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Potentially suitable habitat for breeding
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Suitable habitat for breeding
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT Suitable habitat for breeding
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable breeding habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	No breeding habitat present – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable habitat for breeding
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potentially suitable habitat for breeding
	141	Broombush - wattle very tall shrubland – 141 (Good)	No breeding habitat present – lack of canopy trees

Glossy Black-cockatoo (*Calyptorhynchus lathami*)			
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	No breeding habitat present – lack of canopy trees
	168	Derived Copperburr shrubland – 168 (Good)	No breeding habitat present – lack of canopy trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable nesting habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potentially suitable nesting habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Suitable nesting habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Potentially suitable habitat for breeding
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No breeding habitat present – lack of canopy trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Potentially suitable habitat for breeding
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	No breeding habitat present – lack of canopy trees
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Potentially suitable habitat for breeding
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not suitable breeding habitat – canopy removed
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable habitat for breeding

Glossy Black-cockatoo (*Calyptorhynchus lathami*)		
168	Derived Copperburr shrubland – 168 (Good)	No suitable nesting habitat – lack of canopy



NARROMINE TO NARRABRI Fauna Species Polygons - Glossy Black-Cockatoo (Breeding) - Pilliga MAP 1 OF 3

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:914,200
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Glossy Black-Cockatoo (Breeding) species polygon
- Glossy Black-Cockatoo GHD record (November, 2018; March, 2019; August 2019; June 2022)

IBRA subregion

- Pilliga

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The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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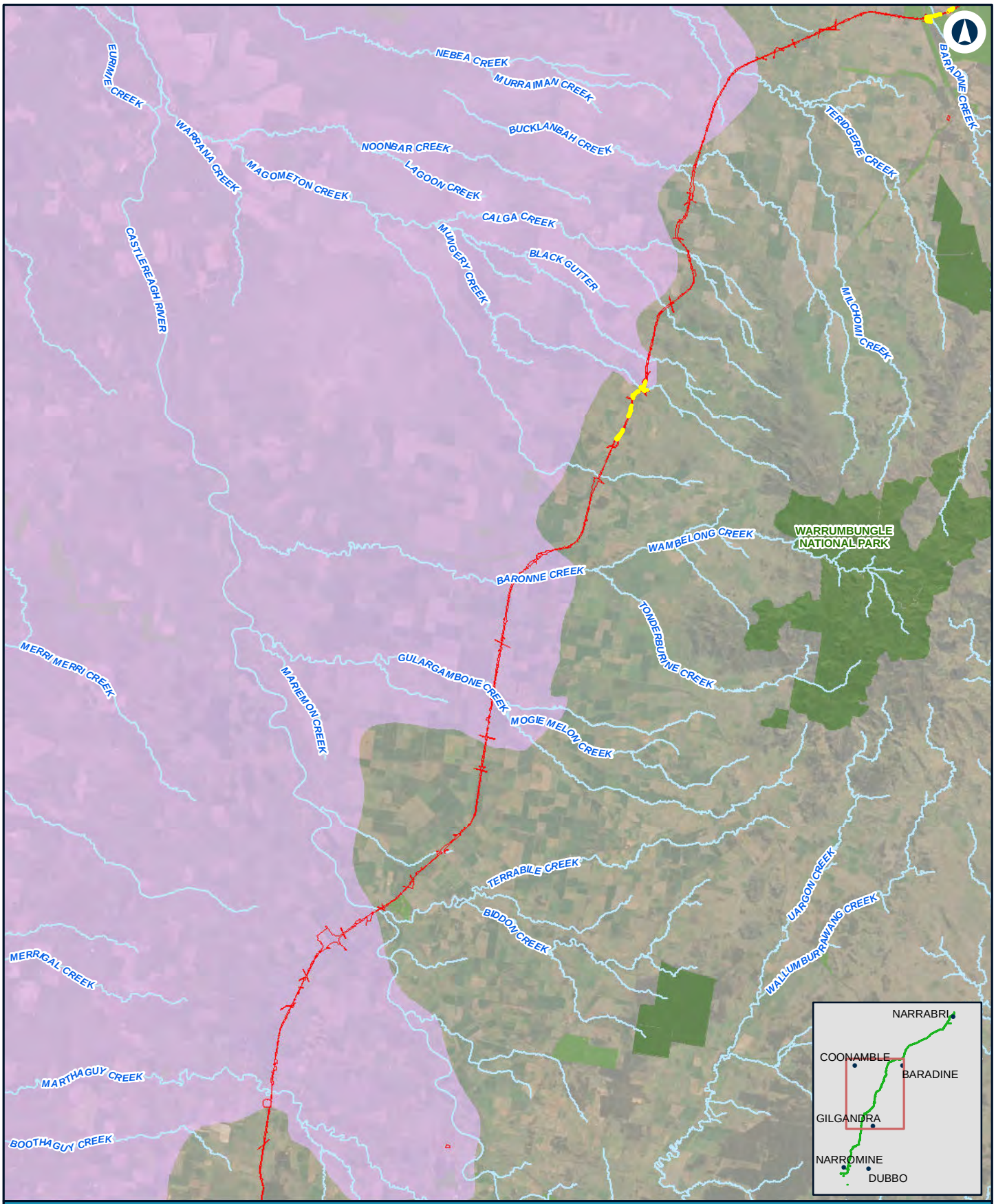

NARROMINE TO NARRABRI Fauna Species Polygons - Glossy Black-Cockatoo (Breeding) - Castlereagh-Barwon MAP 2 OF 3

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:419,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Glossy Black-Cockatoo (Breeding) species polygon

IBRA subregion

- Castlereagh-Barwon

INLAND RAIL ARTC

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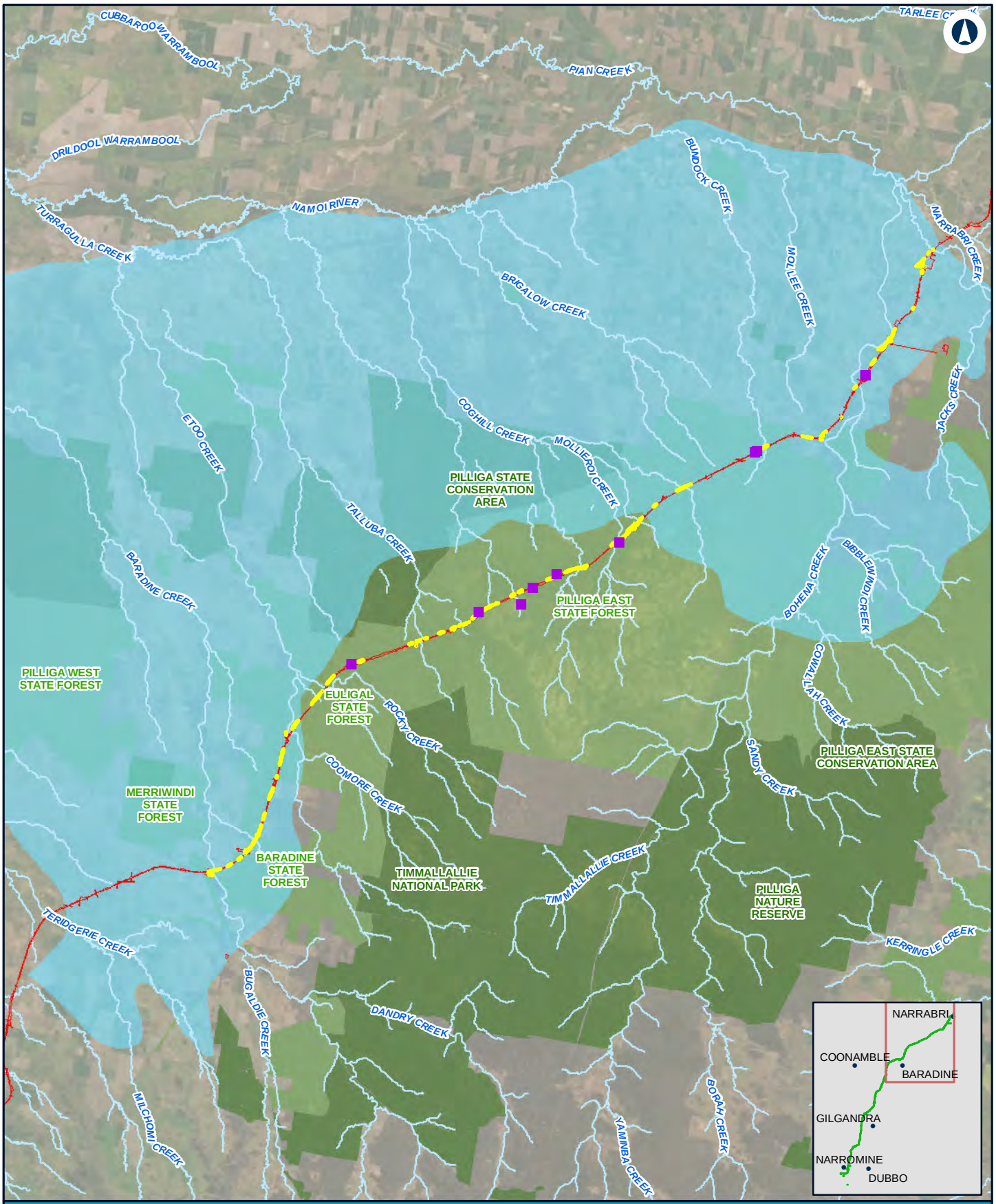

NARROMINE TO NARRABRI Fauna Species Polygons - Glossy Black-Cockatoo (Breeding) - Pilliga Outwash MAP 3 OF 3

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Glossy Black-Cockatoo (Breeding) species polygon
- Glossy Black-Cockatoo GHD record (November, 2018; March, 2019; August 2019; June 2022)

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Table I28 Bush Stone-curlew

Bush Stone-curlew (*Burhinus grallarius*)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	549.5 hectares
Breeding requirements	• The nest site is typically in or near the edge of open grassy woodland or within a cleared paddock where there is good visibility across the surrounding lands (Johnson and Baker-Gabb 1994). • Branches on the ground are essential for the bird's camouflage, and it is unlikely to attempt nesting without it (DEH 2005). • During the breeding season, nesting birds will search for food in the vicinity of the nest site, while at other times, birds may travel large distances (Birdlife 2020). • The presence and abundance of predators or other disturbances reduces the suitability of habitat for particular activities, especially nesting (DEC 2005).
Habitat requirements	• Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. • During the day, Bush Stone-curlews are most commonly observed singly or in pairs roosting within or close to the edge of woodland remnants amongst fallen timber or ground litter (Johnson and Baker-Gabb 1994). • The important structural elements of Bush Stone-curlew habitat appear to comprise a low sparse ground cover, some fallen timber and leaf litter, a general lack of a shrubby understory, open woodlands (DEC 2005).
Habitat in the study area	• Large areas of potential habitat are present in the Pilliga forests, although edges of the forest are likely to be important. • Smaller areas of potential habitat for the species is present in the remainder of the study area where woodland patches occur in agricultural land or roadsides.
Known populations	• The Bush Stone-curlew is a declining bird of the Pilliga area (Date et al 2002). • Birdlife Australia (2020) identifies forest edges in the Pilliga as important habitat for the Bush Stone-curlew. There are few records of the species in the Pilliga, and only scattered records occur in the wider region (EES 2019a). • In a survey of 510 sites in the north-western portion of the Pilliga forests, one Bush Stone-curlew was recorded (while at 92 sites Barking Owls were recorded) (Milledge 2004). • Small numbers are known from the Travelling Stock Routes and grassy woodlands of the Warren – Gilgandra – Coonamble – Gulargambone – Baradine area (DEC 2005) and Poplar Box–Wilga woodland and Baradine Gum-White Cypress woodland in the central west of NSW (Shelly 2001).

Bush Stone-curlew (*Burhinus grallarius*)	
Survey requirements	Survey months: All months It may be easier to detect during breeding season, possibly calls all year, but it is unclear how well it responds to playback (EES 2020).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys – no Pilliga surveys). • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (10 days, four zoologists – diurnal surveys – trapping and bird surveys in the Pilliga). • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, one night in the Pilliga). • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga). • June 2020 (two ecologists, two days and one night in the Gilgandra area). • November 2020 (two ecologists, four days, two nights in the Pilliga and Bohena Creek area). • July 2021 (1 night, two ecologists in the Narromine area). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, two ecologists). All surveys included diurnal bird surveys. Call playback and spotlighting for the Bush Stone-curlew was conducted during nocturnal surveys along the alignment in multiple survey periods. Cameras were set in the Pilliga during the March surveys, including two at a dam for five days (Coxes Road). Five cameras were set in the Pilliga in late August 2019 and collected in late September 2019. One of these was set at a dam (Clay Foot Dam).
Survey results	No individuals were recorded during surveys. This is unsurprising given the low incidence of records in the locality.
Species polygon guidance	Habitat constraints: fallen/standing dead timber including logs. Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). Species is mainly found in western slopes and plains and the Riverina, smaller numbers on Central and North Coast with increasing numbers in Tweed Valley. Occurs particularly where there is adequate fallen timber. The species was allocated to a species credit as experts determined that it cannot be predicted to occur at a site based on vegetation surrogates but can be detected reliably from survey (EES 2020).

Bush Stone-curlew (*Burhinus grallarius*)			
Species polygon justification	No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site, despite many nocturnal and diurnal bird surveys in multiple seasons. However, the species is likely to occur in low densities based on previous records, and presence of suitable potential open woodland habitat containing fallen timber with a general lack of a shrubby understory (DEC 2005). Birdlife Australia (2020) identifies forest edges in the Pilliga as important habitat for the Bush Stone-curlew. There are few records of the species in the Pilliga, and only scattered records occur in the wider region (EES 2019a). Small numbers are known from the Travelling Stock Routes and grassy woodlands of the Warren – Gilgandra – Coonamble – Gulargambone – Baradine area (DEC 2005) and Poplar Box–Wilga woodland and Baradine Gum-White Cypress woodland in the central west of NSW (Shelly 2001). Vegetation polygons in suitable habitat have been excluded from the species polygons where surveys have been conducted and the species was not recorded (no – surveyed). Paddock trees in close proximity to suitable habitat have been included in the species polygon. Paddock trees in crops or substantial distances from suitable woodland habitat have not been included. Vegetation polygons in suitable habitat have been included in the species polygon where surveys have not been conducted (yes – assumed present). Further surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Yes – surveyed (habitat) Castlereagh Barwon: Yes – surveyed (habitat) Pilliga Outwash: Yes – surveyed (habitat) Pilliga: Yes – surveyed (habitat) Liverpool Plains: Yes – surveyed (habitat) Northern Basalts: No – surveyed		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	No suitable habitat (lack of structural diversity)
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable woodland habitat present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT No suitable habitat (lack of structural diversity) Surveyed, not present (some patches)
	56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT No suitable habitat (very small patch, limited connectivity)

Bush Stone-curlew (*Burhinus grallarius*)			
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Suitable woodland habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable woodland habitat present
	248	Mixed box eucalypt woodland – 248 (Good)	Associated PCT Suitable woodland habitat present
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT No suitable habitat (shrubby, very small patch, limited connectivity)
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT Suitable woodland habitat present
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Potentially suitable habitat present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Suitable woodland habitat present
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable woodland habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable habitat – lacks fallen timber and woodland structure
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable woodland habitat present

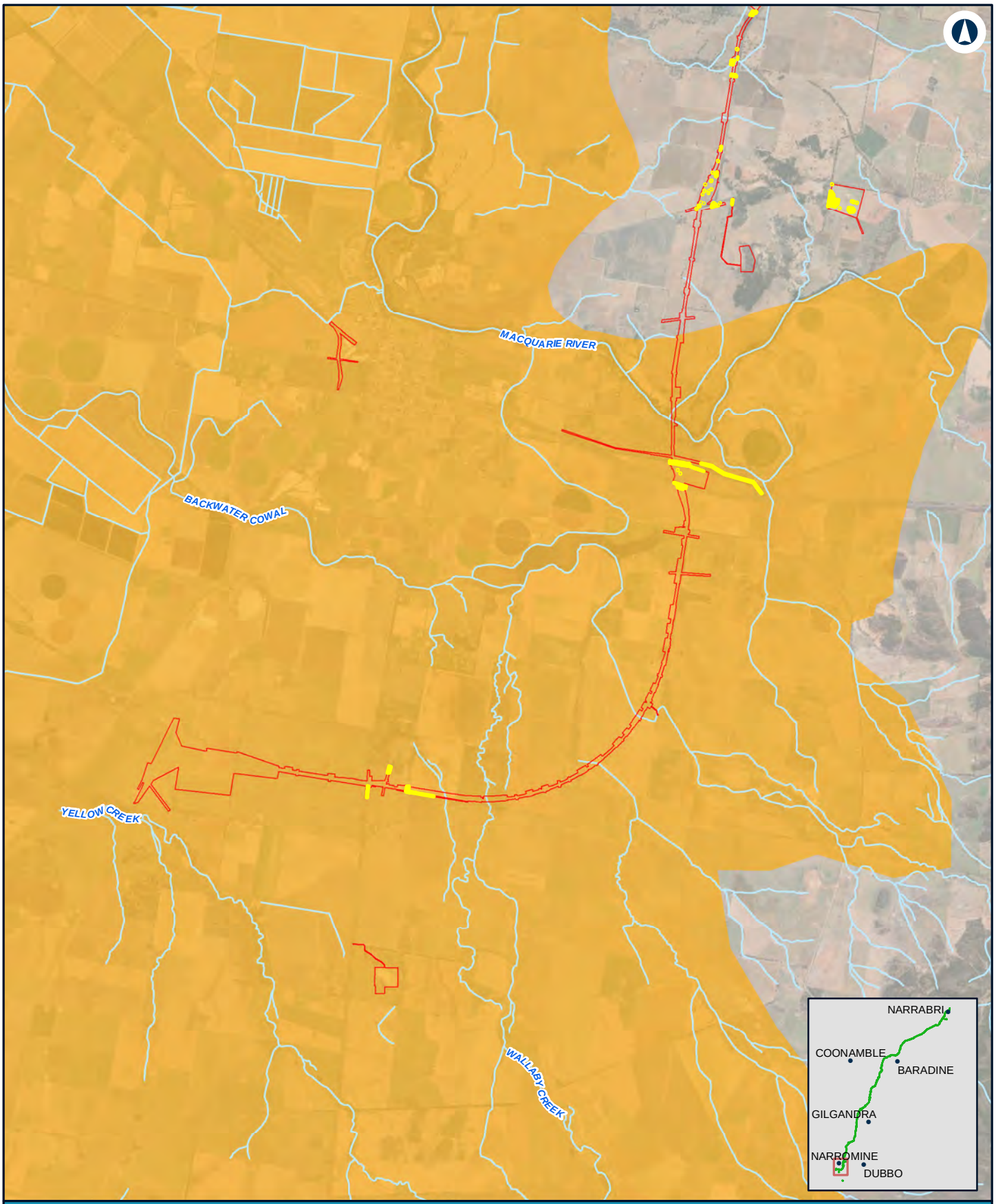
Bush Stone-curlew (*Burhinus grallarius*)			
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Suitable woodland habitat present
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Suitable woodland habitat present
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Suitable woodland habitat present
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Suitable woodland habitat present
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Suitable woodland habitat present
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable woodland habitat present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Associated PCT Not suitable habitat – lacks fallen timber and proximity to woodland patches
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT No suitable habitat – lacks fallen timber and proximity to woodland patches (most areas) Small patches of suitable habitat if located near woodland patches
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Suitable woodland habitat present
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Suitable woodland habitat present
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable woodland habitat present

Bush Stone-curlew (*Burhinus grallarius*)			
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable woodland habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable habitat – lacks fallen timber and woodland structure
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – shrubby
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Suitable woodland habitat present
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT Suitable habitat present
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Suitable habitat present
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Suitable woodland habitat present
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – shrubby understory
	256	Green Mallee tall mallee woodland – 256 (Good)	Associated PCT Suitable woodland habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable woodland habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable woodland habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not suitable habitat – lacks fallen timber and woodland structure

Bush Stone-curlew (*Burhinus grallarius*)			
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable woodland habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Suitable woodland habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable woodland habitat present
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT Not suitable habitat – shrubby understory
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT Not suitable habitat – shrubby understory
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT Not suitable habitat – shrubby understory
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Suitable woodland habitat present
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Suitable woodland habitat present
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Not suitable habitat – shrubby understory
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT Suitable woodland habitat present
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not suitable habitat – lacks fallen timber and woodland structure
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable habitat – lacks fallen timber and woodland structure

Bush Stone-curlew (*Burhinus grallarius*)			
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not suitable habitat – lacks fallen timber and woodland structure
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable woodland habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable woodland habitat present
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not an associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – lacks fallen timber and woodland structure
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable woodland habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable woodland habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Suitable woodland habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable woodland habitat present
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT

Bush Stone-curlew (*Burhinus grallarius*)			
			Not suitable habitat – lacks fallen timber and woodland structure
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT Not suitable habitat – shrubby understory
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not suitable habitat – lacks fallen timber and woodland structure
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Suitable woodland habitat present
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Associated PCT Suitable woodland habitat present
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable woodland habitat present
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat – lack of fallen timber and woodland structure
Northern Basalts	0	Crop and/or introduced grassland – 0	No suitable habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Some areas – no suitable habitat – lack of fallen timber and woodland structure



NARROMINE TO NARRABRI

Fauna Species Polygons - Bush Stone-curlew - Bogan-Macquarie

MAP 1 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-22 Paper: A4
Author: JacobsGHD Scale: 1:97,800

LEGEND

- Construction impact zone
- Bush Stone-curlew species polygon

IBRA subregion

- Bogan-Macquarie

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Data Sources: OEH; Bush Stone-curlew records: BioNet 2020; Basemap layers: NSWSS, esri

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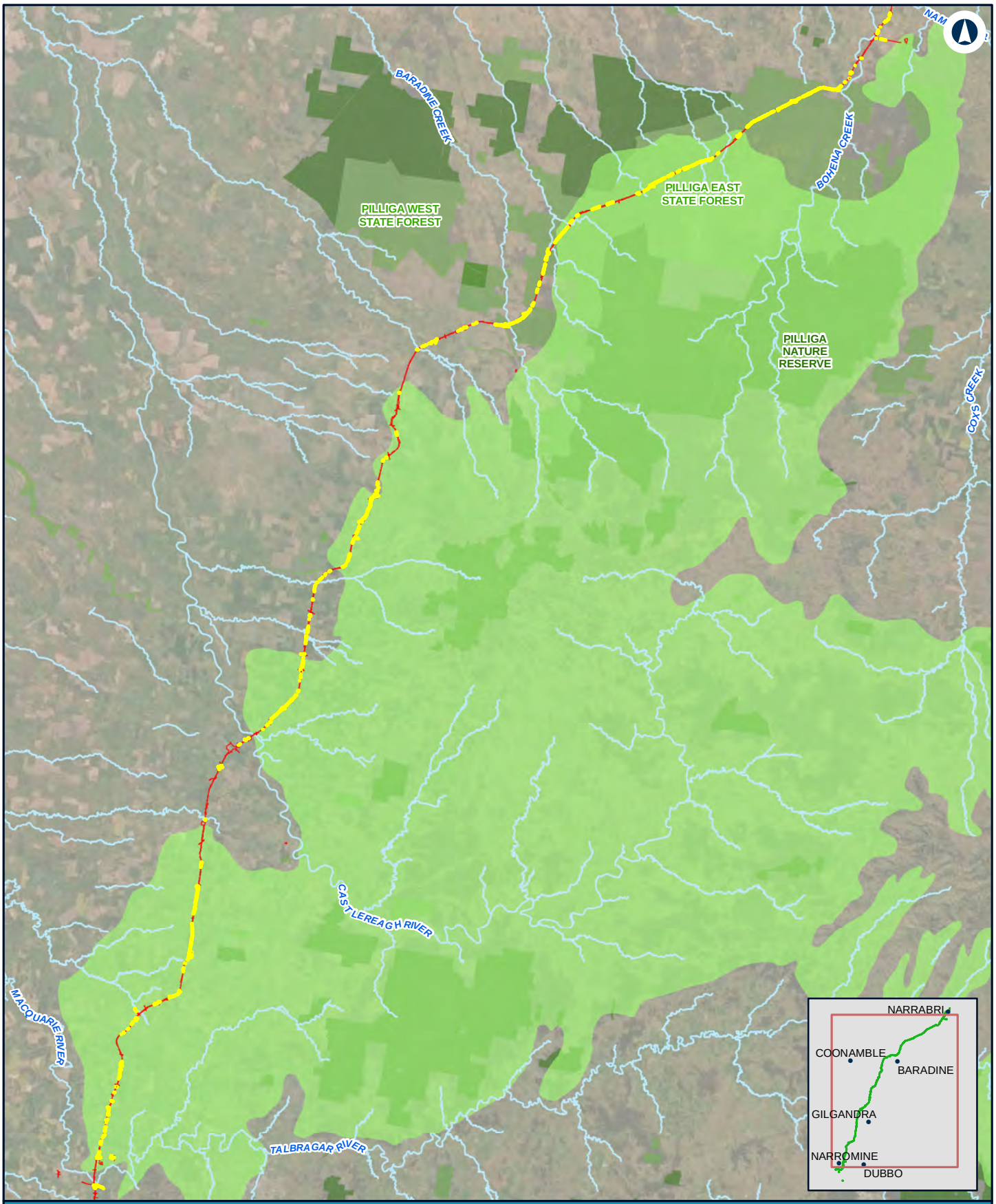

NARROMINE TO NARRABRI Fauna Species Polygons - Bush Stone-curlew - Pilliga MAP 2 OF 5

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-22 Paper: A4
Author: JacobsGHD Scale: 1:914,100

LEGEND

- Construction impact zone
- Bush Stone-curlew species polygon

IBRA subregion

- Pilliga

INLAND RAIL ARTC

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Data Sources: OEH; Bush Stone-curlew records: BioNet 2020; Basemap layers: NSWSS, esri

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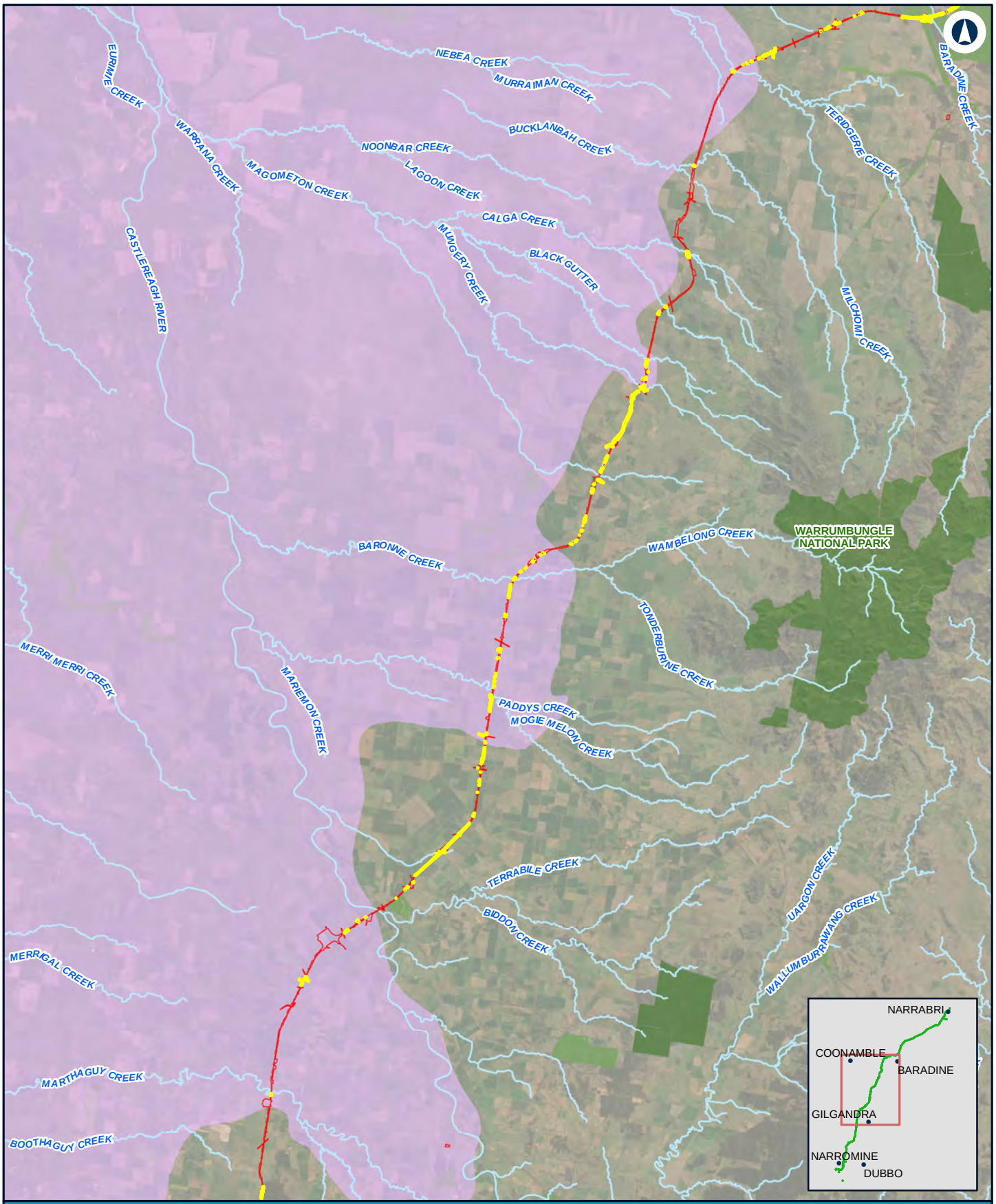

NARROMINE TO NARRABRI Fauna Species Polygons - Bush Stone-curlew - Castlereagh-Barwon MAP 3 OF 5

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-22 Paper: A4
Author: JacobsGHD Scale: 1:419,900

LEGEND

- Construction impact zone
- Bush Stone-curlew species polygon

IBRA subregion

- Castlereagh-Barwon

INLAND RAIL ARTC

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Data Sources: OEH; Bush Stone-curlew records: BioNet 2020; Basemap layers: NSWSS, esri

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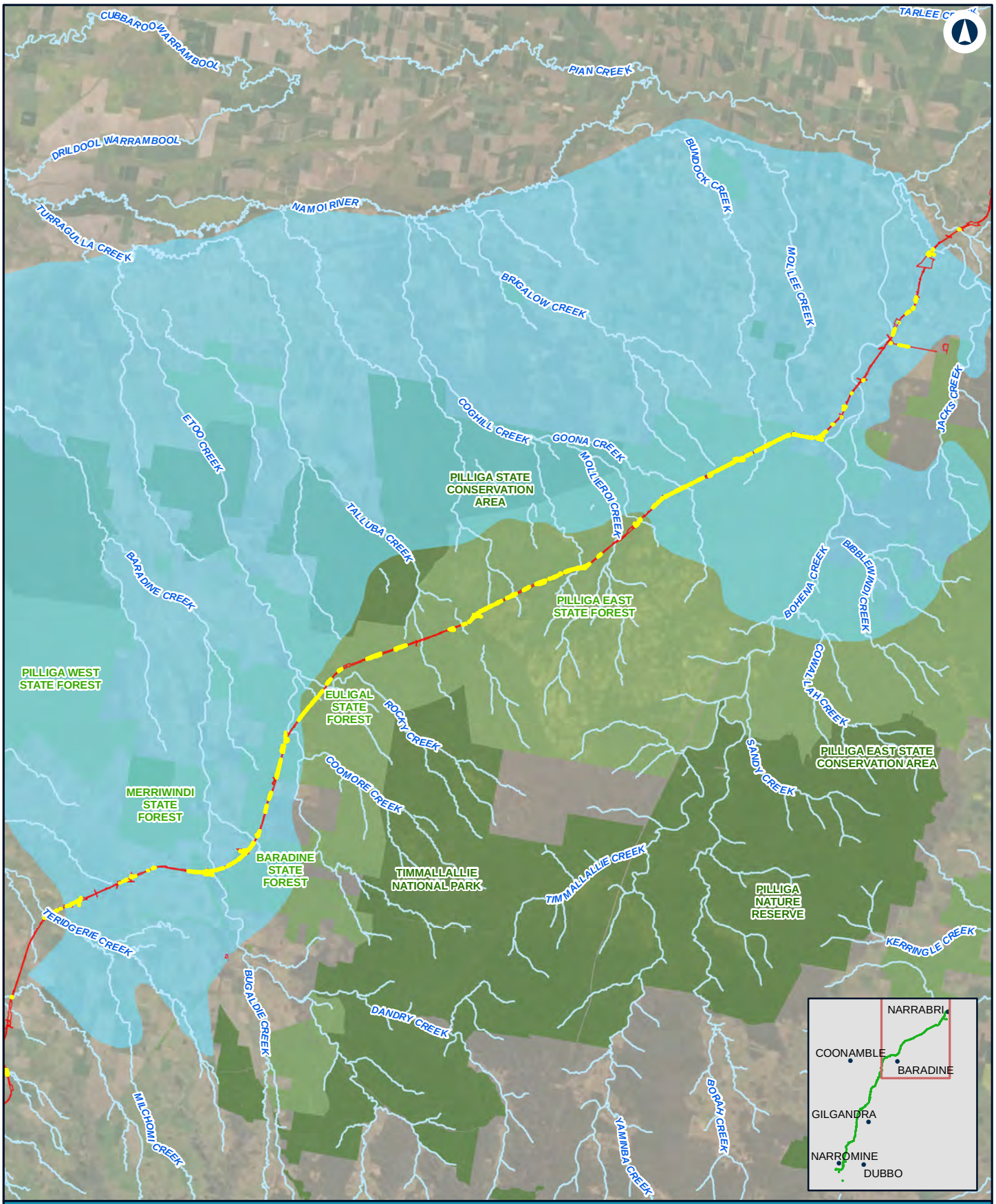

NARROMINE TO NARRABRI Fauna Species Polygons - Bush Stone-curlew - Pilliga Outwash MAP 4 OF 5

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-22 Paper: A4
Author: JacobsGHD Scale: 1:495,900

Data Sources: OEH; Bush Stone-curlew records: BioNet 2020; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Bush Stone-curlew species polygon

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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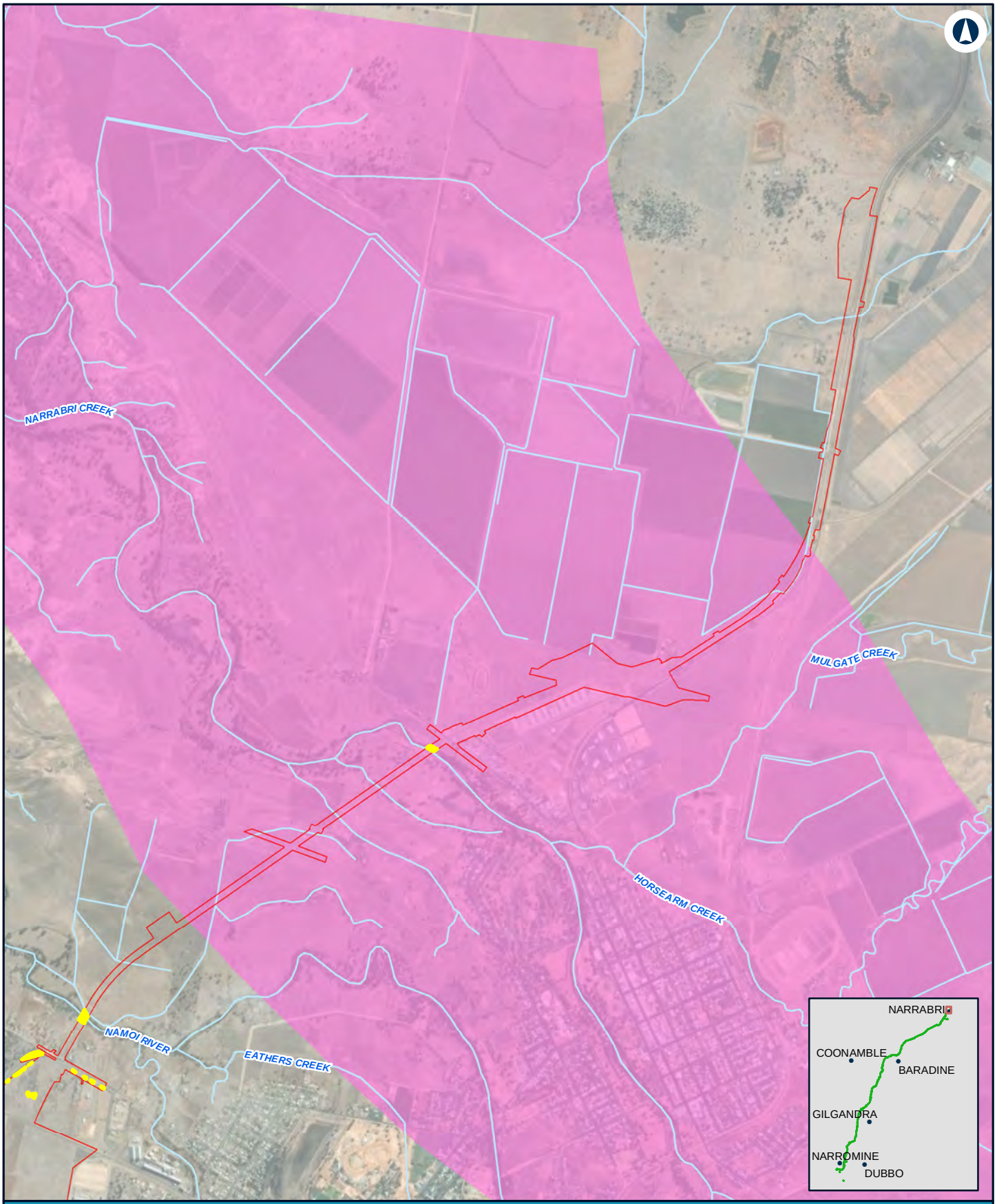

NARROMINE TO NARRABRI

Fauna Species Polygons - Bush Stone-curlew - Liverpool Plains

MAP 5 OF 5

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-22 Paper: A4
Author: JacobsGHD Scale: 1:37,300

LEGEND

- Construction impact zone
- Bush Stone-curlew species polygon

IBRA subregion

- Liverpool Plains

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Data Sources: OEH; Bush Stone-curlew records: BioNet 2020; Basemap layers: NSWSS, esri

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Table I29 Pale-headed Snake

Pale-headed Snake (*Hoplocephalus bitorquatus*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	286.4 hectares
Breeding requirements	• In the wild, gravid females have been observed in January, although mating has been observed in captivity from September to May (Australian Museum 2019). • Females breed only every second or third year or less frequently (EES 2019b).
Habitat requirements	• Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest, in drier environments, it appears to favour habitats close to riparian areas (EES 2019b). • A study of the species at the Namoi River recorded the species in woodland on riverbanks and adjacent river flats where River Red Gums (*E. camaldulensis*) were common, with extensive mature Coolabah/Black Box (*E. coolabah, E. largiflorens*) also occurring (Fitzgerald et al. 2010). • They are arboreal and rely heavily on old and dead standing trees with hollows and exfoliating bark for shelter sites, as it shelters during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees (EES 2019b). • Can spend weeks at a time hidden in tree hollows (EES 2019b). Radio-tracking of snakes on the Namoi River (Fitzgerald et al. 2010) found individuals were sedentary and moved only short distances (up to 134 metres in that study) • Its main prey is tree frogs although lizards and small mammals are also taken (EES 2019b). As such, the populations may tend to be associated with watercourses, billabongs and other flood-prone areas (Fitzgerald et al. 2010). • Major riverine floodplain habitats may represent core habitat for Pale-headed Snakes (Fitzgerald et al. 2010).
Habitat in the study area	• Could occur throughout the Pilliga but would be concentrated around creek lines where frogs (their main prey) occur. • Fitzgerald et. al (2010) showed that Pale-headed Snakes were not recorded >160 metres from the Namoi River.
Known populations	• Patchy and restricted distribution north of Baradine (EES 2019a) • Local records dominated by sightings in the Pilliga West State Conservation Area, Pilliga East State Forest, and riparian vegetation of the Namoi River near Pilliga, Wee Waa and Leard State Forest (EES 2019a). • Recent records of this species west of the Great Dividing Range in NSW include sites dominated by Narrow-leaved Ironbark (*E. crebra*) forest with cypress pine (*Callitris* spp.) Black Box (*E. largiflorens*) and Silver-leaf Ironbark (*E. melanophloia*) woodland and Coolabah (*E. coolabah*) (Fitzgerald et al. 2010). • No local records in close proximity to the study area between Narromine and Baradine (EES 2019a)

Pale-headed Snake (*Hoplocephalus bitorquatus*)	
Survey requirements	Survey months: November to March Survey should be undertaken 1-2 days after rainfall and on humid nights (EES 2019b)
Survey effort	Fauna surveys were conducted in the following months in the Pilliga and Narrabri area • November (3 days, two ecologists –nocturnal spotlighting surveys at Narrabri Creek, Namoi River, Bohena Creek and other small creeks on private property near Narrabri. • March (5 days, two zoologists – nocturnal spotlighting surveys and driving transects in the Pilliga). Surveys in March followed a weekend of heavy rain.
Survey results	One Pale-headed Snake was observed on Cumbil Road south of the alignment during surveys in March 2019. It was located near a tributary of Baradine Creek.
Species polygon guidance	Habitat constraints: none Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). Paddock tree use – 500 metres from moderate/good vegetation (EES 2020).
Species polygon justification	Evidence suggests that in dry areas the species favours habitats close to riparian areas (EES 2019b). Habitat guidance in the TSPD suggests the species may use paddock trees up to 500 metres from drainage lines but is generally sedentary. Fitzgerald (2010) found the species to be sedentary and restricted to riparian areas. Given the above habitat requirements, the species is considered to occur in association with better quality riparian vegetation, particularly in the Pilliga and Narrabri area. The following areas are included in the species polygon: • PCT 399 or 78 in the Pilliga forests and Narrabri areas and a buffer 500 metres either side of this vegetation in order to take into account movement of this species near the riparian zone. • PCT 36 and 78 associated with 3rd order waterways or above in the Castlereagh-Barwon, Pilliga, Pilliga Outwash, and Liverpool Plains IBRA subregions, with a 500 metres buffer of the creek's centreline in order to take into account movement of this species near the riparian zone. At Gulargambone Creek, the buffer is taken to be 500 metres from the edge of PCT 78 given the width of this riparian zone. • Vegetation associated with 3rd order waterways or above in the Castlereagh-Barwon, Pilliga, Pilliga Outwash, and Liverpool Plains IBRA subregions, with a 500 metres buffer of the creek's centreline in order to take into account movement of this species near the riparian zone. Areas where nocturnal surveys were undertaken in suitable habitat and the species not recorded have been removed from the species polygon.

Pale-headed Snake (*Hoplocephalus bitorquatus*)			
	Vegetation associated with first and second order streams are not considered potential habitat, as core habitat for this species is likely to be associated with major rivers (Fitzgerald 2010). Areas with very narrow riparian corridors made up of scattered trees (eg in the Castlereagh-Barwon subregion) with limited connectivity to large expanses of native vegetation are considered degraded and are not mapped in the species polygon. First and second order streams lacking riparian PCTs are not considered habitat for the species.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Yes – surveyed (habitat) Castlereagh Barwon: Yes – surveyed (habitat) Pilliga Outwash: Yes – surveyed (present) Pilliga: Yes – surveyed (habitat) Liverpool Plains: Yes – surveyed (habitat) Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan Macquarie	0	Crop and/or introduced grassland – 0	No suitable habitat present
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable habitat present in riparian areas
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No suitable habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not an associated PCT Suitable habitat if within 500 metres of a riparian zone
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT Suitable habitat if within 500 metres of a riparian zone
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone

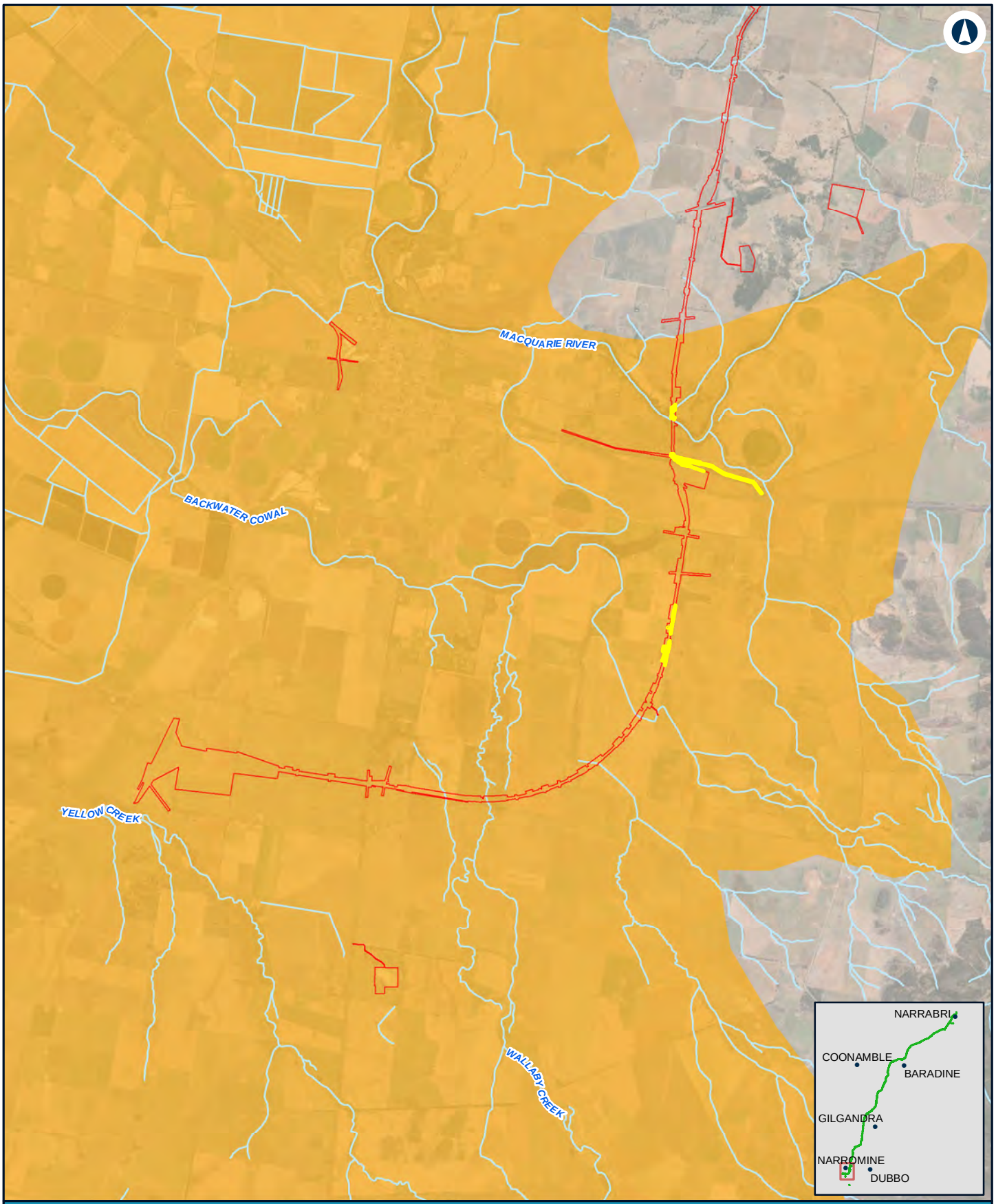
Pale-headed Snake (*Hoplocephalus bitorquatus*)			
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	No suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No suitable habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (DNG)	No suitable habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present in riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable habitat present – lack of canopy trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Does not occur in associated with suitable riparian habitat
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
Pilliga	0	Crop and/or introduced grassland – 0	No suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable habitat present in riparian areas

Pale-headed Snake (*Hoplocephalus bitorquatus*)		
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	No suitable habitat present – lack of canopy trees
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat present – lack of canopy trees
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Suitable habitat if within 500 metres of a riparian zone
56	Poplar Box - Belah woodland – 56 (Good)	Suitable habitat if within 500 metres of a riparian zone
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present in riparian areas
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable habitat present – lack of canopy trees
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable habitat present – lack of canopy trees
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Does not occur in associated with suitable riparian habitat
168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat present – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT Suitable habitat if within 500 metres of a riparian zone
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone

Pale-headed Snake (*Hoplocephalus bitorquatus*)		
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not located within 500 metres of a riparian zone
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	No suitable habitat present – lack of canopy trees
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable habitat present in riparian areas
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT No suitable habitat present – lack of canopy trees
469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Suitable habitat if within 500 metres of a riparian zone
746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Not located within 500 metres of a riparian zone

Pale-headed Snake (*Hoplocephalus bitorquatus*)			
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT Suitable habitat if within 500 metres of a riparian zone
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	No suitable habitat present – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	No suitable habitat present – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present in riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable habitat present – lack of canopy trees
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Does not occur in association with suitable riparian habitat.
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Associated PCT No suitable habitat present – lack of canopy trees
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat present – lack of canopy trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Suitable habitat if within 500 metres of a riparian zone

Pale-headed Snake (*Hoplocephalus bitorquatus*)			
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable habitat present in riparian areas
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No suitable habitat present – lack of canopy trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT Suitable habitat if within 500 metres of a riparian zone
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	No suitable habitat present – lack of canopy trees
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Suitable habitat if within 500 metres of a riparian zone
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT No suitable habitat present – lack of canopy trees
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present in riparian areas
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat present – lack of canopy



NARROMINE TO NARRABRI

Fauna Species Polygon - Pale-headed Snake - Bogan-Macquarie

MAP 1 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:97,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Pale-headed Snake species polygon

IBRA subregion

- Bogan-Macquarie

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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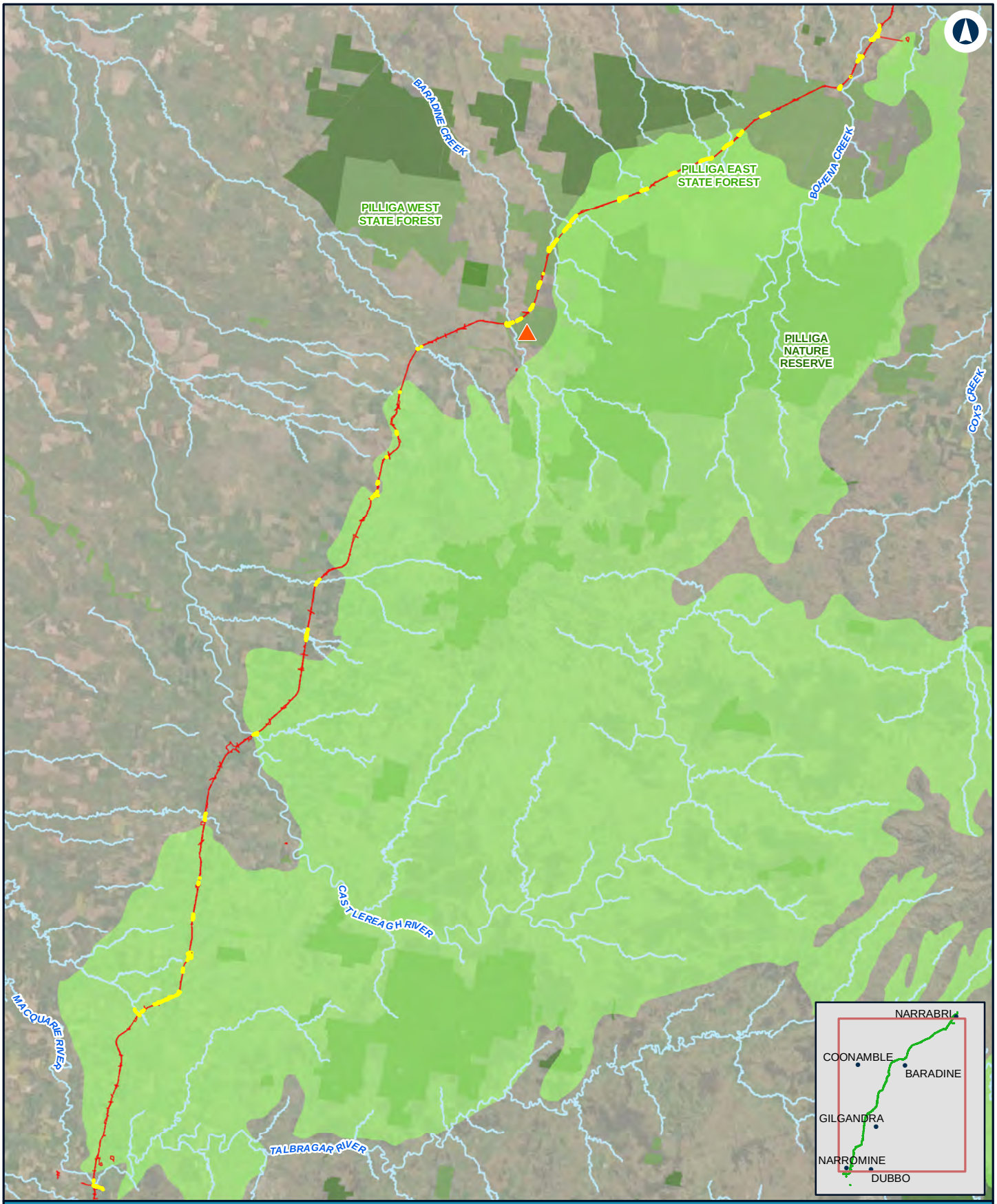

NARROMINE TO NARRABRI

Fauna Species Polygon - Pale-headed Snake - Pilliga

MAP 2 OF 5

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Pale-headed Snake species polygon
- Pale-headed Snake GHD record (March, 2019)

IBRA subregion

- Pilliga

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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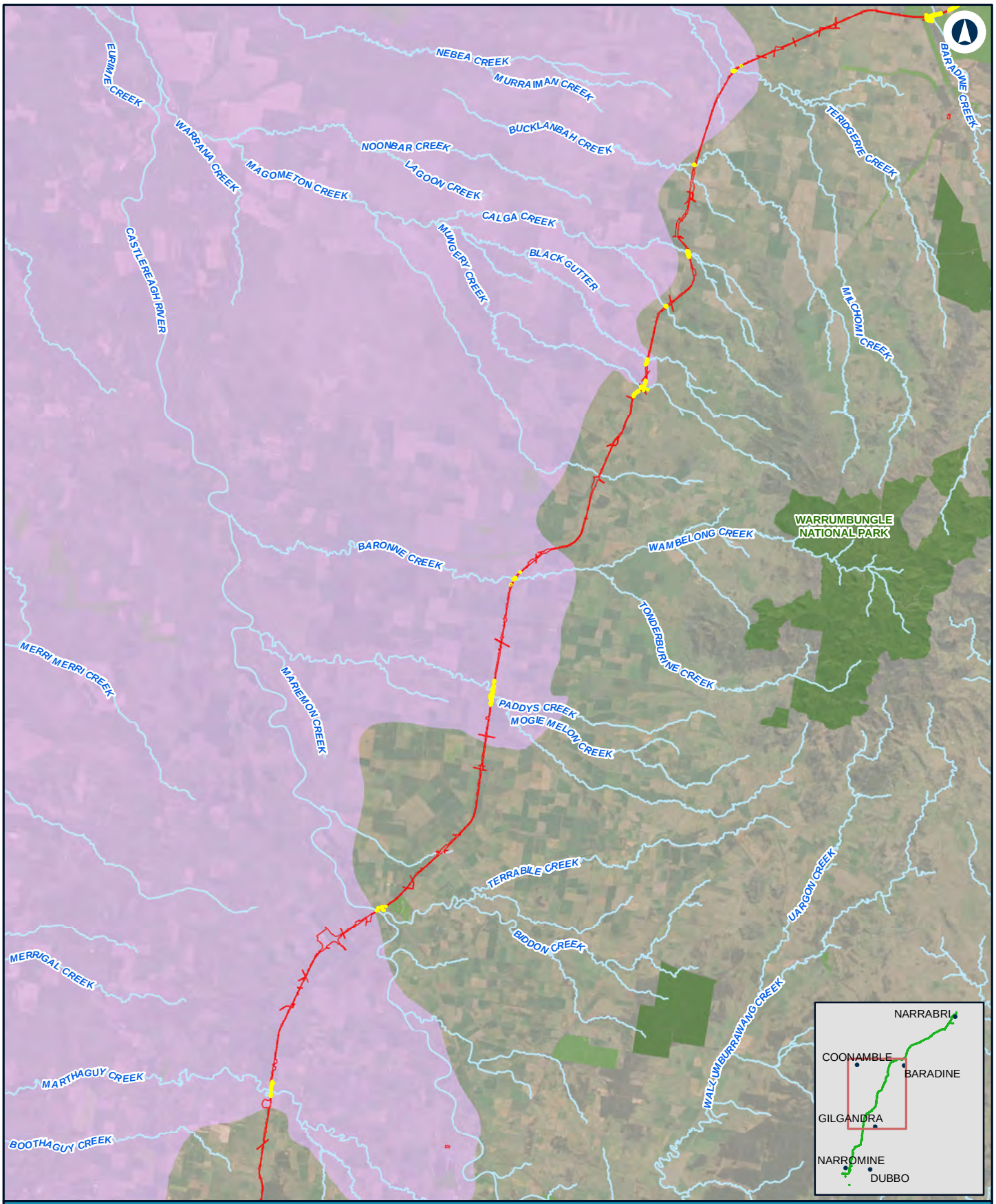

NARROMINE TO NARRABRI | Fauna Species Polygon - Pale-headed Snake - Castlereagh-Barwon | MAP 3 OF 5

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:419,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Pale-headed Snake species polygon
- Pale-headed Snake GHD record (March, 2019)

IBRA subregion

- Castlereagh-Barwon

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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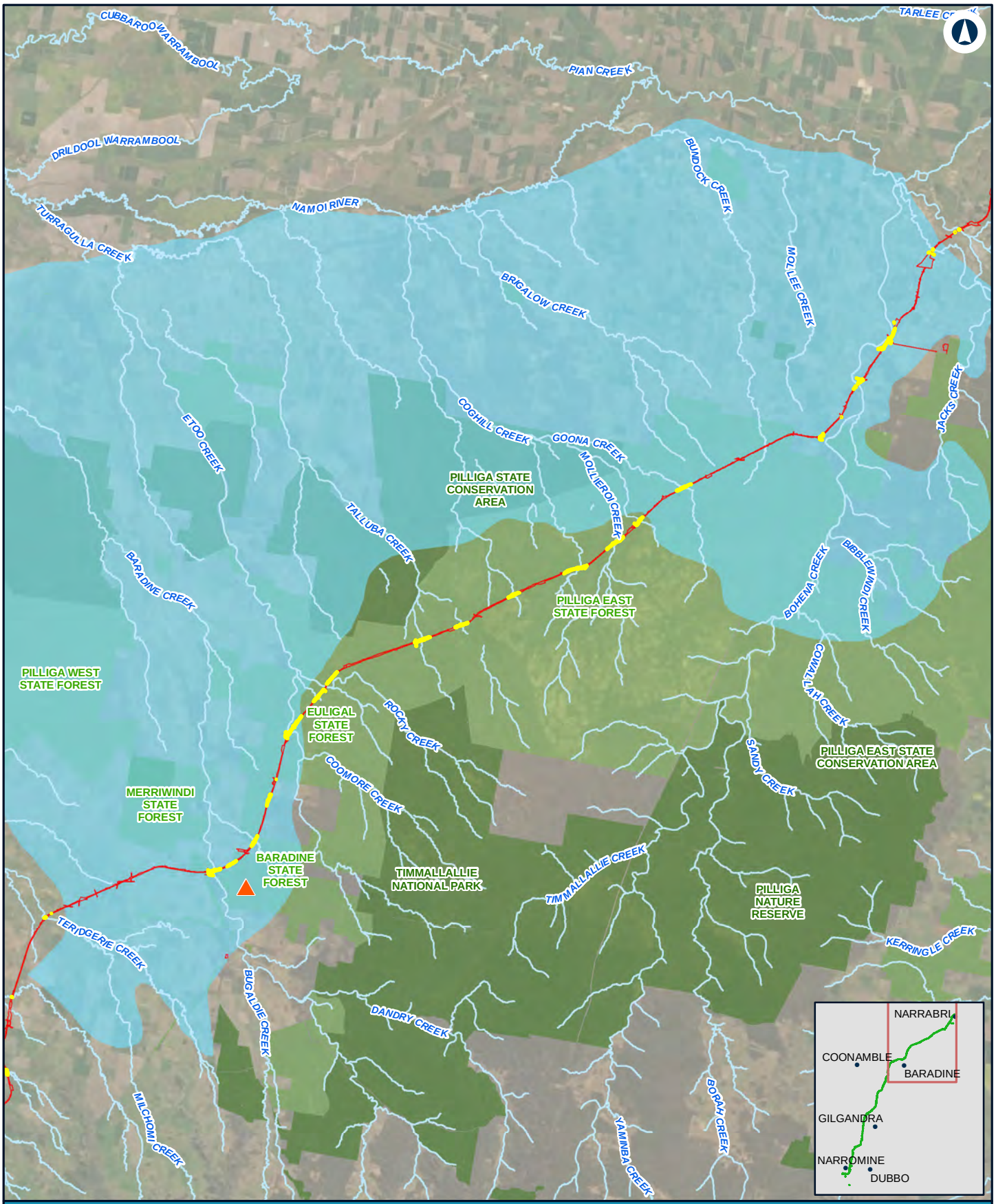

NARROMINE TO NARRABRI

Fauna Species Polygon - Pale-headed Snake - Pilliga Outwash

MAP 4 OF 5

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Pale-headed Snake species polygon
- Pale-headed Snake GHD record (March, 2019)

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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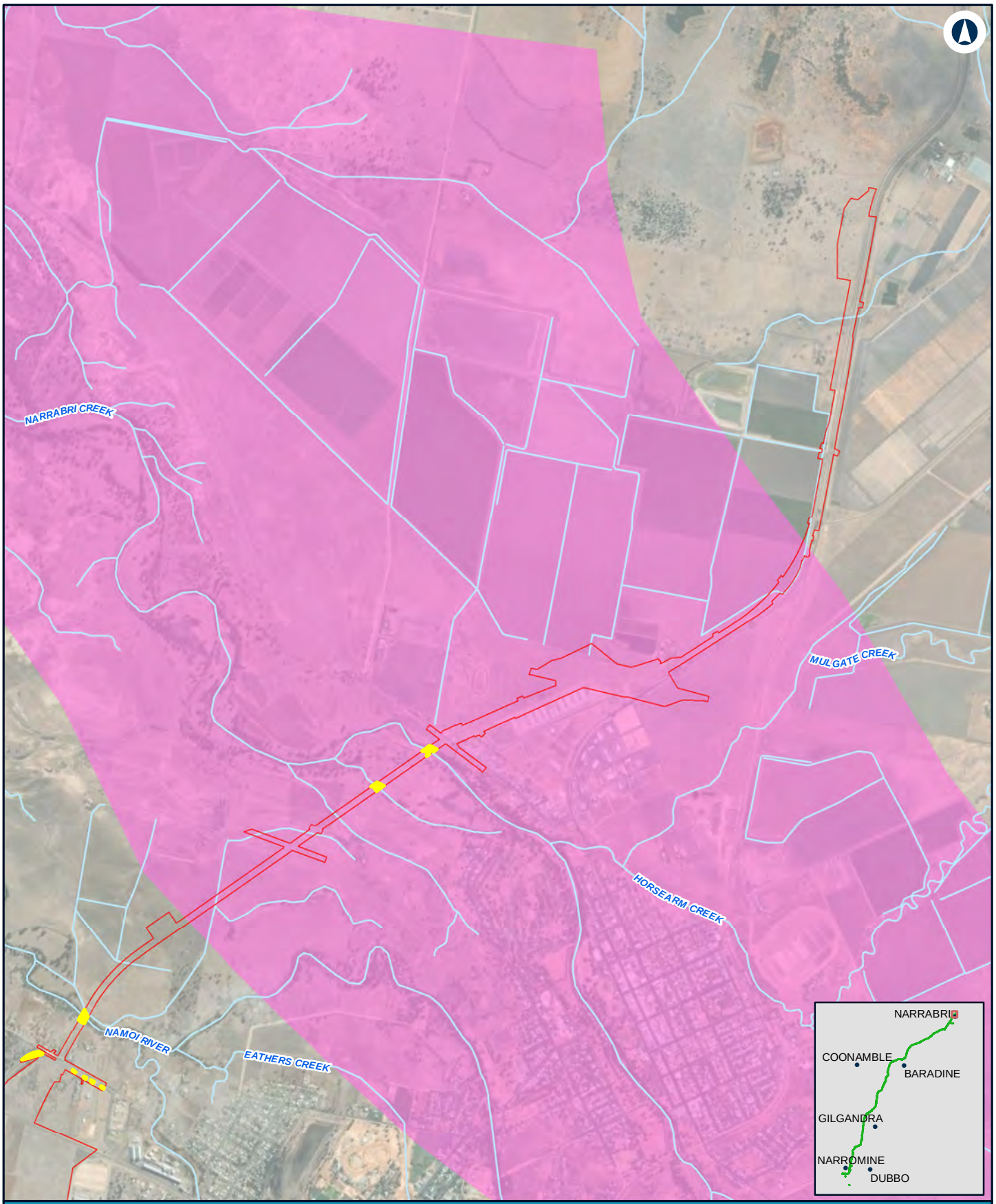

NARROMINE TO NARRABRI

Fauna Species Polygon - Pale-headed Snake - Liverpool Plains

MAP 5 OF 5

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:37,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Pale-headed Snake species polygon

IBRA subregion

- Liverpool Plains

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Table I30 Koala

Koala (*Phascolarctos cinereus*)	
BC Act Status	Vulnerable
Credit type	Species and ecosystem
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	260.4 hectares
Breeding requirements	• Koalas generally breed between September and February. Female koalas can breed from about two years of age (DECC 2008) • While female Koalas can theoretically breed every year, this generally does not occur due to the metabolic pressures of lactation and the low nutrient status of their preferred food resources (DECC 2008). • Dispersal of juveniles (predominantly males) has been recorded in Queensland between June and December, with most dispersal of males commencing in July and August and that of females commencing between September and November prior to, and early in, the annual breeding season (Dique et al 2003). • In northern NSW, long-distance dispersal of up to 16.6 kilometres was recorded in around 20 percent of the population, and the average dispersal distance was found to be 5.6 kilometres (Norman et al 2019).
Habitat requirements	• Koalas inhabit eucalypt woodlands and forests (EES 2019b) • Koalas 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 (EES 2019b). Koalas generally feed within trees of the *Eucalyptus* genus but local habitat studies across their extensive range have revealed they also feed within tree species from many other genera including *Corymbia, Angophora, Lophostemon, Melaleuca, Acacia, Allocasuarina* and *Callitris* (OEH 2018b). • Use of shelter trees for thermoregulatory purposes is another driver of Koala tree use, particularly in hotter and more arid locations and during periods of extreme temperatures (OEH 2018b). • In the Pilliga State Forest of central-western NSW, the average home range is 10–15 hectares (R. Kavanagh, State Forests NSW, pers. comm.; DECC 2008). • In the western slopes and plains of the State, River Red Gum (*Eucalyptus camaldulensis*) and Coolabah (*Eucalyptus coolabah*) are the primary feed tree (DECC 2008). • Habitat use by Koalas in the north-western slopes and plains of NSW focuses on the preferential utilisation of 'Primary' and/or 'Secondary' food trees in the form of 'red gums' and 'boxes' respectively. Primary food trees are used independently of size class, while use of secondary food trees is typically size-class dependent (Phillips et al. 2000, Phillips and Callaghan 2000).

Koala (*Phascolarctos cinereus*)	
Habitat in the study area	• Habitat in the study area lies primarily within the Pilliga forests. There are large areas of foraging habitat primarily close to drainage lines with deeper soils and a lower occurrence of fire (Lunney et al. 2017). • Trees with documented high use (OEH 2018b) that are present in the proposal site include *Eucalyptus chloroclada* (Dirty Gum), *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus camaldulensis* (River Red Gum). Trees with documented high use in the Pilliga (OEH 2018b) that are present in the proposal site include *Eucalyptus pilligaensis* (Pilliga Box) and *Callitris glaucophylla* (White Cypress Pine). Trees with documented significant use in the Pilliga (OEH 2018b) comprises *Eucalyptus crebra* (Narrow-leaved Ironbark). • Linear habitat for this species also occurs along roadside TSRs and in woodland patches in agricultural land. • The Bohena Creek system is thought to be a vital route for the dispersal of the Koala in the Pilliga (ABC News 2014).
Known populations	**Pilliga** • Surveys of the Pilliga forests in the 1990s suggested that the forests were carrying the largest population of Koalas west of the Great Dividing Range in NSW, with the numbers estimated at approximately 15,000 (Kavanagh and Barrott 2001). • A combined series of repeat surveys for Koalas within the Pilliga forests showed a decline of over 80 percent in both the distribution and activity of Koalas within the forests (Lunney et al. 2017). • Although Koalas remain within the forests, they were found in the later surveys to be restricted to moister areas adjacent to creek lines (Kavanagh and Barrott 2001). • Koalas are most common in the western half of the central Pilliga, fairly common in West Pilliga, and least common in the eastern and southern Pilliga (Kavanagh and Barrott 2001). • Logistic regression analysis found that Koalas appear to persist better in areas of the Pilliga that are closer to mapped drainage lines with deep soils and high water-holding capacity. Sites with these characteristics tend to occur in the western part of the study area (Lunney et al 2017). • The Pilliga Area of Regional Koala Significance (ARKS) covers much of the alignment. It is mapped west from where Yarraman Road meets Pilliga Forest Way to the Baradine area, and also a small area near the Newell Highway. The majority of the ARKS is mapped as being of low functional habitat and low resilience. Most of the ARKS is mapped as having very high threat of impacts from wildfire, heat stress and climate change, high impact from dog attack, and moderate threat from fragmentation and vehicle strike (OEH 2019). • The recent decline of Koalas in the Pilliga is not likely to have been the result of a single short-lived catastrophic event (eg a single heatwave) reducing numbers, but is more likely to have been the result of ongoing disturbance (eg a prolonged drought), or a series of adverse events (eg a series of heatwaves or large-scale fires) (Lunney et al 2017). • Population contractions are likely to have occurred in the past in the Pilliga with Koala populations retreating to moister creek lines with either available free water or a higher moisture content in the leaves of their food trees. However, since the early 1900s, creeks within the Pilliga forests have sanded up as a result of land clearing within and on the periphery of the forests and from road building within the forests (Hesse and Humphreys 2001). The scale of the disturbance in the Pilliga is such that disturbed channels appear to be 'normal' (Hesse and Humphreys, 2001). Habitats that would have once likely functioned as

Koala (*Phascolarctos cinereus*)	
	refugia for Koalas during times of drought, are now highly disturbed and are unlikely to provide the required level of protection for the species in the region (Lunney, Predavec, Miller, Kavanagh, et al. 2016). • One local resident suggested that injury and infections from Tiger Pears may be a factor in the decline of the species in the Pilliga forests. This is further supported by radio-tracking studies by Kavanagh and Barrott (2001) which noted the death of two radio-tracked koalas due to septicaemia resulting from thorn-stick injuries from Tiger Pear and also scarring and infections on the feet off most animals. Tiger Pear was known to be common within a 10 kilometre radius of 'The Aloes' in the western portion of the Pilliga (Kavanagh and Barrott 2001) • Aloes Picnic Area, which occurs adjacent to Etoo Creek in the Pilliga forests, was a known hotspot for Koalas (Baradine bird routes brochure, no date) • The Pilliga and Bohena Creek area have recent been mapped as part of the Pilliga ARKS. • Evidence provided to the recent inquiry in Koala populations in NSW noted that the Pilliga Koala population was 'completely unviable' or already extinct (Legislative Council Portfolio Committee 7 2020). **Other locations** • Large numbers of records in Breeza, Gunnedah and vegetation associated with the Melville range to the east (EES 2019a). • Patchy and isolated records between Narromine and Gilgandra (EES 2019a).
Survey requirements	Survey months: All year
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys including habitat assessments – no Pilliga surveys). • November 2018 (10 days, two ecologists – diurnal surveys including scat searches and searches for Koalas/nocturnal surveys including spotlighting and call playback– no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (10 days, four zoologists – diurnal surveys – scat searches and searches for Koalas in the Pilliga). • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga, including spotlighting and call playback). • August 2019 (5 days, two zoologists – diurnal scat searches and nocturnal spotlighting and call playback surveys, one night in the Pilliga). • Late September-early October 2019 (6 days including scat searches, two ecologists. two days, two nights in the Pilliga including scat searches, call playback and spotlighting). • June 2020 (two ecologists, two days and one night in the Gilgandra area). • November 2020 (two ecologists, four days, two nights in the Pilliga and Bohena Creek area). • July 2021 (2 days, one night, two ecologists – Narromine area). • July 2021 (two ecologists and thermal drone pilot – four nights in the Pilliga and one night in the Bohena Creek area). • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, expert survey by Steve Phillips).

Koala (*Phascolarctos cinereus*)	
Survey results	Koala scats were recorded during the surveys at Etoo Creek and at Coolangala Creek in the Pilliga forest. One individual was recorded at Baradine Creek in the Pilliga forest during the thermal drone surveys. An old scat was recorded by Steve Phillips in a small patch of woodland in agricultural land on Berida Road north-west of Gilgandra.
Species polygon guidance	Habitat constraints: Areas identified via survey as important habitat (see below). Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained).
Species polygon justification	The species polygon was prepared for the expert report (refer to Appendix N). A summary the justification is provided below. Surveys for the Koala were undertaken at various locations along the proposal site between 2018 and 2022. Survey methods included scat searches, diurnal surveys, spotlighting, call playback and use of remote cameras. Scats were recorded at Coolangala Creek and Etoo Creek only. Thermal drone surveys conducted in the Pilliga in July 2021 recorded one Koala near Baradine Creek in the Pilliga forest. A separate field survey was conducted by Koala expert Dr Steve Phillips in August 2021 to build on this previous work. During this survey of 34 sites along the proposal site Koala scats were recorded in one located north-west of Gilgandra. Dr Steve Phillips undertook a review of PCT associations and preferred Koala feed trees to identify potentially suitable habitat for the Koala in the study area. This identified up to 1422.63 hectares of potentially suitable habitat in the proposal site. Of this, only 5.77 ha contains primary Koala habitat (ie. habitat dominated by preferred feed trees), and 105.66 hectares contains secondary class A Koala habitat (habitat where preferred feed trees are subdominant). A review of Koala records was used to identify areas of generational persistence along the N2N alignment (ie. habitat supporting breeding populations). Three areas of Koala generational persistence were apparent in the study area, two located around the area of Baradine and Etoo Creeks in the Pilliga, the third located to the southwest of Narrabri at the northern end of the Pilliga. This includes the locations where Koalas were recorded by JacobsGHD and the thermal drone surveys. There is a paucity of Koala records between Narromine and Baradine, which is supported by the recording of scats at only one location to the north-west of Gilgandra. The area of suitable Koala habitat was refined for the species polygon based on the areas of generational persistence and positive survey locations, as these are locations where populations have been recorded in the proposal site. Areas of derived native grassland and other unsuitable habitat areas have been excluded. A final species polygon area of 260.44 ha has been mapped. Areas with no evidence of Koala breeding populations (a lack of generational persistence) and no evidence during field surveys have been excluded from the species polygon.
Relevant IBRA subregions	Inland Slopes: Known – No – surveyed Bogan Macquarie: Known – Yes – surveyed (habitat) Castlereagh Barwon: Known – Yes – surveyed (habitat) Pilliga Outwash: Known – Yes – surveyed (present) Pilliga: Known – Yes – surveyed (present) Liverpool Plains: Known – Yes – surveyed (habitat) Northern Basalts: Known – Not in BAM-C case

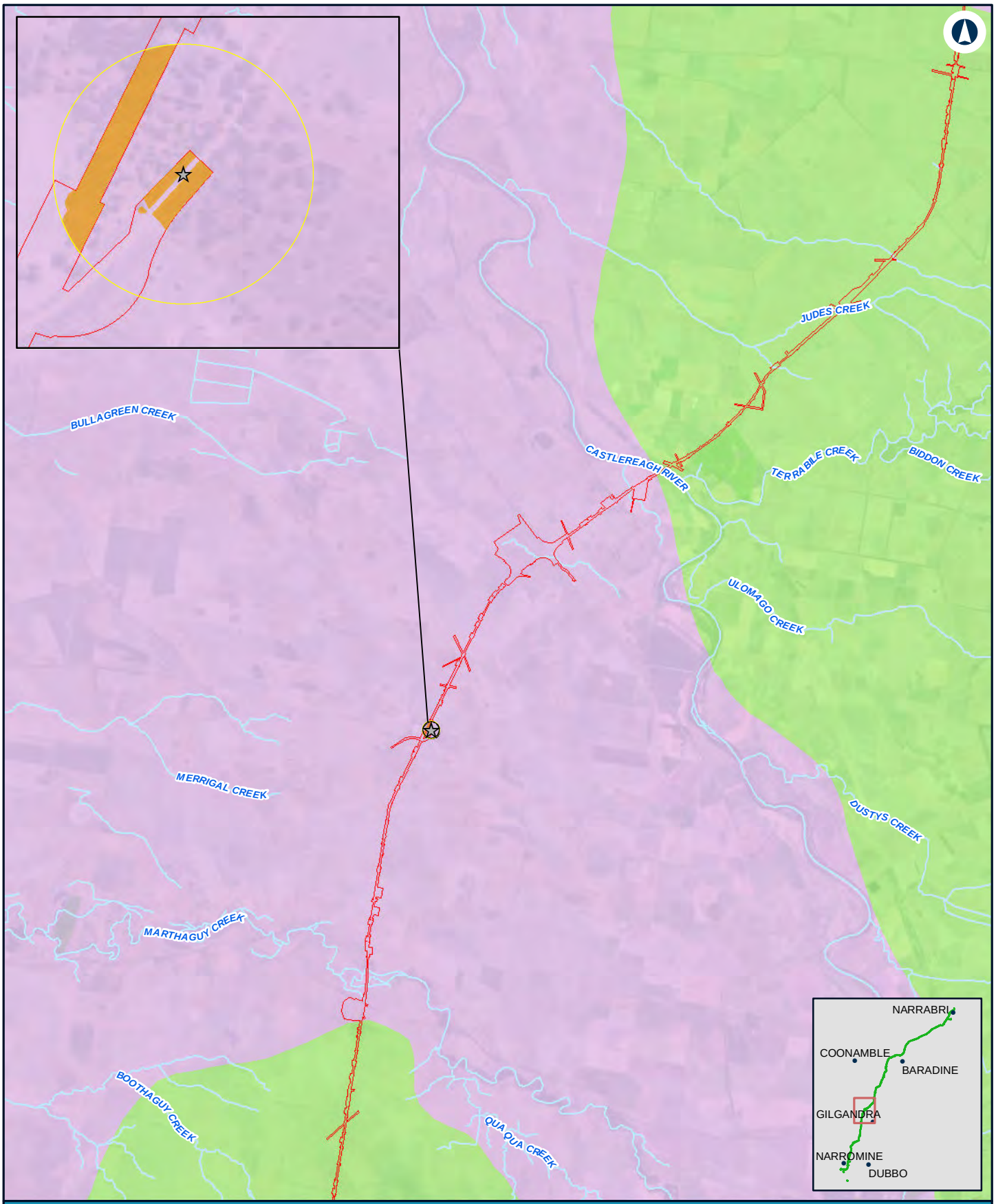
Koala (*Phascolarctos cinereus*)			
Inland Slopes	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (DNG)	Not suitable habitat – lacks eucalypt overstory
	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (Good)	Limited connectivity, not important habitat
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Suitable habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable habitat – lacks eucalypt overstory
	56	Poplar Box - Belah woodland – 56 (Good)	Suitable habitat
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Suitable habitat
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Suitable habitat
	248	Mixed box eucalypt woodland – 248 (Good)	Suitable habitat
	255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Suitable habitat
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Suitable habitat
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Potentially suitable habitat depending on incidence of eucalypts
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable habitat – lacks eucalypt overstory
	56	Poplar Box - Belah woodland – 56 (DNG)	Not suitable habitat – lacks eucalypt overstory
	56	Poplar Box - Belah woodland – 56 (Good)	Suitable habitat present – scat recorded
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Suitable habitat present

Koala (*Phascolarctos cinereus*)			
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable habitat – lacks eucalypt overstory
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Suitable habitat present
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not suitable habitat – lacks eucalypt overstory
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Suitable habitat present
	244	Poplar Box grassy woodland – 244 (Good)	Suitable habitat present
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Suitable habitat present
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Potentially suitable habitat depending on incidence of eucalypts
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Suitable habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not suitable habitat – no eucalypts present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable habitat – no eucalypts present
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Suitable habitat
	56	Poplar Box - Belah woodland – 56 (Good)	Suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Suitable habitat
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Suitable habitat
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable habitat – no eucalypts present
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not suitable habitat – no eucalypts present

Koala (*Phascolarctos cinereus*)		
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not suitable habitat – no eucalypts present
168	Derived Copperburr shrubland – 168 (Good)	Not suitable habitat
202	Fuzzy Box woodland – 202 (Good)	Suitable habitat
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Suitable habitat
244	Poplar Box grassy woodland – 244 (Good)	Suitable habitat
255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland – 255 (Good)	Suitable habitat
256	Green Mallee tall mallee woodland – 256 (Good)	Suitable habitat
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Suitable habitat
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Suitable habitat
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not suitable habitat – no eucalypts present
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Suitable habitat
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Suitable habitat
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Suitable habitat
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Suitable habitat
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Suitable habitat
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Suitable habitat
414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Suitable habitat

Koala (*Phascolarctos cinereus*)			
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Suitable habitat
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Suitable habitat
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Suitable habitat
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not suitable habitat – lack of eucalypts
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not suitable habitat – lack of eucalypts
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not suitable habitat – lack of eucalypts
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Suitable habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Suitable habitat present
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not suitable habitat – lack of eucalypts
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not suitable habitat – lack of eucalypts
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not suitable habitat – lack of eucalypts
	168	Derived Copperburr shrubland – 168 (Good)	Not suitable habitat – lack of eucalypts
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Suitable habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Suitable habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Suitable habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Suitable habitat present

Koala (*Phascolarctos cinereus*)			
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not suitable habitat – lack of eucalypts
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Suitable habitat present
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not suitable habitat – lack of eucalypts
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Suitable habitat present
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not suitable breeding habitat – canopy removed
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Suitable habitat
	168	Derived Copperburr shrubland – 168 (Good)	No suitable nesting habitat – lack of canopy



NARROMINE TO NARRABRI

Fauna Species Polygons - Koala

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 30/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:150,000

LEGEND

- Construction impact zone
- Koala scat record (expert report)
- Koala scat record 250m buffer

IBRA subregion

- Castlereagh-Barwon
- Pilliga

Vegetation Zone

- 56:Poplar Box - Belah woodland on clay-loam soils on aluvial plains on north central NSW:Good

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Data Sources: OEH; Koala records: BioNet 2021; Species polygon - Biolink 2021; Basemap layers: NSWSS, esri

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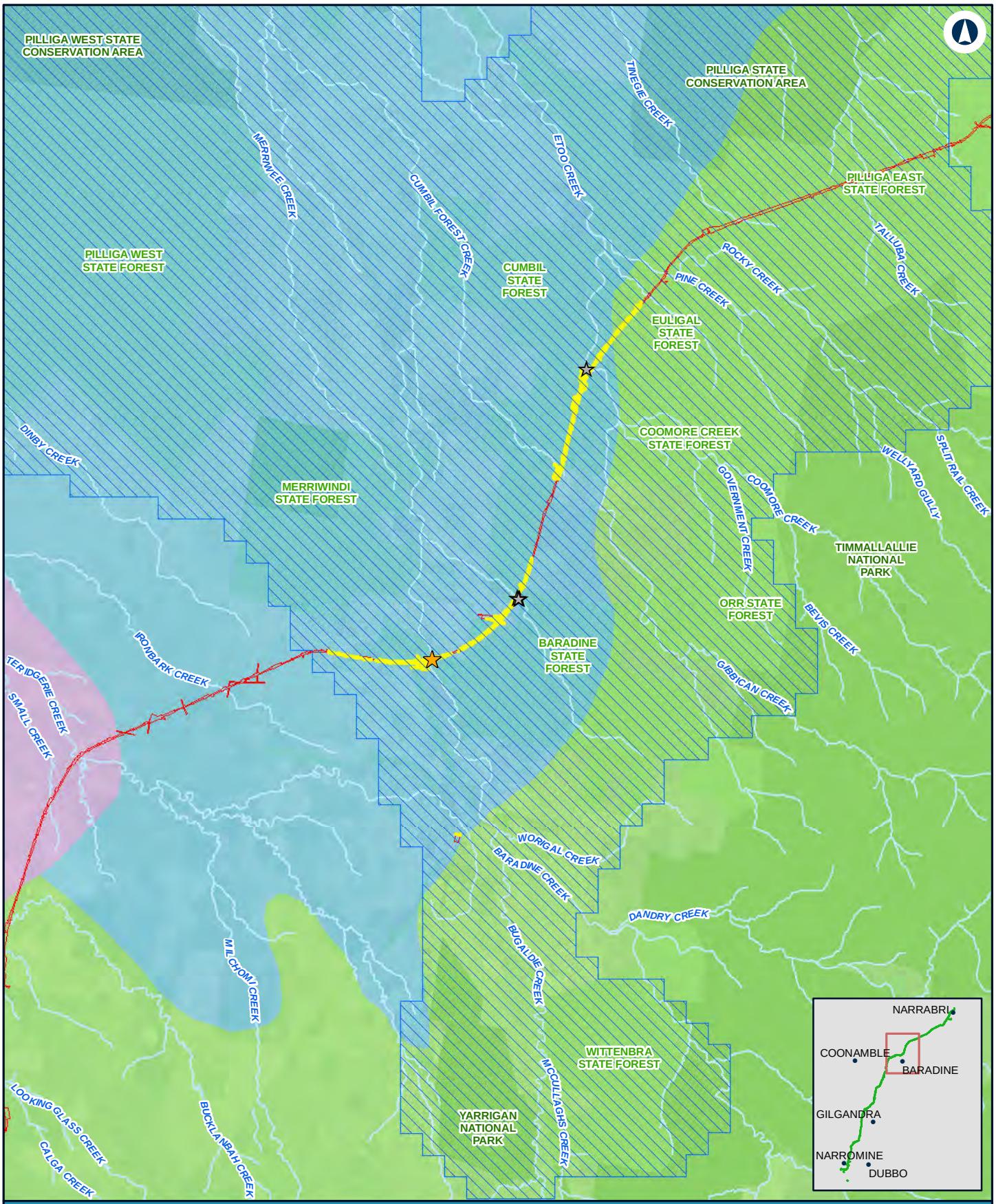

NARROMINE TO NARRABRI

Fauna Species Polygons - Koala

0 3 6 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 4/07/2022 Paper: A4
Author: JacobsGHD Scale: 1:236,862

Data Sources: OEH; Koala records: BioNet 2021; Species polygon - Biolink 2021; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Koala GHD record
- Koala (drone record)
- Koala species polygon

IBRA subregion

- Castlereagh-Barwon
- Pilliga
- Pilliga Outwash
- Area of Regional Koala Significance

INLAND RAIL ARTC

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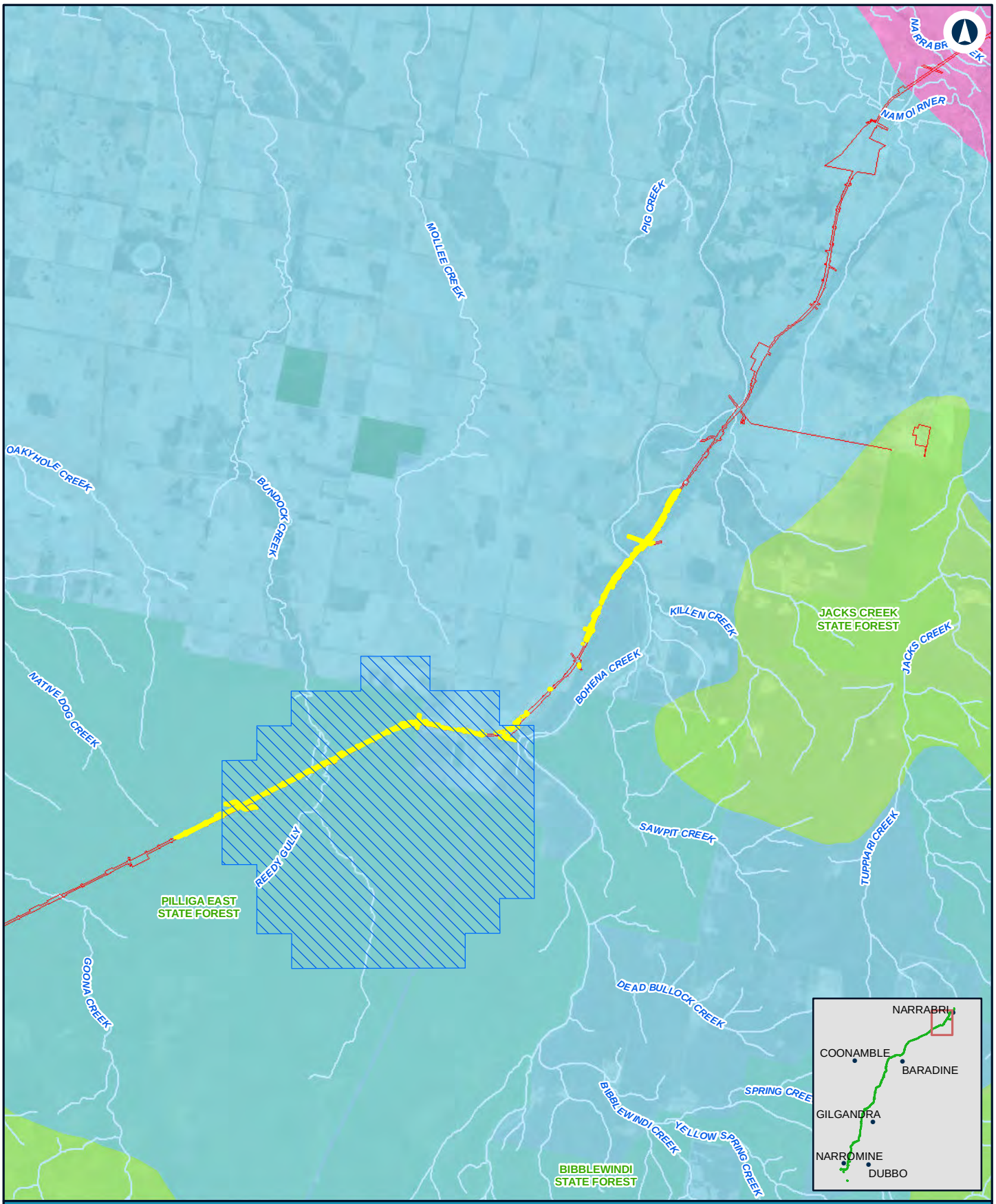

NARROMINE TO NARRABRI

Fauna Species Polygons - Koala

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 30/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:150,000

LEGEND

- Construction impact zone
- Koala species polygon
- Area of Regional Koala Significance

IBRA subregion

- Liverpool Plains
- Pilliga
- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Data Sources: OEH; Koala records: BioNet 2021; Species polygon - Biolink 2021; Basemap layers: NSWSS, esri

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Table I29 Squirrel Glider

Squirrel Glider (*Petaurus norfolcensis*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	651 hectares
Breeding requirements	• In south eastern Australia breeding usually begins in August with each female producing two young. • Relies on large old trees with abundant hollows for breeding and nesting (EES 2019b). • Preferred hollows are those with a large cavity that can house multiple gliders in a large nest, yet with a small entrance that protects the group from predators like goannas (NSW Scientific Committee 2008b).
Habitat requirements	• Inhabits mature or old growth Box, Box-Ironbark (*Eucalyptus paniculata*), (*Eucalyptus molucanna*) woodlands and River Red Gum forest west of the Great Dividing Range (EES 2019b). • Important habitat components appear to be a sufficient density of hollow-bearing trees and a high floristic diversity, including the presence of smooth-barked and winter/spring flowering tree species and a good winter supply of nectar (Menkhorst et al. 1988; Sharpe and Goldingay 1998; NSW Scientific Committee 2008b). • Box-Ironbark with an Acacia understorey is likely to be a key habitat for inland NSW populations of the Squirrel Glider, as in parts of Victoria (Traill and Lill 1997). • Habitat degradation in remnants is continuing through loss of key shelter and dietary resources (ie tree hollows and Acacia or floriferous shrubs). Tree hollows are currently less abundant in forests managed for timber than in linear roadside fragments, and there is a net loss of large hollow trees, without adequate recruitment. The species is subject to cumulative loss of den sites from harvesting of forests or woodlands (NSW Scientific Committee 2008b). • Declines of the large possums in inland NSW are associated with a 70 percent reduction in box-ironbark habitat, a 90 percent reduction in the proportion of large trees with hollows, and loss of a shrubby understorey in remnant habitat (Kerle 2004), and fox predation and loss of ironbarks and hollows in the Pilliga forests (Paull and Kerle 2004).
Habitat in the study area	The Pilliga forests provides a large areas of foraging, breeding and denning habitat for this species. The Squirrel Glider would den in ironbarks and also along creeklines where there is an abundance of large hollow-bearing River Red Gums. Shrubby areas with acacias and other myrtaceous plants would provide foraging habitat.

Squirrel Glider (*Petaurus norfolcensis*)	
Known populations	• The Squirrel Glider is sparsely distributed along the east coast and immediate inland districts from western Victoria to north Queensland. The species is found inland as far as the Grampians in Victoria and the Pilliga and the Coonabarabran areas of NSW (NPWS 1999). • Records in the locality are mostly restricted to areas set aside for conservation including Goulburn River National Park, Warrumbungle National Park, Pilliga Forest and Mount Kaputar National Park (EES 2019b) • The species also occurs in larger woodland patches in the region (EES 2019a). • In the Pilliga forests, scattered records are present, and the lack of records are likely to due in part to the poor detectability of the species. • In a study of possums in the Pilliga forests, only two Squirrel Gliders were recorded out of 26 sites in 1993/1994, and four individuals at 21 sites in 19998/2000. Individuals were recorded in *Eucalyptus pilligaensis* (3), *E. crebra* (3) and *Angophora floribunda* (1) (Paull and Kerle 2004). Higher numbers of Sugar Gliders were recorded in the 1999/2000 surveys (25 individuals) compared to the earlier surveys (8 individuals). • Squirrels occur at lower densities than Sugar Gliders where the two co-exist (Suckling 1995). • Surveys in the Pilliga have demonstrated a continuing decline of possum populations, with observations of Brush-tailed Possums and Ringtail Possums dropping substantially (Kerle 2004). The Squirrel Glider may be going through a similar decline due to the reduction in availability of den habitat (NSW Scientific Committee 2008). • Squirrel Gliders are susceptible to predation by foxes (Suckling 1995). Brush-tailed Possums were found to be the favoured prey of foxes in the Pilliga in the 1993/4 survey (Paull and Date 1999). Problems posed by foxes are likely to be exacerbated by increased distances between suitable feed and den trees. Goannas and owls may also rely more heavily on possums in a habitat where resources have been compromised (Paull and Kerle 2004).
Survey requirements	Survey months: January to December. Survey year round but sites with bi-pinnate acacia, autumn winter flowering trees and shrubs such as *Eucalyptus robusta* and *Banksia* spp. (*integrifolia* etc) should be subject to a more retracted survey period of between March-August. Relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely-connected (ie no more than 50 metres apart) (EES 2019b).

Squirrel Glider (*Petaurus norfolcensis*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal habitat assessments surveys only). • November 2018 (10 days, two ecologists – diurnal habitat assessments and eight nights of nocturnal surveys including spotlighting along the alignment – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (10 days, four zoologists – diurnal surveys – trapping in the Pilliga (week one) and Gilgandra and Bohena Creek areas (week 2)). • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga, including call playback). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, one night in the Pilliga). • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga). • June 2020 (two ecologists, two days and one night in the Gilgandra area). • November 2020 (two ecologists, four days, two nights in the Pilliga and Bohena Creek area). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). The March surveys included one week in the Pilliga forests, with six zoologists conducting surveys, and a second week with two zoologists in the Bohena Creek and northern Pilliga. Trap effort consisted of nine trap lines in the Pilliga and Bohena Creek areas containing 10 tree-mounted Elliott traps, trapped for four nights each (total of 360 trap-nights). Trapping was also conducted south-west of Gilgandra, and comprised two trap lines of 10 tree-mounted Elliott traps, trapped for four nights (total of 80 trap-nights). Five nights of spotlighting surveys were conducted in the Pilliga in March 2019. Spotlighting was conducted at various locations along the alignment in November 2018 for eight nights and August 2019 for five nights, the latter targeting major creeklines and the Pilliga on one evening. Spotlighting was also conducted in the Pilliga on two nights in September/October 2019. Five nights of spotlighting was conducted in conjunction with thermal drone surveys in July 2021 in the Pilliga forests and Bohena Creek area.
Survey results	A family of Squirrel Gliders were observed at a hollow in an ironbark during nocturnal surveys on two occasions in the same tree during the March 2019 surveys in the Pilliga. No individuals were trapped during surveys.
Species polygon guidance	Habitat constraints: NA Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). Relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely-connected (ie no more than 50 metres apart).

Squirrel Glider (*Petaurus norfolcensis*)			
Species polygon justification	The species polygon for the Squirrel Glider incorporates areas of potential habitat in the Pilliga, Pilliga Outwash and Liverpool Plains IBRA subregions. Shrubland vegetation (PCT 141) has been included in the Pilliga where a scattered canopy of trees is also present (larger expanses of this community with no canopy cover are not included). Other areas with suitable woodland habitat and connectivity are included outside the main forested areas as this species is known to occur in linear roadside habitat. Paddock trees are included where these are located within 50 metres of assumed habitat in the species polygon, based on the information provided in the TBDC. Areas have been excluded from the species polygon where survey has been undertaken and the species was not recorded. Small, isolated patches in cleared farmland are not included in the species polygon as persistence of family groups is unlikely as there is no opportunity for recolonisation. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Yes – surveyed (habitat) Pilliga: Yes – surveyed (present) Liverpool Plains: Yes – surveyed (habitat) Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and suitable shrub layer
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable habitat present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and suitable shrub layer
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and suitable shrub layer

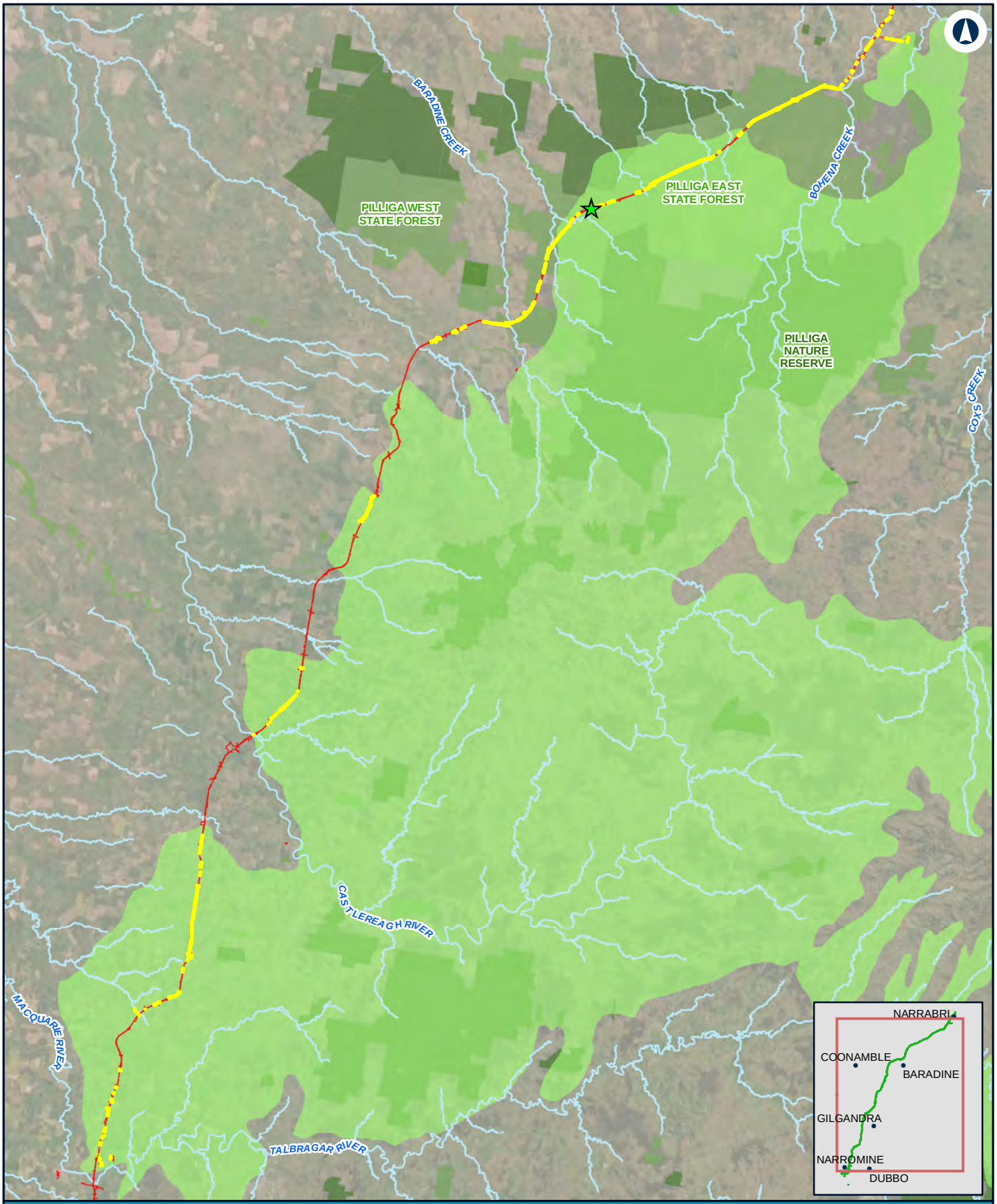
Squirrel Glider (*Petaurus norfolcensis*)		
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and suitable shrub layer
56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Scattered patches affected by grazing and agriculture
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable habitat present. Individuals recorded in this PCT in the Pilliga forests during surveys.
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Suitable foraging habitat where patches are small (included in species polygon) Not suitable habitat where patches are large and lack canopy (not included in species polygon)
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and/or suitable shrub layer
168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Lacks canopy and appropriate shrub layer
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Suitable habitat present
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Small remnant in generally cleared agricultural land, with limited connectivity to large expanses of habitat
244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT

Squirrel Glider (*Petaurus norfolcensis*)		
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Suitable habitat present
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Suitable habitat present, small patch within larger expanse of suitable habitat (included in species polygon)
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat present
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable habitat present
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable habitat present
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Suitable habitat present
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable habitat present
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Suitable habitat present
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Suitable habitat present
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Suitable habitat present
414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Suitable habitat present

Squirrel Glider (*Petaurus norfolcensis*)			
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Suitable habitat present
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Suitable habitat present
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT Suitable habitat present
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and/or suitable shrub layer
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and/or suitable shrub layer
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and/or suitable shrub layer
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable habitat present
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Suitable foraging habitat where patches are small (included in species polygon) Not suitable habitat where patches are large and lack canopy (not included in species polygon)
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and/or suitable shrub layer

Squirrel Glider (*Petaurus norfolcensis*)			
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148	Not an associated PCT Suitable habitat present (included in species polygon)
	168	Derived Copperburr shrubland – 168 (Good)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Suitable habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable habitat present
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT Not suitable habitat – lacks eucalypt canopy and/or suitable shrub layer
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Suitable habitat present
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Suitable habitat present
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Associated PCT Not suitable breeding habitat – canopy removed

Squirrel Glider (*Petaurus norfolcensis*)			
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable habitat present
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer



NARROMINE TO NARRABRI

Fauna Species Polygons - Squirrel Glider - Pilliga

MAP 1 OF 3

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Squirrel Glider species polygon
- Squirrel Glider GHD record (March, 2019)

IBRA subregion

- Pilliga

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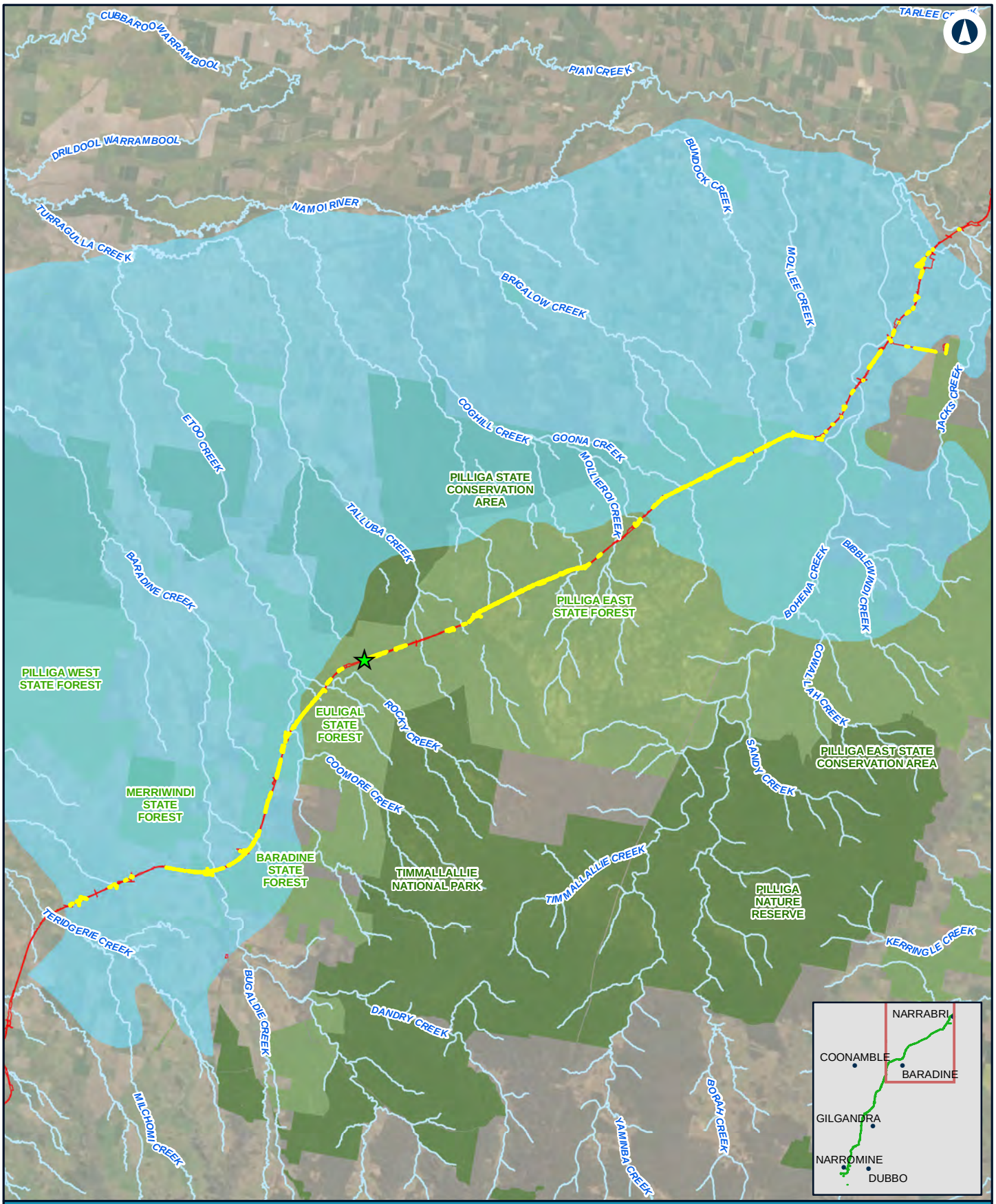

NARROMINE TO NARRABRI | Fauna Species Polygons - Squirrel Glider - Pilliga Outwash | MAP 2 OF 3

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Squirrel Glider species polygon
- Squirrel Glider GHD record (March, 2019)

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

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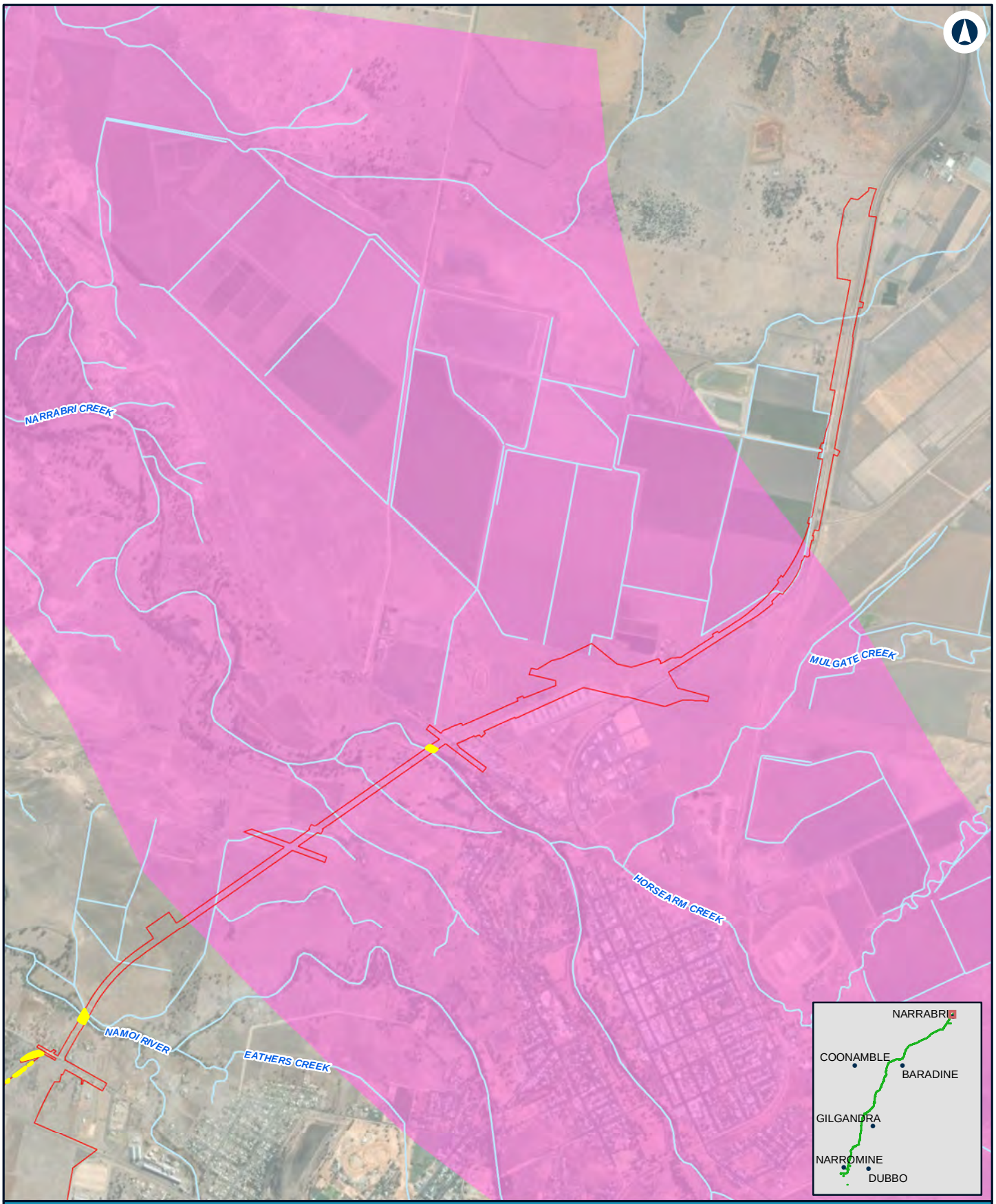

NARROMINE TO NARRABRI

Fauna Species Polygons - Squirrel Glider - Liverpool Plains

MAP 3 OF 3

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:37,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Squirrel Glider species polygon

IBRA subregion

- Liverpool Plains

INLAND RAIL ARTC

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Table I30 Eastern Pygmy-possum

Eastern Pygmy-possum (*Cercartetus nanus*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	835.5 hectares
Breeding requirements	• Appear to be mainly solitary, each individual using several nests (EES 2019b). • Young can be born whenever food sources are available, however most births occur between late spring and early autumn (EES 2019b). • Shelters and breeds in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (eg grass-tree skirts); tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks (EES 2019b).
Habitat requirements	• Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred (EES 2019b). • Many of these habitats are characterised by a high abundance of proteaceous or myrtaceous plants (Bowen and Goldingay 2000). • Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable (EES 2019b). • Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings. (EES 2019b). • Home ranges of Eastern Pygmy-possums in logged forests have been found to comprise a mosaic of disturbed and undisturbed areas, and possums did not avoid logged habitat in their home ranges, indicating that logging did not significantly influence habitat selection. Possums are likely not sensitive to selective logging and burning because nectar-producing plants are adapted to fire disturbance and because a variety of den sites were used, most commonly in tree hollows and fallen logs, which were commonly left as logging residue (Law et al 2013).

Eastern Pygmy-possum (*Cercartetus nanus*)	
Habitat in the study area	Heathy woodland and areas of open woodland with a dense shrub layer within the Pilliga are likely to provide habitat for this species. Woodland and forest elsewhere may also provide habitat where patch size and vegetation cover are suitable. The Eastern Pygmy-possum has been recorded in Broad-leaved Ironbark (*E. fibrosa/C. trachyphloia/C. endlicheri*) forests with a well-developed understory. It was recorded in unburnt vegetation where it was active in tall *Leptospermum* bushes. It was also recorded in Red Gum/Rough-barked Apple (*E. blakelyi/ A. floribunda*) woodlands (NPWS 2000). The species is likely to be patchily distributed in the Pilliga Forest and may occur in small remnants elsewhere in the study area.
Known populations	• Although the Eastern Pygmy-possum is broadly distributed, recent studies have shown that within this range the species appears to be patchily distributed and its overall abundance is low. • There are records within the Pilliga area, Goonoo State Forest, and Warrumbungles National Park. The lack of fauna surveys undertaken west of the Great Dividing Range makes it difficult to determine whether these western records represent isolated populations, or form part of a more continuous distribution (Bowen and Goldingay 2000).
Survey requirements	Survey months: October to March Known to be difficult to trap. Despite a large number of intensive trapping programs undertaken in the eastern forests and woodlands of NSW, only a small number of captures (154) resulted from a total trapping effort of 315,000 Elliott trap-nights and 57,000 pitfall trap-nights (Bowen and Goldingay 2000).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys only). • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys along the alignment – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (10 days, four zoologists – diurnal surveys – trapping in the Pilliga (week one) and Gilgandra and Bohena Creek areas (week 2)). • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga, including call playback). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, one night in the Pilliga). • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). The March 2019 surveys included one week in the Pilliga forests, with six zoologists conducting surveys, and a second week with two zoologists in the Bohena Creek and northern Pilliga. Trap effort consisted of nine trap lines in the Pilliga and Bohena Creek areas containing 10 Elliott A traps trapped for four nights (360 trap nights) and a pitfall line with five buckets at each site trapped for four nights each (180 trap nights). Five nights of spotlighting surveys were conducted in the Pilliga during March, one night in August, two nights in September/October 2019. Five nights of spotlighting was conducted in the Pilliga and Bohena Creek areas in July 2021. Cameras were left for a period of 5-10 days in the March surveys at various locations in the Pilliga, including Trap site 1, 3, 4, Coxes Road dams, Curbo Creek and Emu Dam, as well as the Bohena Creek area.

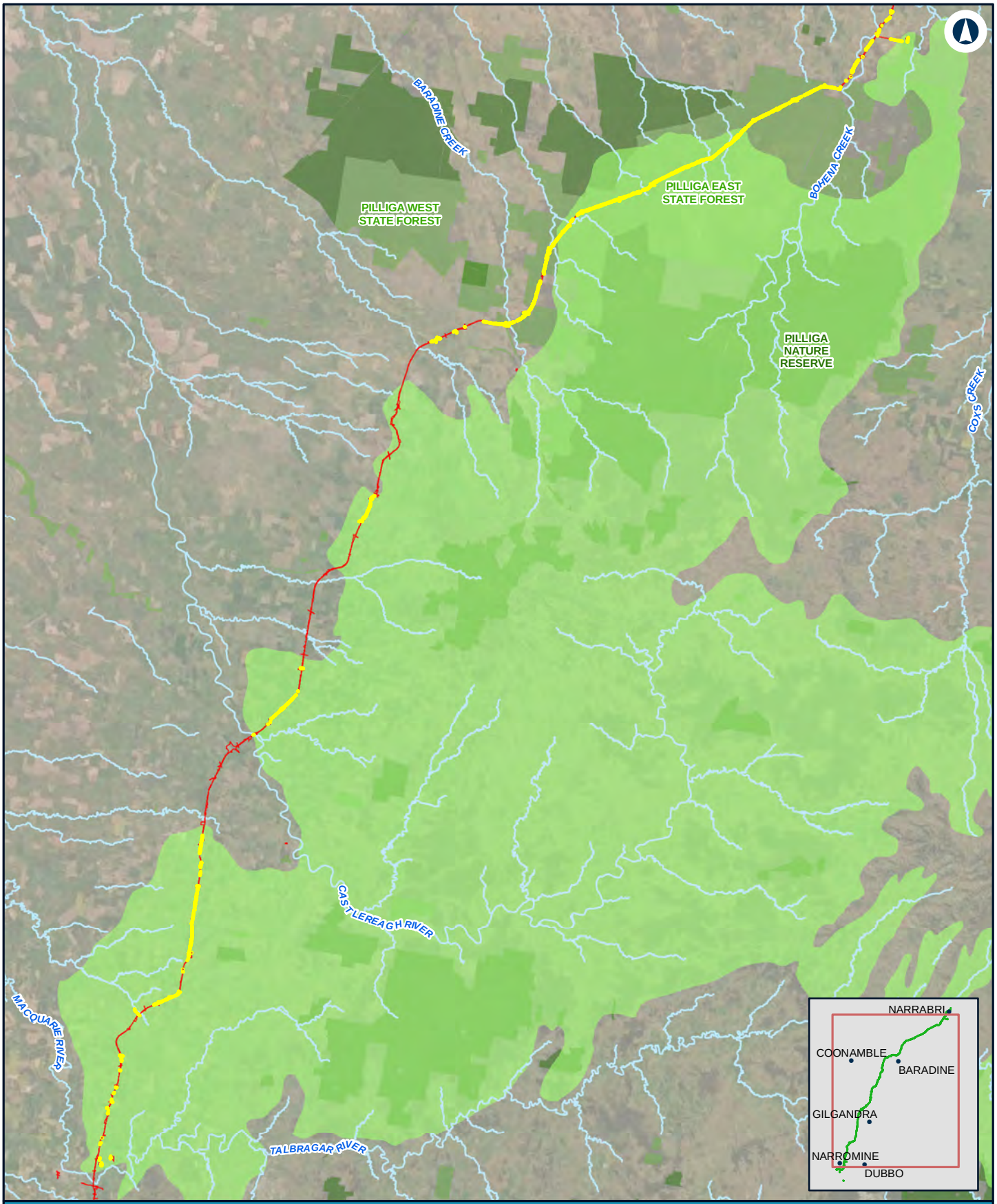
Eastern Pygmy-possum (*Cercartetus nanus*)			
	Five cameras were left for four weeks between late August and late September 2019 in the Pilliga. Locations included Kuenes Bore, Talluba Creek, heath vegetation, Clay Foot Dam and Cumbil Creek.		
Survey results	The Eastern Pygmy Possum was not recorded during surveys. Prevailing drought conditions and low densities are likely to have contributed to the lack of trap success.		
Species polygon guidance	Habitat constraints: none. Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained).		
Species polygon justification	The species polygon for the Eastern Pygmy-possum incorporates areas of potential Eastern Pygmy-possum habitat in the Pilliga and Pilliga Outwash IBRA subregions, particularly within the Pilliga forests to Bohena Creek area. Other areas with suitable woodland habitat and connectivity are included outside the main forested areas. Areas have been excluded from the species polygon where survey has been undertaken and the species was not recorded. Small, isolated patches in cleared farmland are not included in the species polygon as persistence of family groups is unlikely as there is no opportunity for recolonisation. Similarly, small fragments near the edge of the species distribution with only limited connectivity to larger fragments are not included in the species polygon. Additional surveys are recommended in spring 2022 to further refine the species polygon and offset requirements for this species.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Yes – surveyed (habitat) Pilliga: Yes – surveyed (habitat) Liverpool Plains: Yes – surveyed (habitat) Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Included in polygon where located near other suitable habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer

Eastern Pygmy-possum (*Cercartetus nanus*)		
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable habitat – lack of dense shrubby understory
56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Not suitable habitat – lack of dense shrubby understory
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT, suitable habitat present
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT, suitable habitat present
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
141	Broombush - wattle very tall shrubland – 141 (Good)	Suitable shrubby habitat present (not an associated PCT but included in species polygon)
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – not associated with chenopod shrublands
202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT Suitable habitat (included in polygon as connected to)
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Not suitable habitat – shrub layer generally absent
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT, suitable habitat present
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT, suitable habitat present

Eastern Pygmy-possum (*Cercartetus nanus*)			
	256	Green Mallee tall mallee woodland – 256 (Good)	Suitable habitat present, small patch within larger expanse of suitable habitat (not an associated PCT but included in species polygon)
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT, suitable habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT, suitable shrubby habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT, suitable habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT, suitable habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT, suitable habitat present
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT, suitable heathy habitat present
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT, suitable shrubby habitat present
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT, suitable shrubby habitat present
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT, suitable heathy habitat present
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT, suitable habitat present
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT, suitable heathy habitat present
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT, suitable habitat present

Eastern Pygmy-possum (*Cercartetus nanus*)			
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT, suitable habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT, suitable habitat present
	141	Broombush - wattle very tall shrubland – 141 (Good)	Suitable shrubby habitat present
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – not associated with chenopod shrublands
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT, suitable habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT, suitable habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Suitable habitat present

Eastern Pygmy-possum (*Cercartetus nanus*)			
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT, suitable habitat present
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT Not suitable habitat – lacks shrubby understory
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Not an associated PCT Not suitable habitat – lacks shrubby understory
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Habitat degraded – limited connectivity and dominance by exotic species
	168	Derived Copperburr shrubland – 168 (Good)	Not suitable habitat – requires eucalypt canopy and/or suitable shrub layer



NARROMINE TO NARRABRI Fauna Species Polygons - Eastern Pygmy Possum - Pilliga MAP 1 OF 3

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Eastern Pygmy Possum species polygon

IBRA subregion

- Pilliga

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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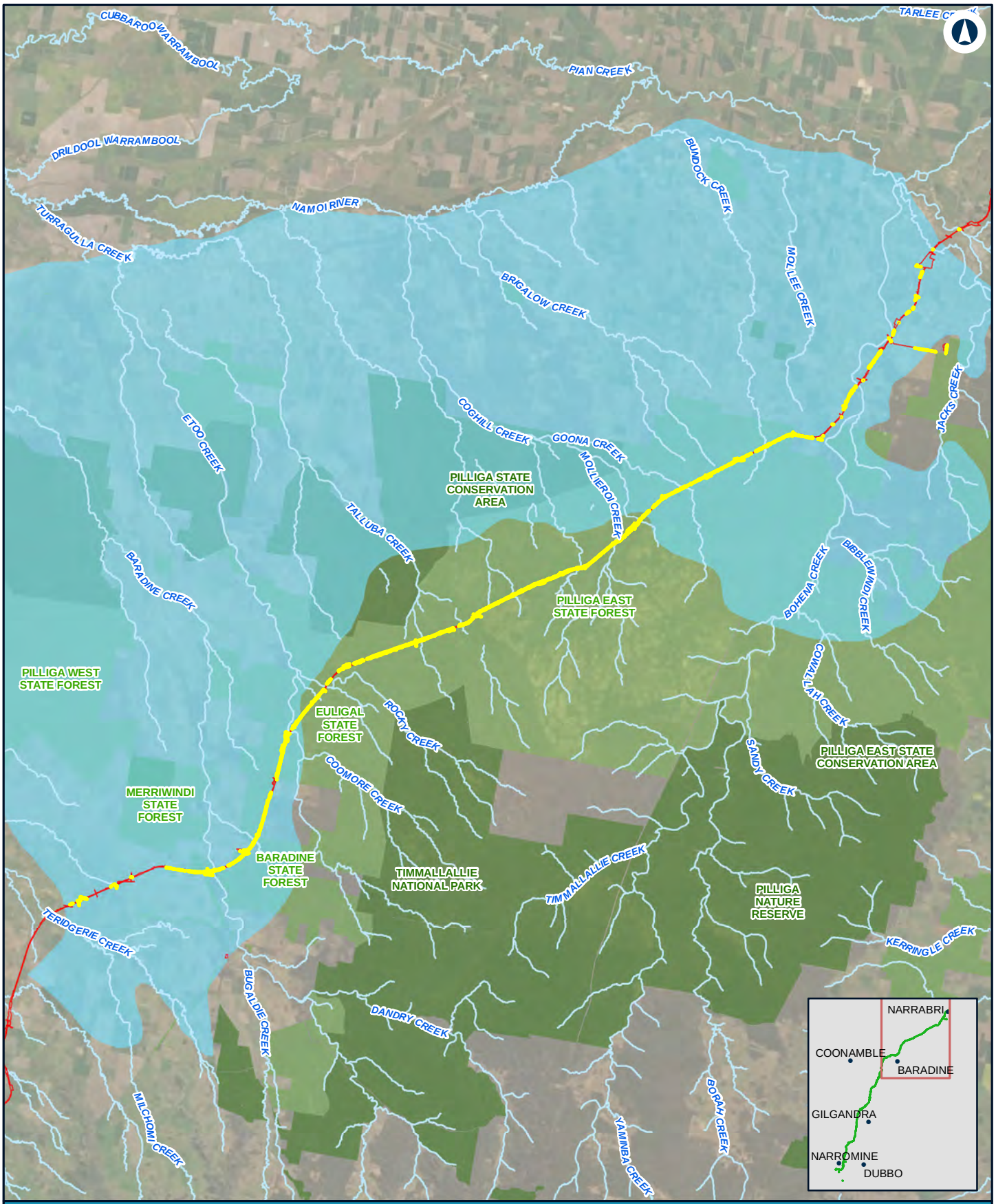

NARROMINE TO NARRABRI | Fauna Species Polygons - Eastern Pygmy Possum - Pilliga Outwash | MAP 2 OF 3

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Eastern Pygmy Possum species polygon

IBRA subregion

- Pilliga Outwash

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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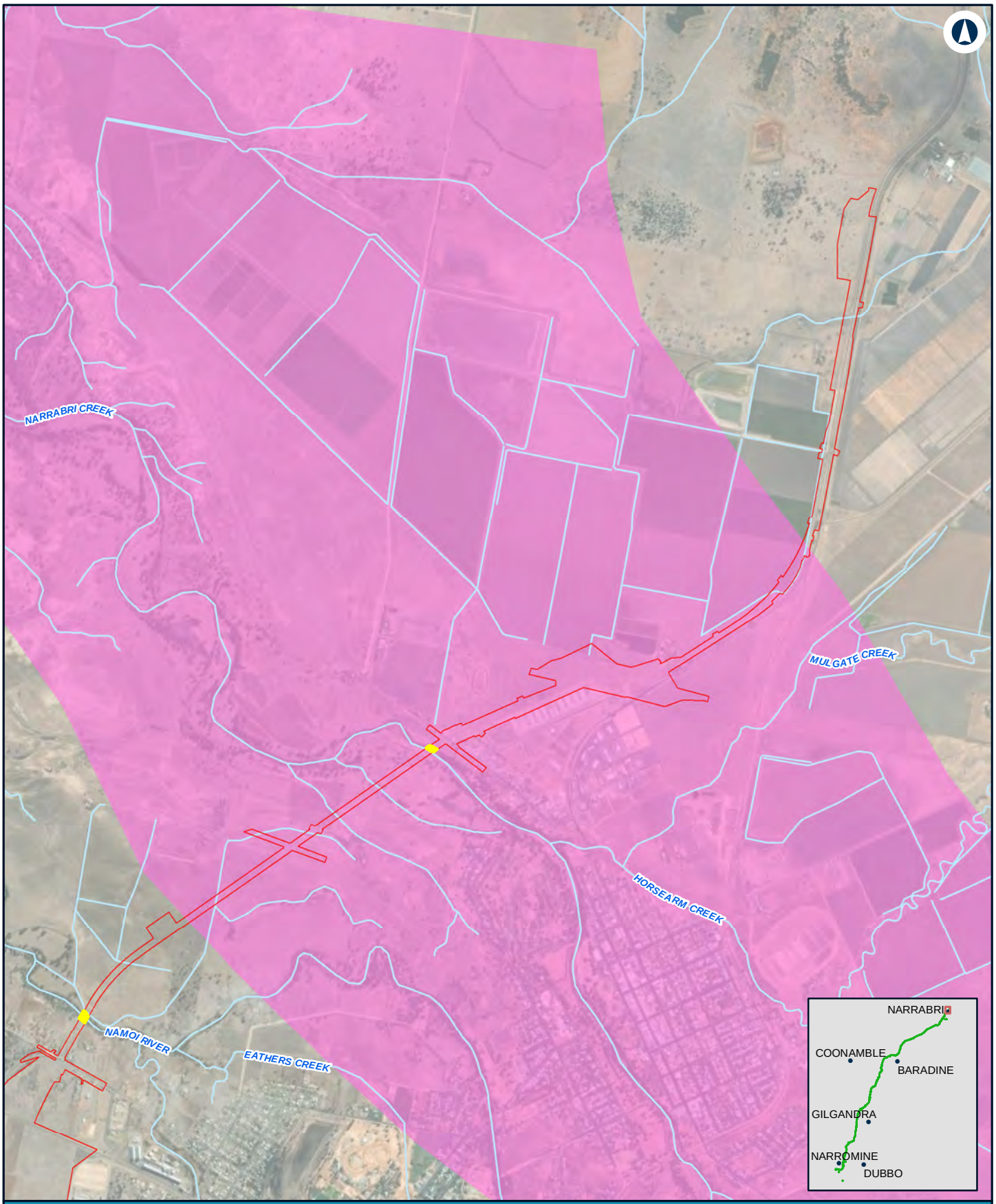

NARROMINE TO NARRABRI Fauna Species Polygons - Eastern Pygmy Possum - Liverpool Plains MAP 3 OF 3

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:37,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Eastern Pygmy Possum species polygon

IBRA subregion

- Liverpool Plains

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Table I31 Rufous Bettong

Rufous Bettong (*Aepyprymnus rufescens*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	357.9 hectares
Breeding requirements	• Rufous Bettongs may be solitary or live in pairs, and are capable of breeding at any time of year. • Estimates of home-range size vary from about 20 hectares in northern New South Wales to 44-107 hectares at Black Rock in North Queensland (Frederick and Johnson, 1996). • Frederick and Johnson (1996) found Rufous Bettongs were predominantly solitary (71 percent of sightings were of single animals) and groups, when they formed, were generally small (maximum of six individuals).
Habitat requirements	• Rufous Bettongs inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter (EES 2019b). • Shelter during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log (EES 2019b). • Diet includes grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects (EES 2019b).
Habitat in the study area	Potential habitat for this species is present in the Pilliga forests area.
Known populations	• The distribution of the Rufous Bettong is mapped in NE NSW and a small area on the Murray (this latter population is extinct) (Strahan 2000). The Rufous Bettong has largely vanished from inland areas of NSW (EES 2019b). • The Rufous Bettong is known from throughout the north-west slopes from historic and database records (Paull and Date 1999). • Systematic fauna surveys of the forests under State Forest tenure were conducted in the 1990s, and included surveys in the Pilliga, Gilgandra and Dubbo areas (Paull and Date 1996). They noted that the Rufous Bettong had not been positively identified for over 50 years from this area prior to these surveys, although there were sporadic, unconfirmed records from the Pilliga and Torrington districts. There were two potential sightings in the Pilliga during these surveys in the 1990s. • There are four records in the Pilliga forests since 1994, which includes the two sightings noted above (EES 2019b). • There are some old or unreliable records in central and western NSW in the Atlas of Living Australia: • Condobolin: this appears to be an early specimen from the South Australian Museum (M1723). Data attached to this record suggests they have picked a mid-point in NSW (near Condobolin) as locality information other than 'NSW' is missing and lat/longs have no decimal places.

Rufous Bettong (*Aepyprymnus rufescens*)	
	• Belubula (Cleifdon) Caves near Cowra (S1657, housed in the Australian Museum). This specimen was collected in 1924 in the fossil cave and is likely to indicate historic distribution (Dr Sandy Ingleby, pers. comm. Mammal Collection Manager, Australian Museum). • Wellington: fossil specimen from Wellington Caves, indicating pre-historic distribution. • Cobar. Record from 2019 which is noted as being Citizen Science (likely to be a mis-identification given location). • Based on the information above, it is likely that the Rufous Bettong is restricted to the Pilliga forests, and would not occur in small, fragmented woodland patches in predominantly cleared agricultural land.
Survey requirements	Survey months: All year. The species can be readily surveyed using cameras.
Survey effort	Fauna surveys were conducted in the following months along the alignment: • November (10 days, two ecologists – diurnal/nocturnal surveys along the alignment but not including the Pilliga). • March (5 days, two zoologists – nocturnal surveys including spotlighting in the Pilliga). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys including spotlighting, one night in the Pilliga). • Late September-early October 2019 (6 days, two ecologists. two days, two nights in the Pilliga including spotlighting). • June 2020 (two ecologists, two days and one night in the Gilgandra area). • November 2020 (two ecologists, four days, two nights in the Pilliga and Bohena Creek area). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). • March 2022 (two ecologists, ten days of habitat assessment in the Pilliga). Cameras were left for a period of 5-10 days in the March surveys at various locations in the Pilliga, including Trap site 1, 3, 4, Coxes Road dams, Curbo Creek and Emu Dam, as well as the Bohena Creek area. Five cameras were left for four weeks between late August and late September 2019 in the Pilliga. Locations included Kuenes Bore, Talluba Creek, heath vegetation, Clay Foot Dam and Cumbil Creek.
Survey results	Possible diggings of the Rufous Bettong were recorded in sandy soils in the north of the Pilliga in March 2022. A number of conical and larger diggings were recorded at this location, as well as possible footprints. Triggs (1996) notes that on softer soils diggings are often larger and less well defined, and that sometimes a number of holes can be found together as the Rufous Bettong digs up large areas of ground when searching for beetle larvae. No evidence of the species was recorded in suitable habitat areas surveyed in the proposal site via remote cameras and spotlighting on multiple survey trips. This is not surprising given the very low incidence of records of this species in the Pilliga. However, the species is likely to occur and its low density of occurrence and cryptic nature (small nocturnal species) are likely to have been a large contributing factor to limited evidence during surveys.

Rufous Bettong (*Aepyprymnus rufescens*)			
Species polygon guidance	Habitat constraints: N/A Patch size: <5 hectares. Percent native vegetation cover: variegated (between 31 and 70 percent retained). Allocated to 'species credit' as it cannot be reliably predicted to use a site based on vegetation and landscape features.		
Species polygon justification	The species polygon has been mapped in suitable vegetation zones in the Pilliga forests. Suitable habitat comprises vegetation zones with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter (EES 2019b). The species polygon has been restricted to the main Pilliga forests, and does not extend it to linear remnants and fragmented patches in agricultural land elsewhere in the proposal site given: • Distribution mapping and habitat preferences associate the species with large, forested areas of the NSW north coast and Pilliga area (NW slopes) (EES 2019b). • There is a lack of records in central NSW other than the Pilliga (Paull and Date 1999, EES 2021)). • The species occurs in low densities in forest and woodland habitat (Frederick and Johnson, 1996). • The species occurs as solitary individuals or in small groups only (Frederick and Johnson, 1996). Given the last two points in particular, the species is highly unlikely to occur in highly fragmented habitat in agricultural land (eg habitat islands), unless in it is on the edges of the Pilliga forests. This approach was confirmed by BCS. As such, no species polygons have been created outside the Pilliga forests. Areas where spotlighting surveys or camera surveys have been conducted within or immediately adjacent to the corridor in the Pilliga forests and the species not recorded are excluded from the species polygon.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Yes – surveyed (habitat) – Pilliga forest only Pilliga: Yes – surveyed (habitat) – Pilliga forest only Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat – small remnants in generally cleared agricultural land
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Not suitable habitat – sparse groundlayer present.

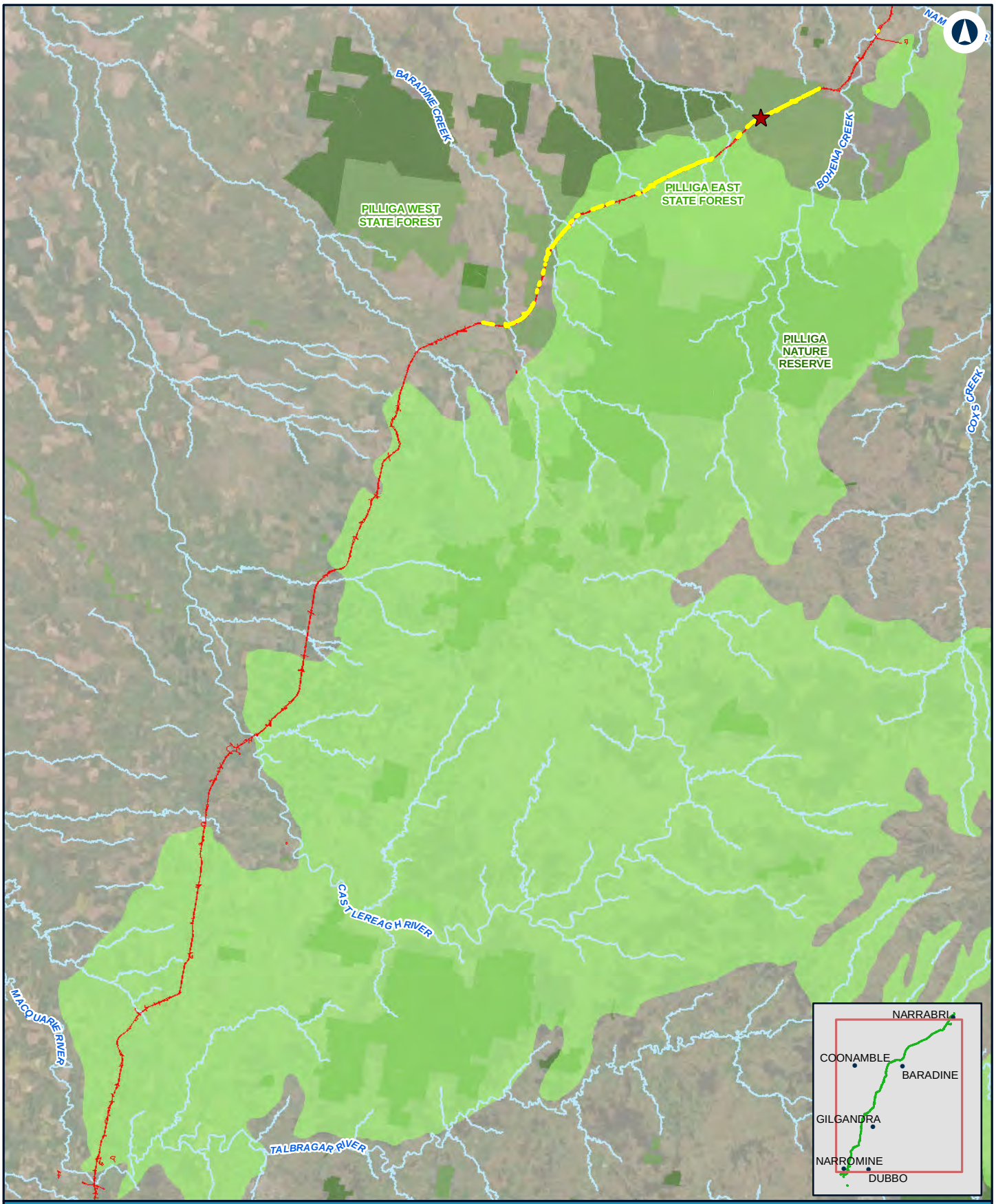
Rufous Bettong (*Aepyprymnus rufescens*)			
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable habitat – PCT contains a sparse understorey characterised by low abundances of saltbush species and native grasses
	56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Generally occurs as small patches with poor connectivity in southern portion of Pilliga IBRA subregion
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Generally narrow remnants in generally cleared agricultural land, with limited connectivity to large expanses of habitat
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable habitat – lacks woodland overstory
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory Not suitable habitat – small remnants in generally cleared agricultural land, with limited connectivity to large expanses of habitat
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory

Rufous Bettong (*Aepyprymnus rufescens*)			
	202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT Not suitable habitat – small remnant surrounded by PCTs that are not suitable habitat
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Not suitable habitat – small remnants in generally cleared agricultural land, with limited connectivity to large expanses of habitat
	244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Not suitable habitat – small remnants in generally cleared agricultural land, with limited connectivity to large expanses of habitat
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Generally occurs as small patches with poor connectivity in southern portion of Pilliga IBRA subregion
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not suitable habitat – lacks woodland overstory
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Suitable habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable habitat present

Rufous Bettong (*Aepyprymnus rufescens*)			
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Suitable habitat present
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Suitable habitat present
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Suitable habitat present
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Suitable habitat present
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT Occurs as small patches with poor connectivity in southern portion of Pilliga IBRA subregion
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat – occurs in forest or woodland with a grassy understory
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT Not suitable habitat – lacks woodland overstory
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not an associated PCT Not suitable habitat – lacks woodland overstory.

Rufous Bettong (*Aepyprymnus rufescens*)			
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory. Generally narrow remnants in generally cleared agricultural land, with limited connectivity to large expanses of habitat.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Not suitable habitat – small remnants in generally cleared agricultural land
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory. A very sparse shrub and ground layer is present in this PCT
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory.
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Suitable habitat present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Suitable habitat present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable habitat present

Rufous Bettong (*Aepyprymnus rufescens*)			
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT Not suitable habitat – lacks woodland overstory
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not an associated PCT Not suitable habitat – lacks forest overstory
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Not an associated PCT Not suitable habitat – occurs in forest or woodland with a grassy understory. Only sparse grass cover present
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT Not suitable habitat – canopy and shrub layer removed



NARROMINE TO NARRABRI Fauna Species Polygon - Rufous Bettong - Pilliga MAP 1 OF 2

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

LEGEND

Construction impact zone

Rufous Bettong species polygon

IBRA subregion

Pilliga

Species

?Rufous Bettong

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:914,200
Data Sources: OEH; Rufous Bettong records: BioNet 2021; Basemap layers: NSWSS, esri

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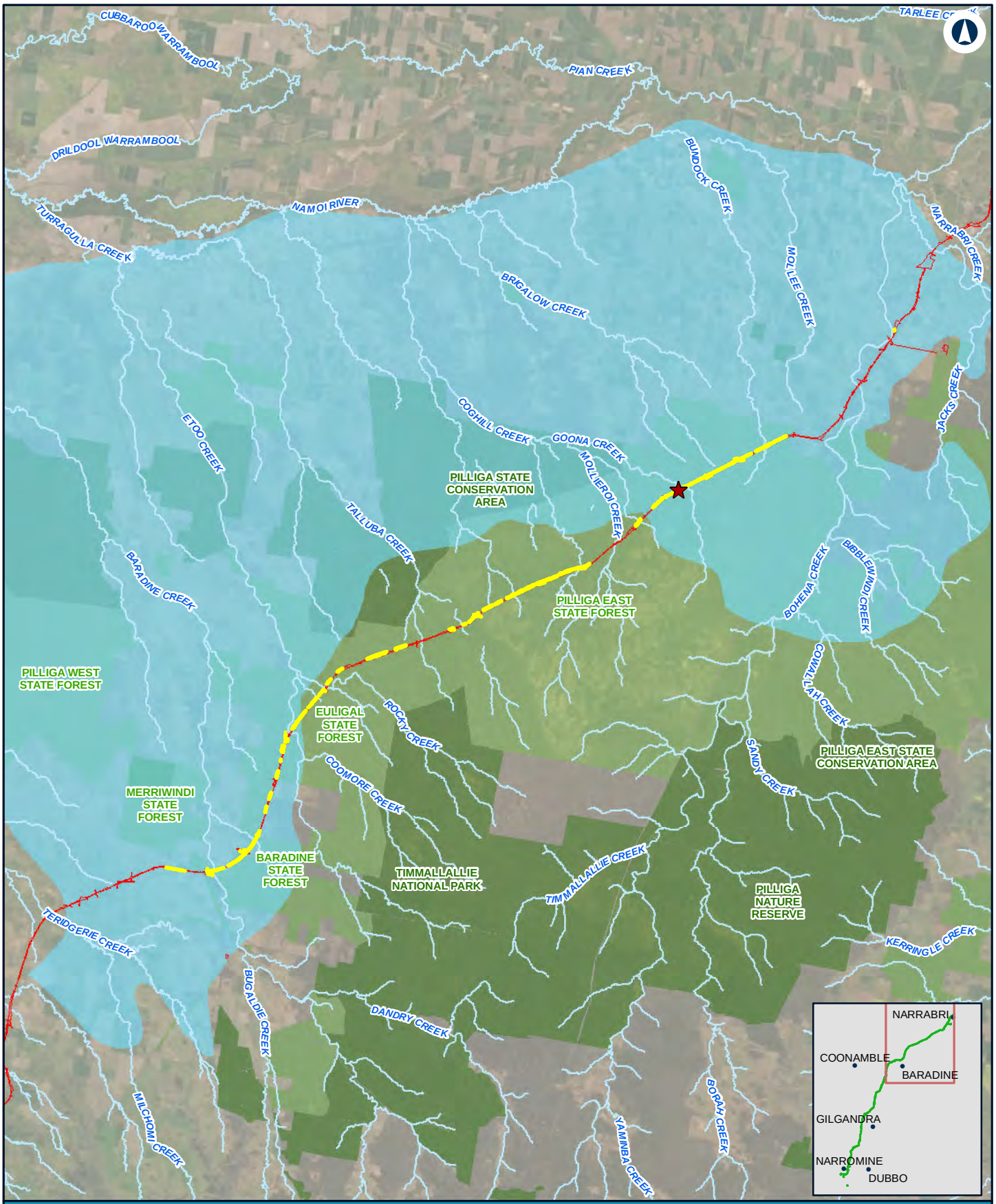

NARROMINE TO NARRABRI Fauna Species Polygon - Rufous Bettong - Pilliga Outwash MAP 2 OF 2

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Rufous Bettong records: BioNet 2021; Basemap layers: NSWSS, esri

LEGEND

Construction impact zone
Rufous Bettong species polygon

IBRA subregion

Pilliga Outwash

Species

?Rufous Bettong

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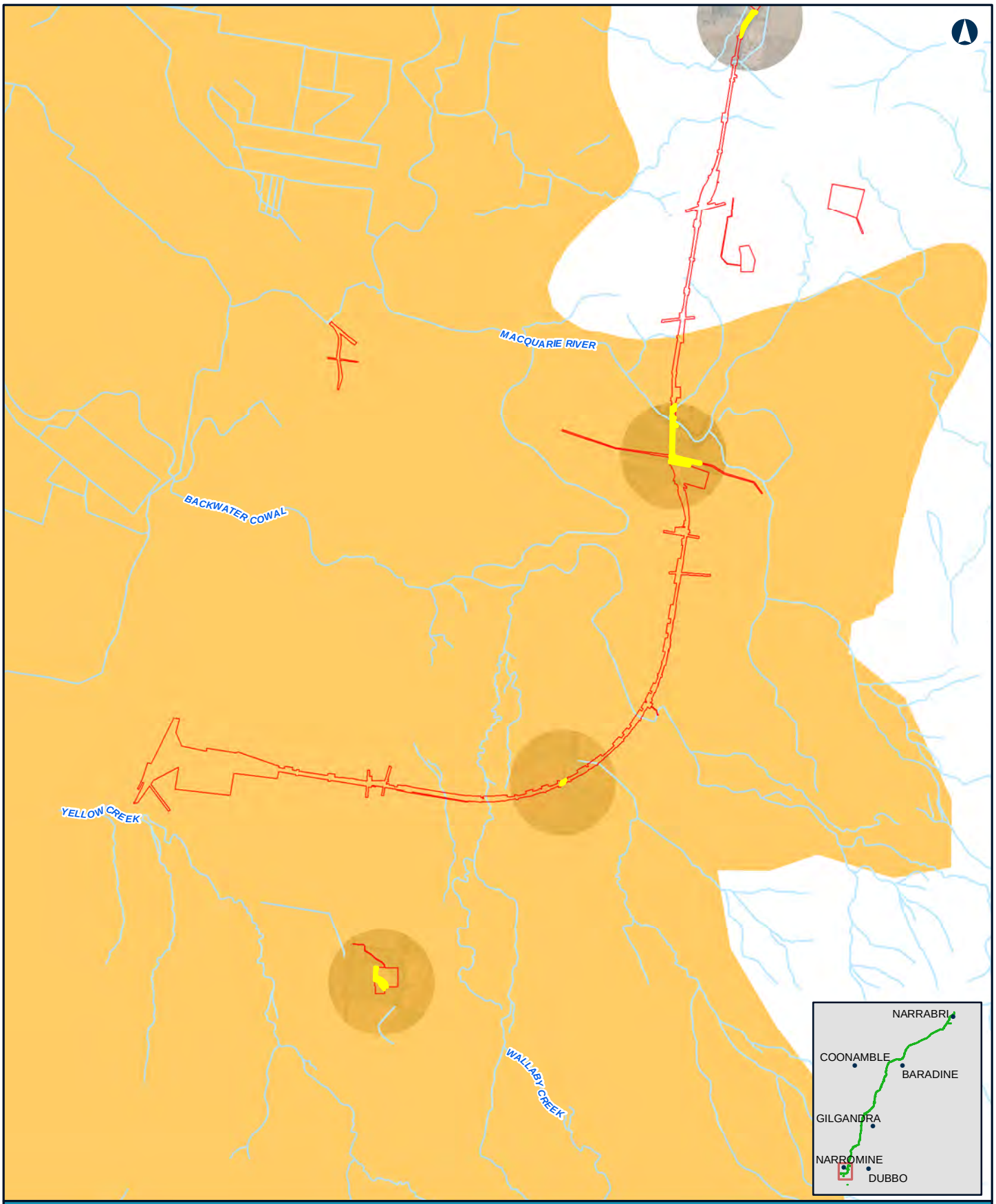
Table I32 Little Eagle

Little Eagle (*Hieraaetus morphnoides*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	465.8 hectares
Breeding requirements	• Paddock trees can provide important breeding (OEH 2019). • Nesting can also occur in tall living trees in patches of eucalyptus woodland of at least 25 hectares (Debus et al. 2007). • The nest is an open bowl of twigs and branches, lined with green leaves. The female mainly broods the young and feeds the young small pieces of food bill to bill. The male hunts for food for the young. The male will incubate while the female eats the food he has brought for her.
Habitat requirements	• Occupies open eucalypt forest, woodland or open woodland. *Allocasuarina* or *Acacia* woodlands and riparian woodlands of interior NSW are also used. • Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. • Lays two or three eggs during spring, and young fledge in early summer. • Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.
Habitat in the study area	• Large areas of potential habitat are present in the Pilliga forests and other woodland patches in the study area. • No nest trees of this species were recorded during surveys. • One very large raptor nest was observed in the study area at a property north of Narromine. This nest tree was pointed out by the landowner, who had observed Wedge-tailed Eagles use the nest over a number of years. Large raptor nests were also observed at a property north of Narrabri by the ecology team that were being used by Whistling Kites. No other large raptor nests suitable for use by the Little Eagle were observed in the study area. Most stick nests observed were of a size used by ravens and magpies.
Known populations	Records throughout the locality within larger tracts of native vegetation, riparian corridors and cleared lands (OEH 2019)
Survey requirements	Survey Months: August to October (breeding)

Little Eagle (*Hieraaetus morphnoides*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys). • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys along the alignment but not including the Pilliga). • March 2019 (10 days, four zoologists – diurnal surveys/trapping in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal/nocturnal surveys). • September/October 2019 (six days – two ecologists – diurnal/nocturnal surveys). • June 2020 (two ecologists, two days and one night in the Gilgandra area). • November 2020 (two ecologists, four days, two nights in the Pilliga and Bohena Creek area). • July 2021 (2 days, two ecologists in the Narromine are). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, expert survey by Tony Saunders). Surveys included diurnal bird surveys and searches for nest trees in woodland patches and paddock trees. Incidental observations of raptors were also made while driving along the alignment between survey sites.
Survey results	No individuals were recorded during the many field surveys in the study area, however it is likely that the species would occur. Prevailing drought conditions are likely to have contributed to the lack of observations. No specific breeding habitat was identified in Bionet (EES 2020a) or Birdata (Birdllife Australia 2020) records.
Species polygon guidance	Habitat constraints: Nest trees – live (occasionally dead) large old trees within vegetation. Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). **Polygon** Breeding habitat is live (occasionally dead) large old trees within suitable vegetation AND the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy. Where a breeding site has been identified in accordance with the BAM the species buffer polygon should be established by providing a circular polygon with a 300 metre radius around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. Little Eagles are less likely than urban-adapted raptors to readily cross urban or peri-urban spaces to hunt. The 300 metre polygon is in accordance with the ACT offset guidelines for this species. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements) (EES 2021).

Little Eagle (*Hieraaetus morphnoides*)	
Species polygon justification	One pair of Little Eagles was recorded during field surveys. Few large raptor nests were observed, although one potentially suitable for the Little Eagle was recorded near Bohena Creek. EES (2020a) and Birdata (2020) records suggest that occasional individuals would occur in the study area. The expert report prepared by Dr Tony Saunders is provided in Appendix N. A summary of the justification for the species polygon is provided below. Based on the locations of potential breeding habitat along the proposal site and the distance between adjacent breeding pairs found in the literature, it is estimated that up to 61 breeding pairs of Little Eagle may occur along the proposal site. At least sixteen of these are likely to occur within the 80 kilometres long Pilliga forests section of the proposal site, but there may be more as some adjacent nests can be less than five kilometres from each other. In order to create the species polygon in areas where potential habitat is relatively continuous, a buffer of one kilometre radius within the potential territories has been created over the potential breeding habitat. The Threatened Biodiversity Data Collection recommends a 300 metre buffer for this species, however given the linear nature of the alignment, this has been increased to a 1 kilometre buffer for the purposes of this assessment. The total species polygon for the Little Eagle was determined to be 465.40 hectares of which 277.01 hectares are within the Pilliga forests.
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Expert report Castlereagh Barwon: Expert report Pilliga Outwash: Expert report Pilliga: Expert report Liverpool Plains: Expert report Northern Basalts: Expert report



NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle (Breeding) - Bogan-Macquarie MAP 1 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:97,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Little Eagle (Breeding) species polygon

IBRA subregion

- Bogan-Macquarie

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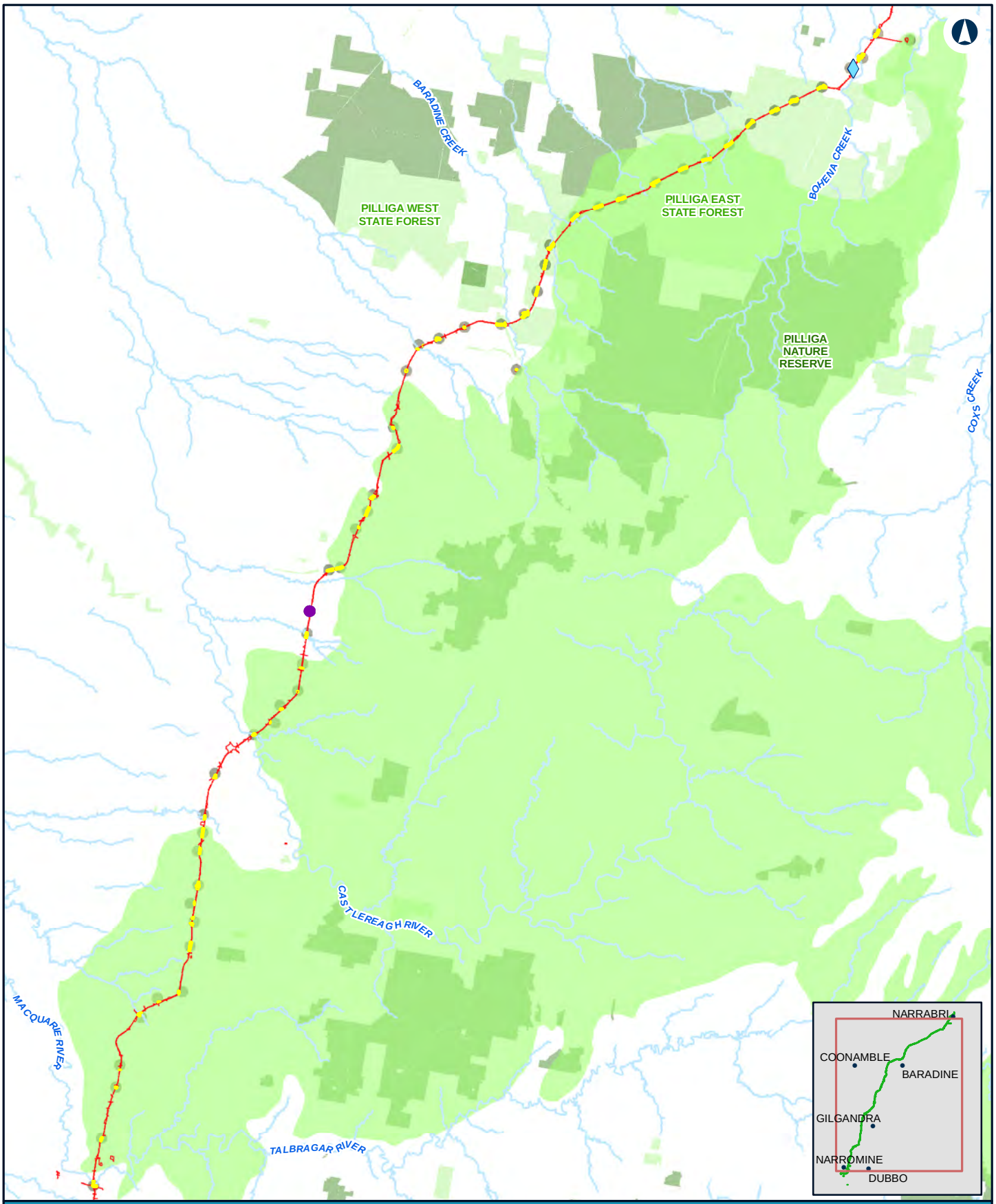

NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle (Breeding) - Pilliga MAP 2 OF 5

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Little Eagle (Breeding) species polygon
- Little Eagle (Breeding) GHD record (November, 2020)
- Possible Little Eagle nest

IBRA subregion

- Pilliga

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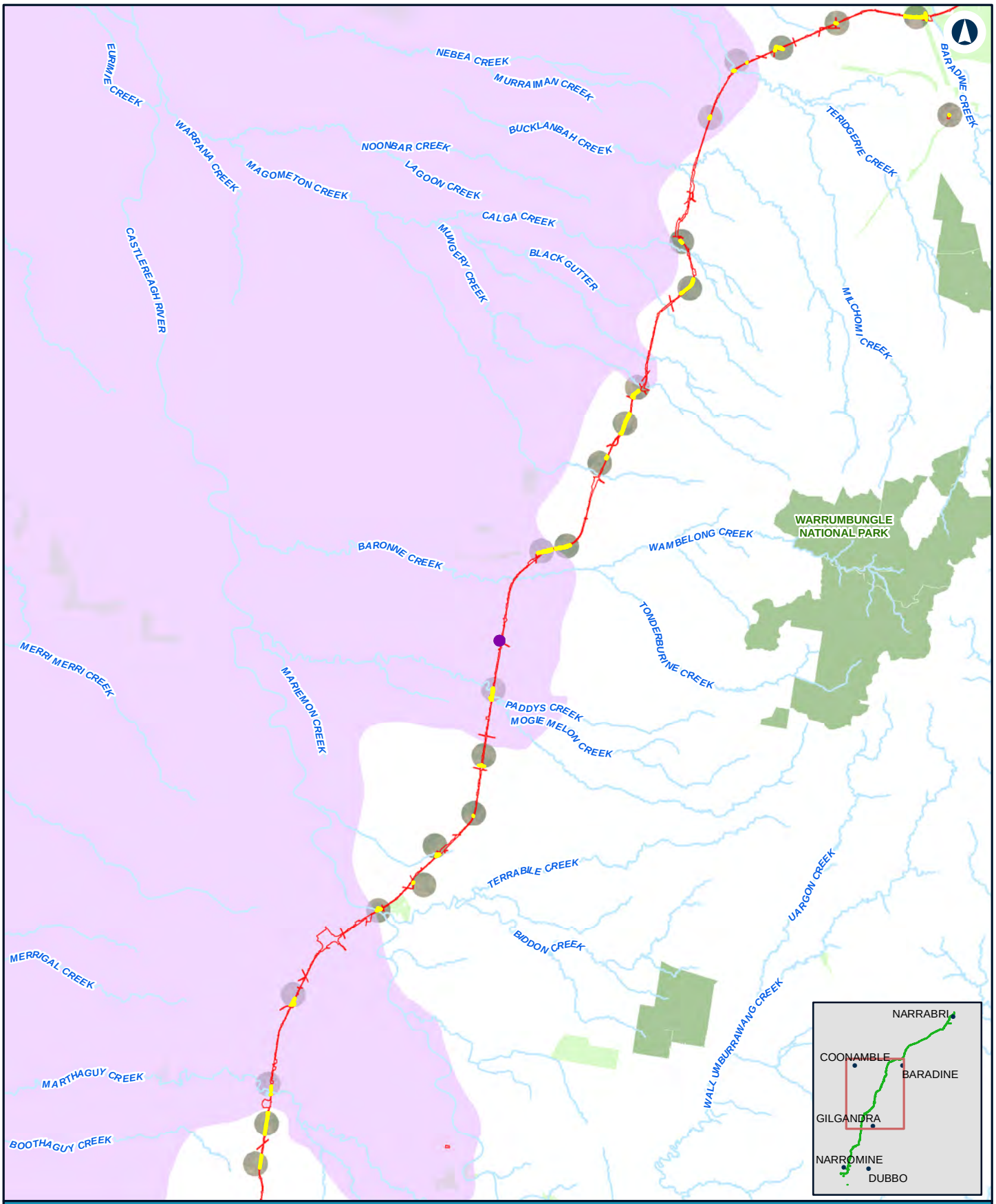

NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle (Breeding) - Castlereagh-Barwon MAP 3 OF 5

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:419,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Little Eagle (Breeding) species polygon
- Little Eagle (Breeding) GHD record (November, 2020)

IBRA subregion

- Castlereagh-Barwon

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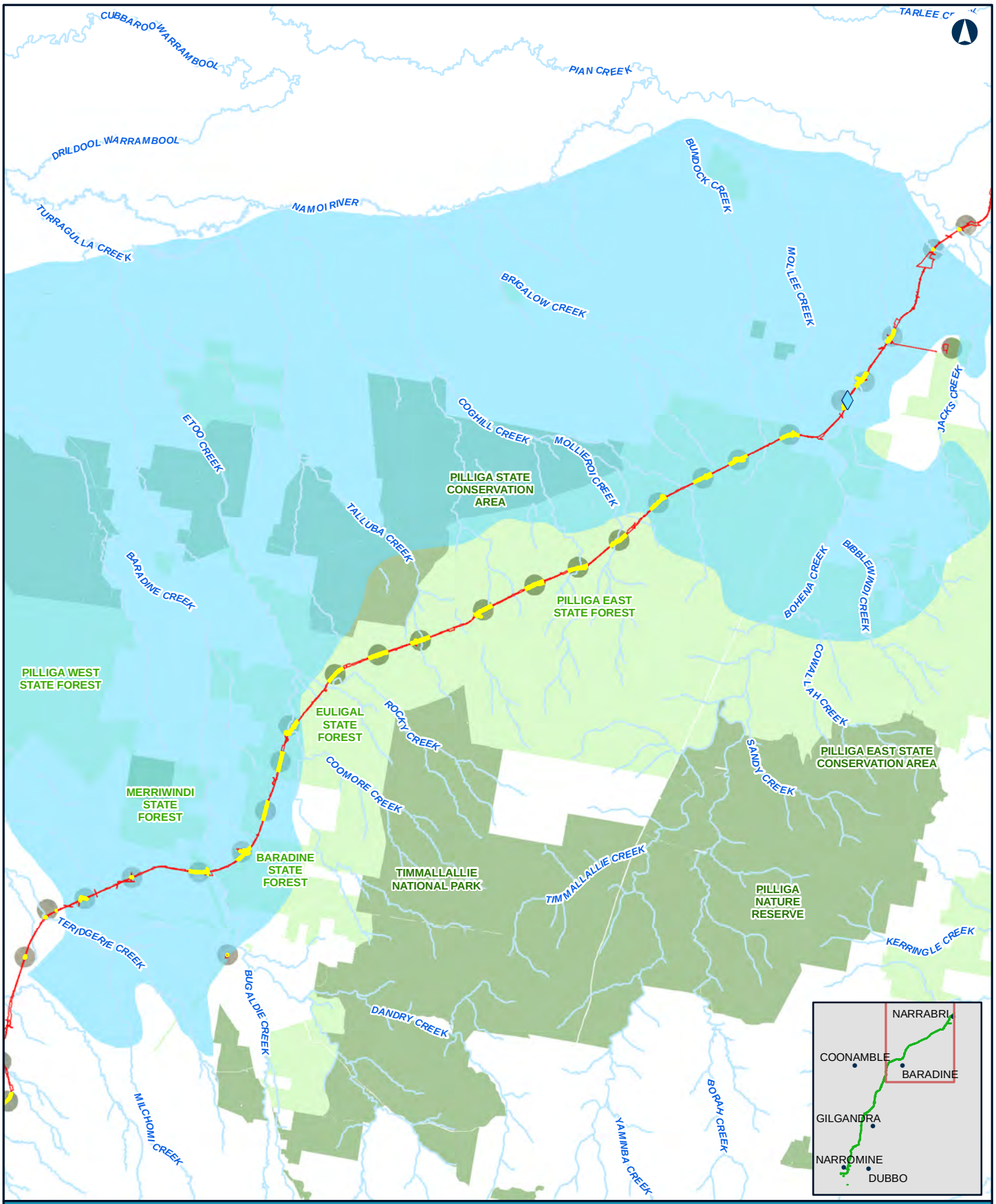

NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle (Breeding) - Pilliga Outwash MAP 4 OF 5

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Little Eagle (Breeding) species polygon
- Possible Little Eagle nest

IBRA subregion

- Pilliga Outwash

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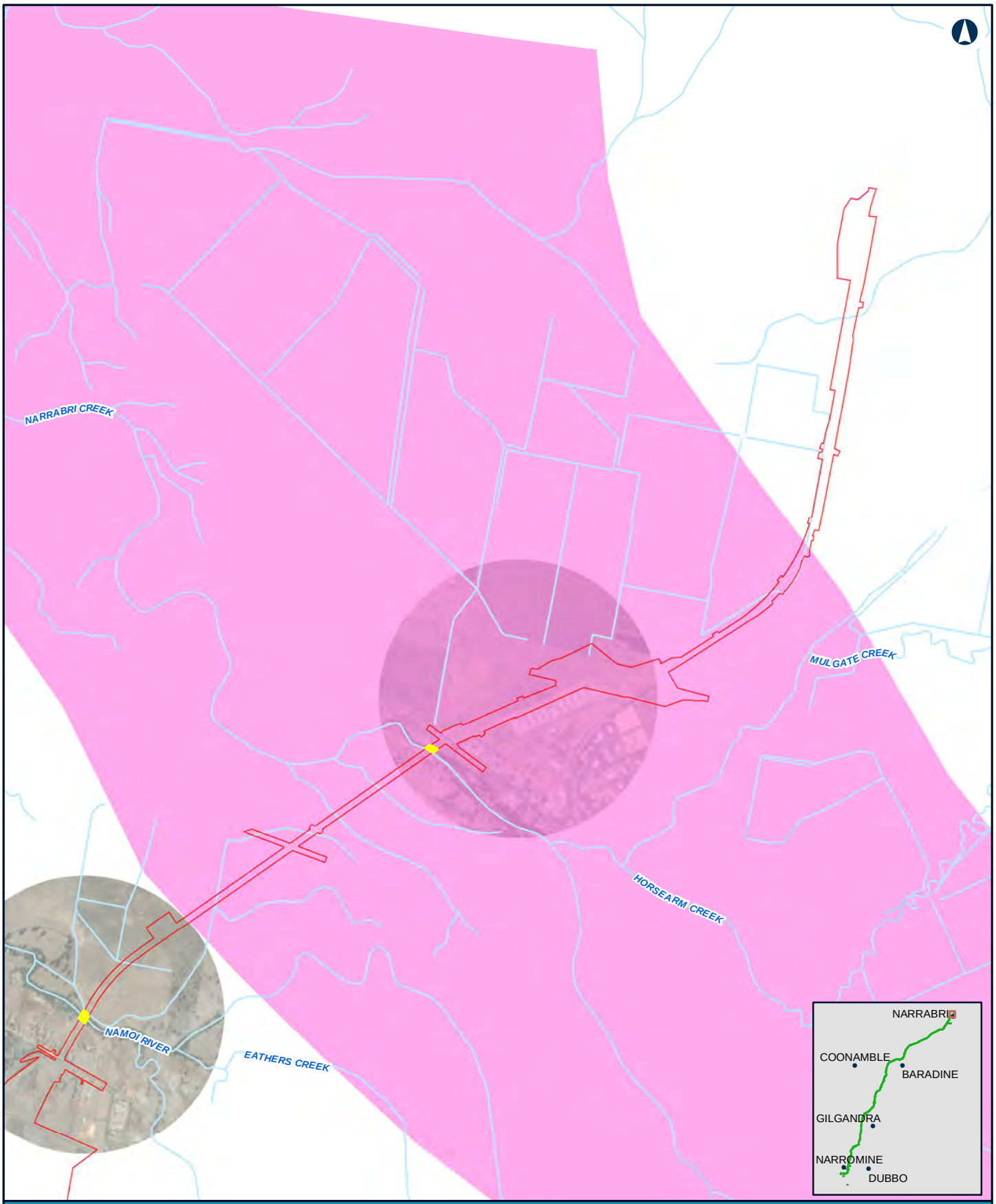

NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle (Breeding) - Liverpool Plains MAP 5 OF 5

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:37,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Little Eagle (Breeding) species polygon

IBRA subregion

- Liverpool Plains

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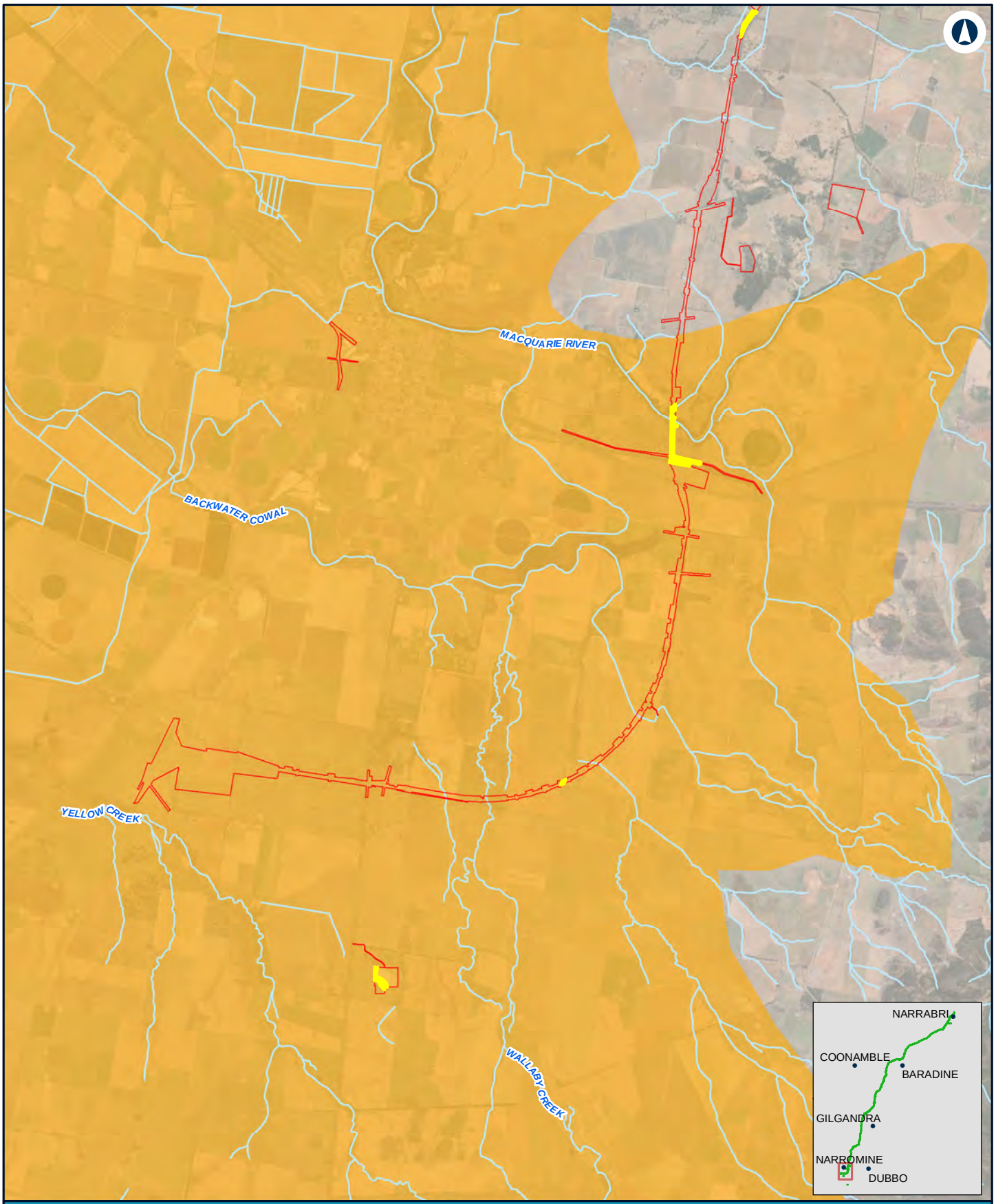
Table I33 Square-tailed kite

Square-tailed Kite (*Lophoictinia isura*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	407.3 hectares
Breeding requirements	• Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. (OEH 2019). • Pairs nest solitarily, and the nest is a platform of sticks lined with green leaves and placed 8-34 metres above the ground in the fork of a living tree within forest or woodland (Debus 1998). The clutch size is two or three eggs, usually three. The incubation period is probably about 40 days, and the nestling period is about 59-65 days (Debus op cit.). The young are dependent upon the adults for about one to two months after fledging. • The laying season is from July to December (Debus 1998).
Habitat requirements	• Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. (OEH 2019). • In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. (OEH 2019). • Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage (OEH 2019). • Appears to occupy large hunting ranges of more than 100 km2 (OEH 2019).
Habitat in the study area	• Large areas of potential habitat are present in the Pilliga forests and other woodland patches in the study area. • No nest trees of this species were recorded during surveys. • One very large raptor nest was observed in the study area at a property north of Narromine. This nest tree was pointed out by the landowner, who had observed Wedge-tailed Eagles use the nest over a number of years. Large raptor nests were also observed at a property north of Narrabri by the ecology team that were being used by Whistling Kites. No other large raptor nests suitable for use by the Square-tailed Kite were observed in the study area. Most stick nests observed were of a size used by ravens and magpies.

Square-tailed Kite (*Lophoictinia isura*)	
Known populations	• In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. • Garnett and Crowley (2000) estimated that the total population is unlikely to exceed 10,000 adults. • It is also categorized as a species of "Least Concern" by BirdLife International, based on the probability that its population has not declined more than 30 percent in 10 years or three generations. • Local records concentrated around the Pilliga forests, Leards Forest, Goran State Forest, Goulburn River National Park and Goonoo Forests.
Survey requirements	Survey months: September to January (breeding)
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys and nest searches along the alignment). • November 2018 (10 days, two ecologists – diurnal bird surveys and nest searches along the alignment but not including the Pilliga). • March 2019 (10 days, four zoologists – diurnal bird surveys and nest searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest searches along the alignment). • September/October 2019 (six days – two ecologists – diurnal bird surveys and nest searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days, two ecologists in the Narromine area). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). • August 2021 (two ecologists, two days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area), surveys conducted with the species expert. Surveys included diurnal bird surveys and searches for nest trees in woodland patches and paddock trees. Incidental observations of raptors were also made while driving along the alignment between survey sites.
Survey results	No individuals were recorded during the many field surveys in the study area, however it is likely the species would occur. No specific breeding habitat was identified in Bionet (EES 2020a) or Birdata (Birdllife Australia 2020) records.

Square-tailed Kite (*Lophoictinia isura*)	
Species polygon guidance	Habitat constraint: nest trees. Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). **Polygon** The species is allocated to dual credit because they tend to be sensitive to disturbance around nests. It will be difficult to identify a Kite nest (there are lots of comparable sized stick nests built by other species), especially given Kites have large territories and other stick nesters will undoubtedly also be nesting where Kites might be recorded. Kites will need be in attendance to confirm breeding sites. Breeding habitat is live large old trees within suitable vegetation AND the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy. Where a breeding site has been identified in accordance with the BAM the species buffer polygon should be established by providing a circular polygon with a 300 metre radius around the nest tree and incorporate all woody and non-woody native vegetation within the radius. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements) (EES 2021).
Species polygon justification	The expert report prepared by Dr Tony Saunders is provided in Appendix N. A summary of the justification for the species polygon is provided below. Based on the locations of potential breeding habitat along the proposal site and the distance between adjacent breeding pairs found in the literature, it is estimated that up to 52 breeding pairs of Square-tailed Kite may occur along the proposal site. At least twelve of these are likely to occur within the 80 kilometres long Pilliga forests section of the proposal site, but there may be more as some adjacent nests can be less than seven kilometres from each other. In order to create the species polygon in areas where potential habitat is relatively continuous, a buffer of one kilometre radius within the potential territories has been created over the potential breeding habitat. The Threatened Biodiversity Data Collection recommends a 300 metre buffer for this species, however given the linear nature of the alignment, this has been increased to a one kilometre buffer for the purposes of this assessment. The total species polygon for the Square-tailed Kite was determined to be 407.11 hectares of which 235.57 hectares are within the Pilliga forests.

Square-tailed Kite (*Lophoictinia isura*)	
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Expert report Castlereagh Barwon: Expert report Pilliga Outwash: Expert report Pilliga: Expert report Liverpool Plains: Expert report Northern Basalts: Not in BAM-C case – not a candidate species



NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite (Breeding) - Bogan-Macquarie MAP 1 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:97,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Square-tailed Kite (Breeding) species polygon

IBRA subregion

- Bogan-Macquarie

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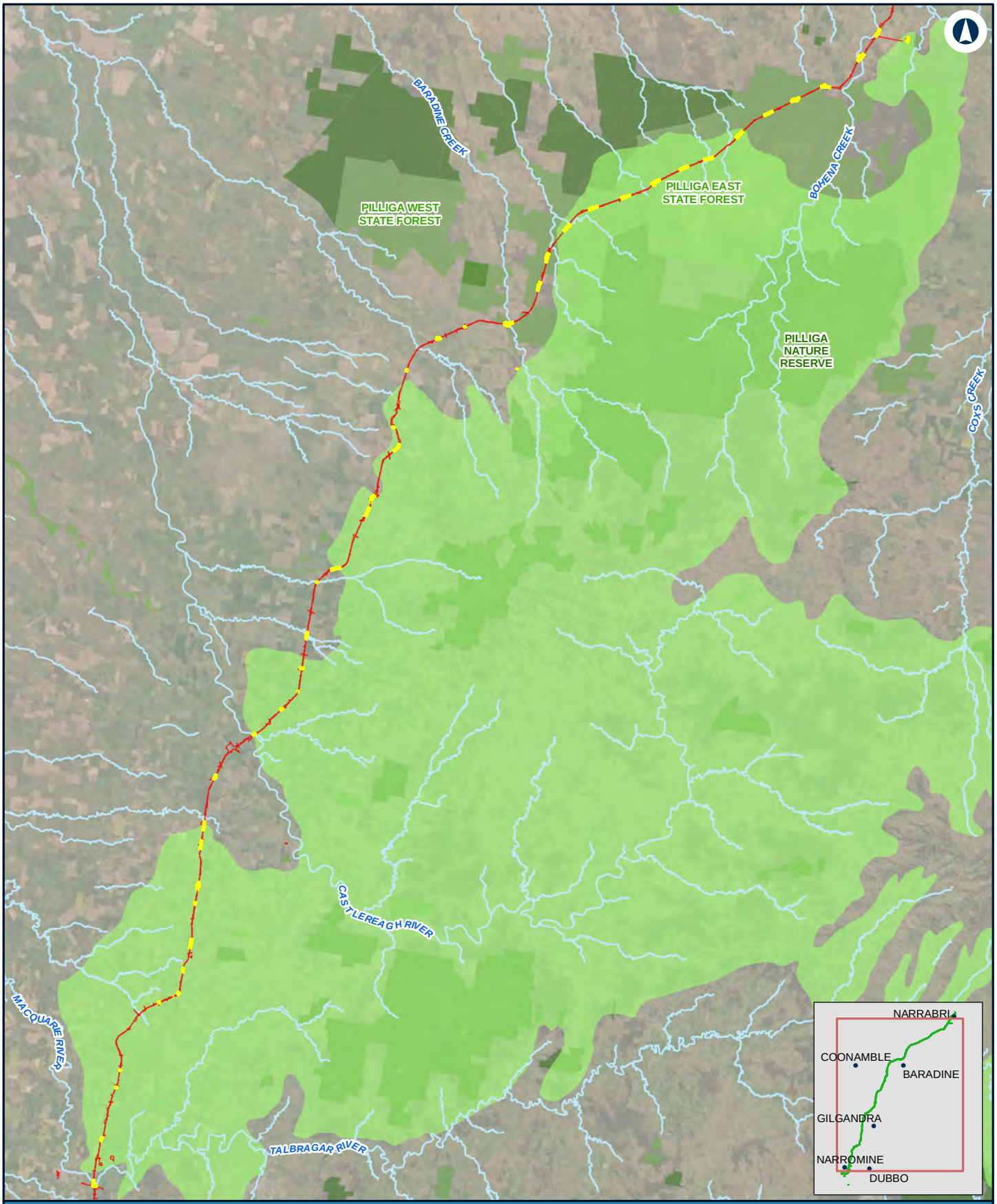

NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite (Breeding) - Pilliga MAP 2 OF 5

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:912,800
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Square-tailed Kite (Breeding) species polygon

IBRA subregion

- Pilliga

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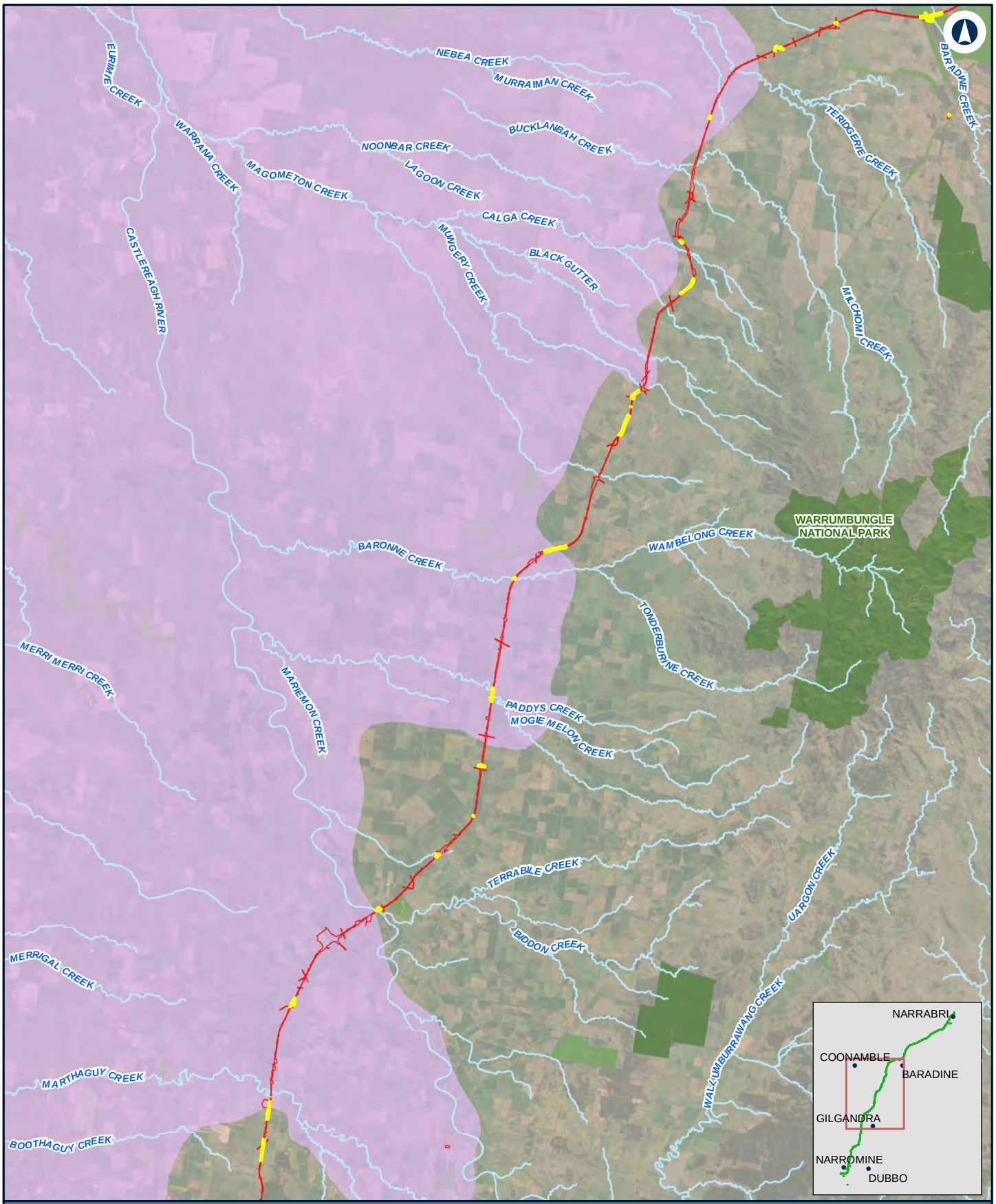

NARROMINE TO NARRABRI | Fauna Species Polygons - Square-tailed Kite (Breeding) - Castlereagh-Barwon | MAP 3 OF 5

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:419,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Square-tailed Kite (Breeding) species polygon

IBRA subregion

- Castlereagh-Barwon

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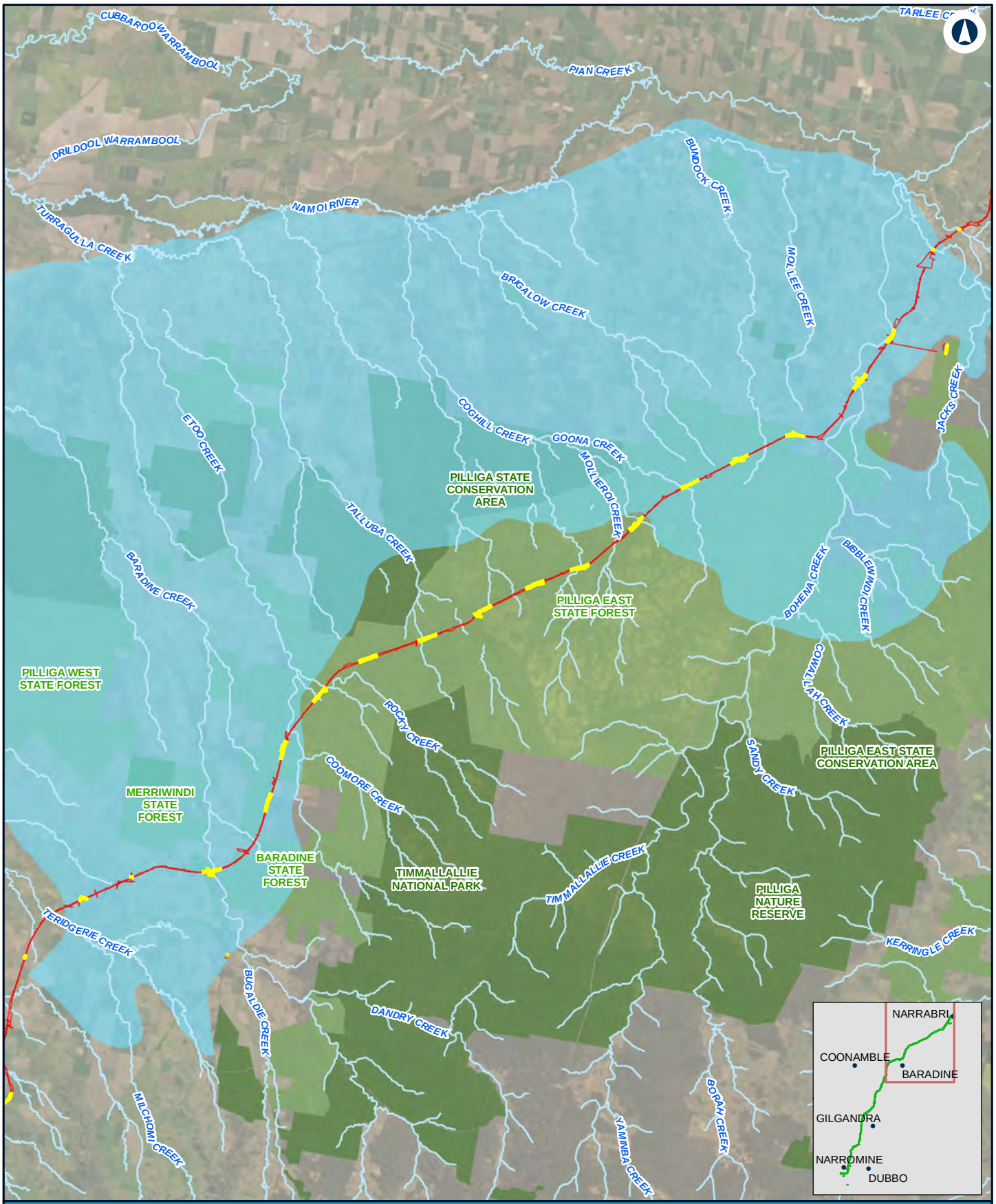

NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite (Breeding) - Pilliga Outwash MAP 4 OF 5

0 7 14 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:495,900
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Square-tailed Kite (Breeding) species polygon

IBRA subregion

- Pilliga Outwash

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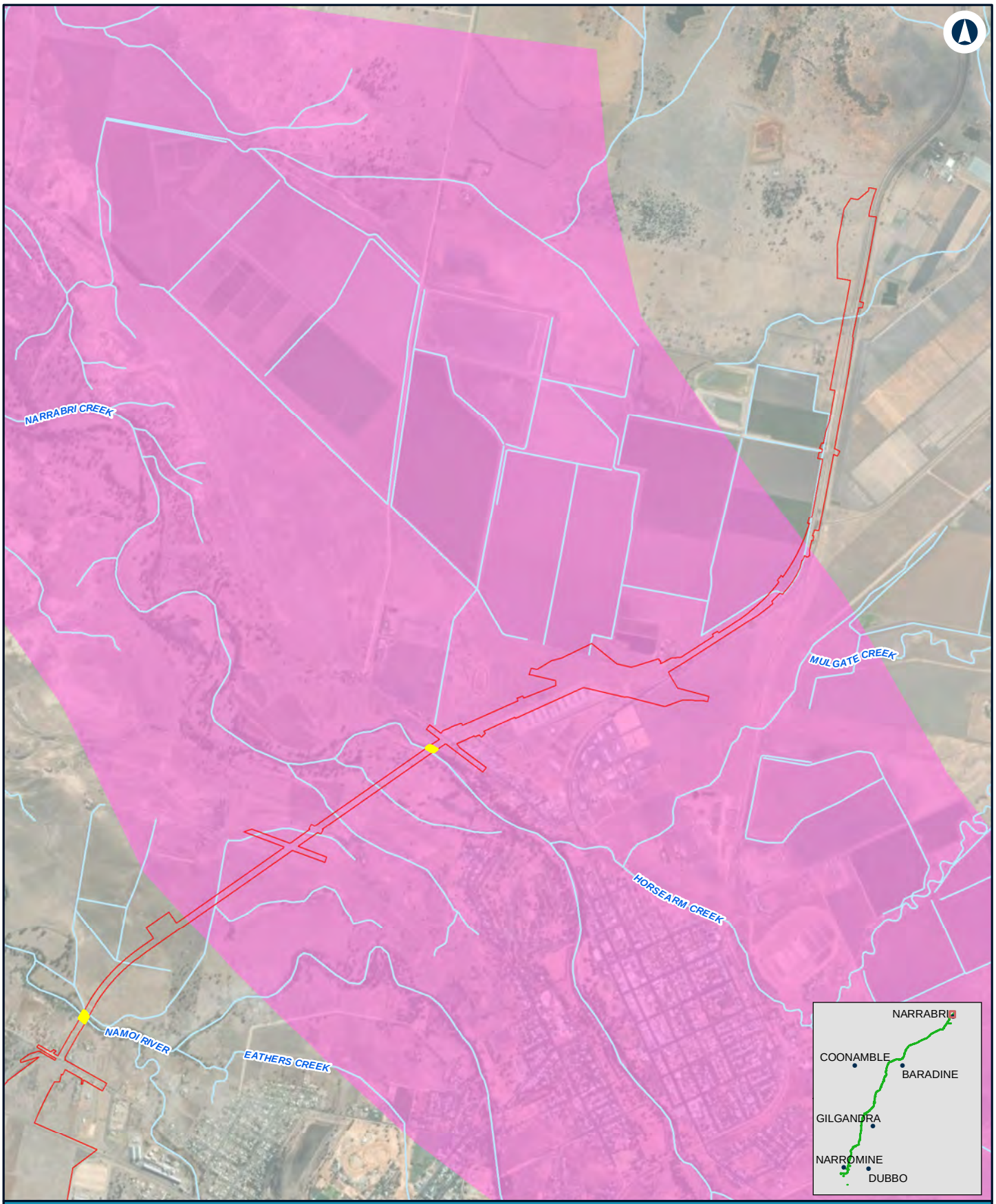

NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite (Breeding) - Liverpool Plains MAP 5 OF 5

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:37,300
Data Sources: OEH; Basemap layers: NSWSS, esri

LEGEND

- Construction impact zone
- Square-tailed Kite (Breeding) species polygon

IBRA subregion

- Liverpool Plains

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Candidate fauna species 'not on site' or 'surveyed – not present' and no species polygon prepared

Table I34 Bristle-faced Free-tailed Bat

Bristle-faced Free-tailed Bat (*Setirostris eleryi*)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• The species is known to roost communally, sometimes with other species. • Roosts at Gundabooka National Park in north-western NSW were all located in Bimble Box or Inland Red Box hollows with tiny entrances, amongst fringing vegetation of a large dry creek channel (Pennay 2006).
Habitat requirements	• The species favours riparian zones, riverine and drainage line habitats (Scotts 2012; McKenzie, Bullen and Pennay, 2020). • At Gundabooka National Park, the species was found to forage and roost in riparian habitat, and avoided surrounding mulga shrublands (Pennay, 2006). • Records are from scattered locations throughout the arid and semi-arid regions of northern Australia (Pennay, 2006). • Central Australian individuals have been found to be associated with ephemeral drainage lines adjacent to ranges (Reardon and Pennay 2008). This is similar for the NSW records.
Habitat in the study area	• Narrow riparian corridors with hollow-bearing are present in the proposal site within the Castlereagh-Barwon IBRA subregion. This area is well outside the known range of this species. • No riparian habitat is present in the proposal site within the Northern Basalts IBRA subregion.
Known populations	• Distributed from the southern half of the Northern Territory to central Queensland and north-western NSW. • Four of the five locality records of this species reported from NSW are concentrated on the northern North-west Slopes (Scotts 2012), with the fifth from near Bourke (Pennay 2006). • In NSW, the species has been recently recorded from only three disjunct locations: thirteen individuals from Gundabooka National Park, south of Bourke; one individual from Dhinnia Dthinawan Nature Reserve (formerly Bebo State Forest), north of Warialda; and two individuals near Bonshaw.

Bristle-faced Free-tailed Bat (*Setirostris eleryi*)	
Survey requirements	Survey months: October to March Survey should sample the available range of suitable vegetation along riparian areas on the subject land. Traps or nets should be set near water holes (especially if isolated), under/beside large trees, in/beside creek beds, or in 'flyway' spaces between vegetation. NB. Use of acoustic detection alone is not suitable for this species as the call is difficult to distinguish from other common species (EES 2020).
Survey effort	Targeted bat surveys were undertaken over two survey periods at different sites for the proposal. Anabat surveys comprised the following: 1. November 2018 at sites within the Narrabri, Gilgandra and Narromine areas (10 sites for 20 survey nights – 200 anabat nights) 2. March 2019 at sites within the Pilliga State Forest (3 sites for 12 survey nights – 36 anabat nights). Harp netting comprised eight trap nights in the Pilliga and four trap nights near Gilgandra in March 2019, and resulted in many microbat captures: • 4 nights at Trap site 1 (two harp nets set beside each other on Coolangala Creek) • 4 nights at Trap site 6 (two harp nets set beside each other on Rocky Creek) • 4 nights at the trap site south of Gilgandra (two harp nets set beside each other along a track in woodland in agricultural land). Harp netting was also undertaken in November 2018 surveys, however due to access and work hour constraints, harp nets were only set between dusk and 11pm, and there were no captures during this period: • 1 evening at the Narrabri Creek (two harp nets set beside each other beside Narrabri Creek) • 1 evening at Bohena Creek (two harp nets set beside each other on a tributary of Bohena Creek) • 1 evening at a dam south of Narrabri and one evening on a dry creek in woodland on the same property • 1 evening at the Castlereagh River (two harp nets set beside each other on the forested bank) (note that this site is immediately adjacent to the Castlereagh Barwon IBRA subregion, but not within it).
Survey results	No individuals were recorded during surveys via Anabat analysis or in harp nets. No records of the species occur within 20 kilometres of the alignment (EES 2020b).
Species polygon guidance	Habitat constraints: Land within 500 metres of watercourses or dams surrounded by eucalypts containing hollows Patch size: 5-24 hectares. Percent native vegetation cover: variegated (between 31 and 70 percent retained). Potential habitat is riparian areas (including dry river/creek beds) within the PCTs associated with the species. All habitat on the subject land where the subject land is within 500 metres of a river, creek or riparian area must be mapped. Use aerial imagery to map river, creek or riparian areas (including dry creek channels, former creek channels, billabongs etc.) on or within 500 metres of the subject land. Species polygon boundaries should align with PCTs on the subject land to which the species is associated that are within 500 metres of waterbodies mapped (EES 2020).

Bristle-faced Free-tailed Bat (*Setirostris eleryi*)			
Species polygon justification	No species polygon has been prepared for this species. No evidence of this species was recorded during Anabat or harp netting surveys. Very few records are known from NSW. Four of the five locality records of this species reported from NSW are concentrated on the northern North-west Slopes (Scotts 2012), with the fifth from near Bourke (Pennay 2006). The proposal site is located at the very southern edge of the Castlereagh-Barwon IBRA subregion and the very southern end of the Northern Basalts IBRA subregion. No riparian woodland habitat is present in the section of the proposal that is within the section within Northern Basalts IBRA subregion. While riparian woodland is present is located in scattered locations within the Castlereagh-Barwon IBRA subregion, the species was not recorded during surveys, and these locations are over 280 kilometres from Gundabooka National Park and the Bonshaw area. Central Australian individuals have been found to be associated with ephemeral drainage lines adjacent to ranges (Reardon and Pennay 2008). This is similar for the NSW records. Waterways in the Castlereagh-Barwon IBRA subregion that are crossed by the proposal are not located adjacent to any ranges. Given the above points, the Bristle-faced Freetail Bat is highly unlikely to occur in the proposal site.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: No – surveyed/outside distribution Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: Not in BAM-C case – not a candidate species Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT No suitable habitat – lack of hollow-bearing trees along drainage lines
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No suitable habitat – lack of hollow-bearing trees
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT No suitable habitat – lack of hollow-bearing trees

Bristle-faced Free-tailed Bat (*Setirostris eleryi*)			
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potentially suitable habitat if within 500 metres of a riparian zone, but well outside known distribution
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Potentially suitable habitat
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT No suitable habitat – lack of hollow-bearing trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Potentially suitable habitat if within 500 metres of a riparian zone, but well outside known distribution
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT No suitable habitat – lack of hollow-bearing trees along drainage lines
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Potentially suitable habitat if within 500 metres of a riparian zone, but well outside known distribution
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potentially suitable habitat if within 500 metres of a riparian zone, but well outside known distribution
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Not an associated PCT Potentially suitable habitat if within 500 metres of a riparian zone, but well outside known distribution

Table I35 Eastern Cave Bat

Eastern Cave Bat (*Vespadelus troughtoni*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	True. Any impact on breeding habitat identified for this species is a potential serious and irreversible impact.
EPBC Act Status	Not listed
Breeding requirements	• A cave-roosting species, which has also been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals (OEH 2019). • They roost near the entrance in reasonably well-lit areas, often in small avons or domes in the roofs of canes as well as cracks and crevices (Churchill 2008). • Roost microclimate stability appears to be of low importance in maternity roost selection (Churchill 2008). • Births occur mid to late November in NSW (Churchill 2008). • Young have been observed left alone at the roost, clustered in groups while the females foraged (Churchill 2008). • Females have been observed shifting roosts with their young every few days (Churchill 2008).
Habitat requirements	• A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs. • Occasionally found along cliff-lines in wet eucalypt forest and rainforest (OEH 2019).
Habitat in the study area	• The Eastern Cave Bat would forage in the Pilliga, particularly where forested habitat is in close proximity to sandstone outcrops. • No sandstone outcrops suitable for breeding are located within two kilometres of the alignment.
Known populations	• The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. • Concentrated number of records in the locality around the Pilliga forests, Goulburn River National Park, Warrumbungle's National park and around Boggabri and the Namoi River (OEH 2019). • A known roost of this species is located in sandstone outcrops in Pilliga Nature Reserve, about 35 kilometres to the east of Baradine. • Anabat surveys of six sites in the Pilliga by Law et al (2011) recorded only six calls of this species over 920 hours of sampling. No individuals were trapped.

Eastern Cave Bat (*Vespadelus troughtoni*)	
Survey requirements	Survey months: November to January • Survey methods: Harp trap (or mist net) placed in areas of potential breeding habitat on the subject land. The survey may use harp traps or a combination of harp traps and mist nets. Age, sex and reproductive status of captured bats must be assessed and recorded. • Acoustic detectors may be used; however, this method does not allow for reproductive status to be identified. If acoustic detectors are the only survey method used and the target species is detected, breeding must be assumed and a species polygon mapped. • Radio tracking or 'other' (roost) searches are optional methods that may be used to pinpoint the breeding site and refine the species polygon when recommended survey confirms the presence of breeding habitat. However, these methods cannot be used to demonstrate the species is absent from the subject land (OEH 2018).
Survey effort	Targeted bat surveys were undertaken over two survey periods at different sites. Anabat surveys comprised the following: 1 – November 2018 at sites within the Narrabri, Gilgandra and Narromine areas (10 sites for 20 survey nights – 200 anabat nights) 2 – March 2019 at sites within the Pilliga State Forest (3 sites for 12 survey nights – 36 anabat nights). Harp netting comprised eight trap nights in the Pilliga and four trap nights near Gilgandra in March 2019, and resulted in many captures: • 4 nights at Trap site 1 (two harp nets set beside each other on Coolangala Creek) • 4 nights at Trap site 6 (two harp nets set beside each other on Rocky Creek) • 4 nights at the trap site south of Gilgandra (two harp nets set beside each other along a track in woodland in agricultural land). Harp netting was also undertaken in November 2018 surveys, however due to access and work hour constraints, harp nets were only set between dusk and 11pm, and there were no captures during this period: • 1 evening at the Narrabri Creek (two harp nets set beside each other beside Narrabri Creek) • 1 evening at Bohena Creek (two harp nets set beside each other on a tributary of Bohena Creek) • 1 evening at a dam south of Narrabri and one evening on a dry creek in woodland on the same property • 1 evening at the Castlereagh River (two harp nets set beside each other on the forested bank).
Survey results	During the March 2019 surveys in the Pilliga for the proposal, no definite or probable calls of this species were recorded. The species group *Vespadelus troughtoni / V. vulturnus/ Chalinolobus morio* was recorded at Narrabri Creek and at a property south of Narrabri in the November surveys, however overlap of call characteristics make it too difficult to distinguish between species and make a definite identification. No breeding habitat is located within two kilometres of these locations.

Eastern Cave Bat (*Vespadelus troughtoni*)	
Species polygon guidance	Habitat constraint: Caves (within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds). Patch size: 5-24 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). **Polygon** Potential breeding habitat is PCTs associated with the species within 100 metres of rocky areas, caves, overhangs crevices, cliffs and escarpments, or old mines or tunnels, old buildings and sheds within the potential habitat. Surveys must be undertaken as per the Threatened Bat Survey Guide to confirm breeding habitat. All breeding habitat on or within 100 metres of the subject land and the area immediately surrounding the feature must be mapped. Artificial structures should be inspected and included on the map if the species is using these features for breeding. All habitat for this species should also be mapped if present. Species mapping polygon for breeding habitat must use high resolution aerial imagery and topographic maps to identify features on the subject land (caves, scarps, cliffs etc). Polygon boundaries must be at least 100 metres wide (or 50 metres radius for point locations such as caves) with the breeding habitat features (may be multiple) as the centroid (see Threatened Bat Survey Guide). When the species is present on the subject land and the proposed impact is not a potential SAII, standard species credits will be generated. All habitat on the subject land where the subject land is within two kilometres of caves, scarps, cliffs, rock overhangs and disused mines must be mapped. Use high resolution aerial imagery and topographic maps to identify potential roost habitat features on the subject land within two kilometres caves, scarps, cliffs etc. Species polygon boundary should align with PCTs on the subject land to which the species is associated that are within two kilometres of identified potential roost habitat features.
Species polygon justification	Not a candidate species No species polygon has been mapped for this species. No definite or probable calls attributable to this species were recorded during surveys. No caves, scarps, cliffs, mines or tunnels are present in or near the proposal site. Known roost habitat is located over 35 kilometres from the proposal site. Rocky habitat in the Mt Tenandra area west of the Warrumbungles is not located near any large areas of forested habitat. Native vegetation in this area predominantly comprises crops or grassland, or small scattered patches of highly fragmented open woodland. This habitat is not considered suitable for this species. Given the lack of breeding habitat in or near the study area, surveys conducted are considered sufficient for this species.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known

Eastern Cave Bat (*Vespadelus troughtoni*)			
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not on site – habitat constraints Pilliga: No – surveyed Liverpool Plains: Not on site – habitat constraints Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Eastern Cave Bat (*Vespadelus troughtoni*)			
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Eastern Cave Bat (*Vespadelus troughtoni*)			
	202	Fuzzy Box woodland – 202 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Eastern Cave Bat (*Vespadelus troughtoni*)			
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Eastern Cave Bat (*Vespadelus troughtoni*)			
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Eastern Cave Bat (*Vespadelus troughtoni*)			
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	435	White Box - White Cypress Pine shrub grass hills woodland – 435 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	435	White Box - White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment, lack of canopy
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Eastern Cave Bat (*Vespadelus troughtoni*)			
		forest on flats and drainage lines – 473 (Good)	
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	168	Derived Copperburr shrubland – 168 (Good)	No suitable – no caves in the area

Table I36 Large-eared Pied Bat

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	True. Any impact on breeding habitat identified for this species is a potential serious and irreversible impact.
EPBC Act Status	Vulnerable
Breeding requirements	• The structure of maternity roosts appears to be very specific (arch caves with dome roofs) (DERM 2011). • Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January. They remain loyal to the same cave over many years.
Habitat requirements	• 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. • Almost all records of the species are within several kilometres of cliff lines or rocky terrain, in fertile wooded valley habitat. • This species has been recorded foraging in a range of vegetation types, including dry and wet sclerophyll forest, grassy woodland, Callitris dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland and sandstone outcrop country (DERM 2011).

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
	• The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. • It is presumed to have undergone large declines in numbers (based on known loss of available habitat) (Pennay, 2010).
Habitat in the study area	The Large-eared Pied Bat would forage in the Pilliga, particularly where forested habitat is in close proximity to sandstone outcrops. No sandstone outcrops suitable for breeding are located within two kilometres of the alignment.
Known populations	• There are no definitive data on total population numbers, however it is known to occur in small populations (around 50 individuals) (Hoye, 2005). • Three communal maternity roosts are known from caves in the Pilliga Sandstone region (Pennay 2008). • A known roost of this species is located in sandstone outcrops in Pilliga Nature Reserve, about 35 kilometres to the east of Baradine. • Anabat surveys of six sites in the Pilliga by Law et al (2011) recorded only one call of this species over 920 hours of sampling. No individuals were trapped.
Survey requirements	Survey months: November to January. • Survey methods: Harp trap (or mist net) placed in areas of potential breeding habitat on the subject land. The survey may use harp traps or a combination of harp traps and mist nets. Age, sex and reproductive status of captured bats must be assessed and recorded. • Acoustic detectors may be used; however, this method does not allow for reproductive status to be identified. If acoustic detectors are the only survey method used and the target species is detected, breeding must be assumed and a species polygon mapped. • Radio tracking or 'other' (roost) searches are optional methods that may be used to pinpoint the breeding site and refine the species polygon when recommended survey confirms the presence of breeding habitat. However, these methods cannot be used to demonstrate the species is absent from the subject land (OEH 2018).
Survey effort	Targeted bat surveys were undertaken over two survey periods at different sites for the proposal. Anabat surveys comprised the following: 1 – November 2018 at sites within the Narrabri, Gilgandra and Narromine areas (10 sites for 20 survey nights – 200 anabat nights) 2 – March 2019 at sites within the Pilliga State Forest (3 sites for 12 survey nights – 36 anabat nights). GHD also conducted Anabat surveys on two nights at a property north of Narrabri for a separate project in March 2018. Harp netting comprised eight trap nights in the Pilliga and four trap nights near Gilgandra in March 2019, and resulted in many microbat captures: • 4 nights at Trap site 1 (two harp nets set beside each other on Coolangala Creek) • 4 nights at Trap site 6 (two harp nets set beside each other on Rocky Creek)

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
	• 4 nights at the trap site south of Gilgandra (two harp nets set beside each other along a track in woodland in agricultural land). Harp netting was also undertaken in November 2018 surveys, however due to access and work hour constraints, harp nets were only set between dusk and 11pm, and there were no captures during this period: • 1 evening at the Narrabri Creek (two harp nets set beside each other beside Narrabri Creek) • 1 evening at Bohena Creek (two harp nets set beside each other on a tributary of Bohena Creek) • 1 evening at a dam south of Narrabri and one evening on a dry creek in woodland on the same property • 1 evening at the Castlereagh River (two harp nets set beside each other on the forested bank).
Survey results	During the March 2019 surveys in the Pilliga for the proposal, probable calls of this species were recorded at Coolangala Creek (Trap site 1). No other evidence of this species was recorded along the alignment.
Species polygon guidance	Habitat constraints: Cliffs (within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels). Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 and 30 percent retained). **Polygon** Potential breeding habitat is PCTs associated with the species within 100 metres of rocky areas containing caves, or overhangs or crevices, cliffs or escarpments, or old mines, tunnels, culverts, derelict concrete buildings. Surveys must be undertaken as per the Threatened Bat Survey Guide to confirm breeding habitat. Species mapping polygon for breeding habitat must use high resolution aerial imagery and topographic maps to identify features on the subject land (caves, scarps, cliffs etc). Polygon must be at least 100 metres wide (or 50 metres radius for point locations such as caves) with the breeding habitat features (may be multiple) as the centroid (see Threatened Bat Survey Guide). All breeding habitat on or within 100 metres of the subject land and the area immediately surrounding the feature must be identified. All habitat on the subject land should also be mapped if present. Use high resolution aerial imagery and topographic maps to identify potential roost habitat features on the subject land within two kilometres caves, scarps, cliffs etc. Species polygon boundary should align with PCTs on the subject land to which the species is associated that are within two kilometres of identified potential roost habitat features.

Large-eared Pied Bat (*Chalinolobus dwyeri*)			
Species polygon justification	Not a candidate species. No species polygon has been mapped for this species. Probable calls of this species were recorded via Anabat in the Pilliga Forest. Known roost habitat at Pilliga Nature Reserve is located over 35 kilometres from the proposal site. No caves, scarps, cliffs, mines or tunnels are present in or near the proposal site in the Pilliga forests. Rocky habitat in the Mt Tenandra area west of the Warrumbungles is not located near any in fertile wooded valley habitat. Native vegetation in this area predominantly comprises grassland, or small scattered patches of highly fragmented open woodland. This habitat is not considered suitable for this species. The population that occurs in the Warrumbungles would forage in large tracts of native wooded vegetation located within the National Park. No caves, scarps, cliffs, mines or tunnels are present elsewhere in or near the proposal site.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: No – surveyed Liverpool Plains: Not on site – habitat constraints Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Large-eared Pied Bat (*Chalinolobus dwyeri*)		
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not suitable breeding habitat – no caves present within two kilometres of alignment
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape

Large-eared Pied Bat (*Chalinolobus dwyeri*)		
168	Derived Copperburr shrubland - 168 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment (Pilliga forests) Not suitable breeding habitat – very small, scattered patches present in the Mt Tenandra area within a predominantly cleared, agricultural landscape
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Large-eared Pied Bat (*Chalinolobus dwyeri*)		
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment

Large-eared Pied Bat (*Chalinolobus dwyeri*)			
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT Not suitable breeding habitat – no caves present within two kilometres of alignment
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT No suitable breeding habitat – no caves in the area
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable breeding habitat – no caves in the area

Table I37 Grey-headed Flying-fox

Grey-headed Flying-fox (*Pteropus poliocephalus*)	
BC Act Status	Vulnerable
Credit type	Species and ecosystem
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Breeding requirements	The Grey-headed Flying-fox breading season begins in early autumn, after which time the larger camps begin to break up, reforming in late spring/early summer, as food resources become more abundant (Hall and Richards 2000). Males and females segregate in October when females usually give birth. Following six months of gestation, females bear a single young each year. Lactation usually begins in October and continues for three to four months or sometimes longer (Nelson 1965). For a period of four to five weeks after giving birth, the mother carries her single young with her to feeding sites. Once the young are completely furred, they are left in maternal camps and continue to be nursed for a further 12 weeks until they are independent.
Habitat requirements	The Grey-headed Flying-fox occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. The species roosting camps are generally located within 20 kilometres of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Grey-headed Flying-foxes can travel up to 50 kilometres from the camp to forage; commuting distances are more often less than 20 kilometres. The species feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines, the species is also known to forage in cultivated gardens and fruit crops.
Habitat in the study area	Grey-headed Flying-foxes may forage on rare occasions in the proposal site. No breeding camps were observed.
Known populations	Grey-headed Flying-foxes are generally found within 200 kilometres of the eastern coast of Australia, but in times of natural food shortages, individuals may be found further west (EES 2021). Occupancy at the edges of their range is ephemeral in most areas, and vagrants are occasionally sighted several hundred kilometres beyond expected bounds (Eby and Law 2008). No Grey-headed Flying-fox breeding camps are mapped in the study area by the National Flying-fox Web Viewer (DAWE 2020). A Little Red Flying Fox colony is known from Narrabri, and this species also occasionally roosts at Narromine. Grey-headed Flying-foxes are sometimes recorded roosting at Dubbo (DAWE 2020).

Grey-headed Flying-fox (*Pteropus poliocephalus*)	
Survey requirements	Survey months: October to December The Grey-headed Flying-fox occupies most areas in their distribution in highly irregular patterns, and, therefore, surveys based on animal sightings are unlikely to be reliable. A more effective survey method is to search appropriate databases and other sources for the locations of camps, and to conduct vegetation surveys to identify feeding habitat (DEE 2020a).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys along the alignment) • November 2018 (10 days, two ecologists – diurnal surveys along the alignment but not including the Pilliga) • March 2019 (10 days, four zoologists – diurnal surveys in the Pilliga and Gilgandra area) • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga) • August 2019 (5 days – two ecologists – diurnal and nocturnal surveys along the alignment) • September/October 2019 (6 days – two ecologists – diurnal and nocturnal surveys along the alignment) • June 2020 (2 days, two ecologists, two days in the Gilgandra area) • November 2020 (4 days, two ecologists, diurnal and nocturnal surveys along the alignment) • July 2021 (2 days, two ecologists – diurnal and nocturnal surveys in the Narromine area) • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area) • August 2021 (two ecologists, two days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area).
Survey results	No Grey-headed Flying-fox roost camps were recorded in the proposal site.
Species polygon guidance	The initial search for camps should encompass any recorded camps and roosting habitat likely to occur on the subject land. If a camp is located the survey only needs to take place in the camp (that is the area occupied by the target species) to identify breeding females. Camps used for breeding must be mapped. Use GPS to map outer perimeter of the camp to create the species polygon. Additionally, selected <1 for average number of offspring because females do not give birth every (often miscarry etc).
Species polygon justification	A species polygon is not required for this species, given the lack of roost camps in the proposal site.

Grey-headed Flying-fox (*Pteropus poliocephalus*)	
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No -surveyed (habitat constraints) Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: No -surveyed (habitat constraints) Liverpool Plains: No -surveyed (habitat constraints) Northern Basalts: No -surveyed (habitat constraints)

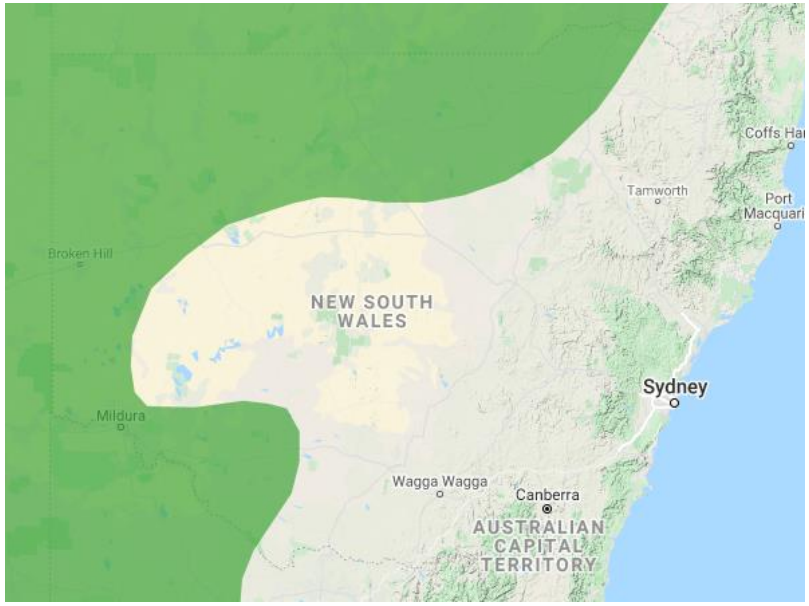
Table I38 Brush-tailed Phascogale

Brush-tailed Phascogale (*Phascogale tapoatafa*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Habitat requirements	• The Brush-tailed Phascogale is known to prefer dry sclerophyll open forest with rough barked trees of 25 cm DBH or greater for foraging, sparse groundcover of herbs, grasses, shrubs or leaf litter. The species can also be found inhabiting heath, swamps, rainforest and wet sclerophyll forest. • The species feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. • Female Brush-tailed Phascogales have exclusive territories of approximately 20 to 40 ha, while males have overlapping territories often greater than 100 hectares. • Brush-tailed Phascogale typically nest and shelter in tree hollows with entrances 2.5 to 4 centimetres wide and use many different hollows over a short time span (DPIE 2020a).

Brush-tailed Phascogale (*Phascogale tapoatafa*)	
Known populations	• In NSW the Brush-tailed Phascogale is mainly found east of the Great Dividing Range although there are occasional records west of the divide (DPIE 2020a). • A record existed in the Atlas of Living Australia of a Brush-tailed Phascogale near Narromine. The record info has it as ANWC M06009 and the locality as Wahgunyah, Glenbrook, via Singleton, collected in 1972. GHD's accredited assessor Kirsten Crosby contacted the CSIRO on 16 March 2021 and CSIRO have updated this record with the correct data from near Singleton, removing this species from the Narromine area (email received 17 March 2021). The BCS accountable officer for the species also agreed that this record was likely to be invalid. As such, the species is not considered to occur in the Bogan-Macquarie IBRA region.
Species polygon guidance	If Brush-tailed Phascogale is detected or presence is assumed (impact site only) the species polygon is drawn around the outer-edge of the PCTs that the species is associated, as defined in the TBDC.
Species polygon justification	No species polygon has been prepared as the record for this species in the Bogan Macquarie IBRA subregion has been updated to show its correct location in Singleton, NSW. No other records of this species exist in this area.

Table I39 Australian Bustard

Australian Bustard (*Ardeotis australis*)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• Little is known about longevity or population processes. • Australian Bustards breed once a year. • They most commonly occur in small groups of 2-6 individuals, but can also be solitary or in small family groups. • The Australian bustard has been recorded to exhibit an exploded lek system. • After mating, females nest and rear their young, with no further input from the male (Ziembicki 2009). • Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover; roosts on ground among shrubs and long grasses or under trees.

Australian Bustard (*Ardeotis australis*)	
Habitat requirements	• Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams. • Forages on insects, young birds, lizards, mice, leaves, seeds and fruit. • Dispersive, with irregular widespread movements over long distances; movements are thought to be in response to habitat and climatic conditions; known to converge on areas with high mice numbers and in recently burnt areas.
Habitat in the study area	May occur on cleared land within pastoral and cropping farms within the study area on occasion. Limited potential habitat within the Pilliga given the scarcity of tussock grasslands and low shrubland.
Known populations	• In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. • Birdlife International (2021) maps the distribution as being north-west of the Pilliga and Nyngan, and curving south near Mildura and into western Victoria (see map below). • The species is considered to be extinct in the Pilliga area (Date et al 2002). • Nearest records are located near Moree and the Macquarie Marshes (EES 2019a).
	 Australian Bustard distribution (Birdlife International 2021)

Australian Bustard (*Ardeotis australis*)	
Survey requirements	Survey months: All months
Survey effort	Fauna surveys were conducted along the alignment in the following periods: • September 2018 (5 days, two ecologists – diurnal bird surveys – no Pilliga surveys). • November 2018 (10 days, two ecologists – diurnal bird surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way). • March 2019 (5 days, six zoologists – diurnal bird surveys in the Pilliga). • March 2019 (5 days, two zoologists – diurnal bird surveys in the Narrabri and north Pilliga). • March 2019 (5 days, two zoologists – diurnal bird surveys in the Gilgandra area). • August 2019 (5 days, two zoologists – diurnal bird surveys along the alignment). • Late September-early October 2019 (6 days, two ecologists. diurnal bird surveys along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days, two ecologists in the Narromine area). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). • August 2021 (two ecologists, two days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area).
Survey results	No individuals were recorded during surveys.
Species polygon guidance	Habitat constraints: none Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). <u>Polygon</u> If detected or presence is assumed (impact site only) the species polygon is drawn around the outer edge of the PCTs that the species is associated, as defined in the TBDC.

Australian Bustard (*Ardeotis australis*)			
Species polygon justification	No (surveyed)/vagrant No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. Birdlife International (2021) maps the distribution as being north-west of the Pilliga and Nyngan and curving south near Mildura and into western Victoria. There are small numbers of records near Narrabri. There were no local records prior to the main surveys being undertaken (EES 2020a/ Birdlife Australia 2020a), however three birds (two males and a female) were observed near Narrabri by locals in early 2020 (Birdlife Australia 2020b, Narrabri Courier 2020). Local birdwatchers noted that Australian Bustards are not common in the area and had not been observed for many years (about 30 years according to one article). Records on Birdata for the region surrounding the study area include six individuals at Burren Junction in 2020 and one individual at Pilliga Bore Baths in 2016 (both locations about 80 kilometres west of the study area), and one individual at Eulah Creek in 2006 (about 15 kilometres east of Narrabri) (Birdlife Australia 2020). Australian Bustards are nomadic, and numbers may sometimes irrupt (build up rapidly) and then disperse again in response to availability of food (for example after rains or grasshopper plagues) (Ziembicki 2009). The Australian Bustard has undergone large historic population declines in the south and south-east of Australia and are now largely absent from areas where they were formerly found (Garnett and Crowley 2000, Marchant and Higgins 1993). In NSW, they are now mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain (EES 2019b). A survey of landowners found that in NSW, Australian Bustards were usually short-term visitors, whereas the species was considered resident on properties in Queensland (Ziembicki 2009). The species is considered to be extinct in the Pilliga area (Date et al 2002). Given the above information, the proposal site is considered to be generally outside the current distribution of the species. No evidence of the species was recorded during any surveys.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: No – surveyed Pilliga Outwash: No – surveyed Pilliga: No – surveyed Liverpool Plains: No – surveyed Northern Basalts: No – surveyed		
Bogan-Macquarie	0		
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland

Australian Bustard (*Ardeotis australis*)			
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	248	Mixed box eucalypt woodland – 248 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Marginal habitat present
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution

Australian Bustard (*Ardeotis australis*)			
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
Pilliga	0	Crop and/or introduced grassland – 0	Marginal habitat present, not recorded during surveys and outside usual distribution
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland

Australian Bustard (*Ardeotis australis*)		
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
141	Broombush - wattle very tall shrubland – 141 (Good)	Suitable habitat present, not recorded during surveys and outside usual distribution
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution

Australian Bustard (*Ardeotis australis*)			
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland

Australian Bustard (*Ardeotis australis*)			
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	0	Crop and/or introduced grassland – 0	Marginal habitat present
Pilliga Outwash	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland

Australian Bustard (*Ardeotis australis*)		
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland

Australian Bustard (*Ardeotis australis*)			
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT Suitable habitat present, not recorded during surveys and outside usual distribution
	0	Crop and/or introduced grassland – 0	Marginal habitat present, not recorded during surveys and outside usual distribution
Liverpool Plains	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – prefers grassland or low open grassy woodland
	168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Suitable habitat, not recorded during surveys and outside usual distribution
	0	Crop and/or introduced grassland – 0	Marginal habitat present, not recorded during surveys and outside usual distribution
Northern Basalts	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Suitable habitat, not recorded during surveys and outside usual distribution

Table I40 Black-breasted Buzzard

Black-breasted Buzzard (*Hamirostra melanosternon*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves (EES 2019b). • The species is known to breed in sites with cropping, but also requires retained vegetation (TBDC).
Habitat requirements	• Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat (EES 2019b). • Also hunts over grasslands and sparsely timbered woodlands (EES 2019b).
Habitat in the study area	• This species may occur on rare occasions in the area as a vagrant. • No nest trees of this species were recorded during surveys. • One very large raptor nest was observed in the study area at a property north of Narromine. This nest tree was pointed out by the landowner, who had observed Wedge-tailed Eagles use the nest over a number of years. Large raptor nests were also observed at a property north of Narrabri by the ecology team that were being used by Whistling Kites, and a stick nest south of Narrabri is likely to be used by Little Eagles. No other large raptor nests suitable for use by the Black-breasted Buzzard were observed in the study area. Most stick nests observed were of a size used by ravens and magpies.
Known populations	• There are no records of this species along or near the alignment. There is one record in the Pilliga, about 40 kilometres from the alignment.
Survey requirements	Survey months: September to November (breeding)
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September (5 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment, not including the Pilliga). • November (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga). • March (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment).

Black-breasted Buzzard (*Hamirostra melanosternon*)			
	• July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). Surveys included diurnal bird surveys and searches for nest trees in woodland patches and paddock trees. Incidental observations of raptors were also made while driving along the alignment between survey sites.		
Survey results	No individuals recorded during surveys.		
Species polygon guidance	Habitat constraints: Waterbodies (land within 40 metres of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts). Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). The species is known to breed in sites with cropping, but also requires retained vegetation. Polygon requirements taken to be 300 metre buffer around a nest tree as per the other raptor species.		
Species polygon justification	Not a candidate species No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. Given the lack of evidence during the many field surveys, location of the proposal away from the species' core area, and limited number of records in the region, breeding habitat for the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding vagrants. This conclusion was confirmed by the BCS accountable officer during a teleconference in February 2020 with BCS.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Vagrant Castlereagh Barwon: Vagrant Pilliga Outwash: Vagrant Pilliga: Vagrant Liverpool Plains: Vagrant Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potentially suitable breeding habitat present, outside breeding range

Black-breasted Buzzard (*Hamirostra melanosternon*)			
	49	Partly derived Windmill Grass – Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	No suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Nesting habitat may be present if near large waterbodies, outside breeding range

Black-breasted Buzzard (*Hamirostra melanosternon*)			
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable nesting habitat present at permanent waterbodies
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT No breeding habitat present – lack of canopy trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potentially suitable nesting habitat may be present if near large waterbodies, outside breeding range
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Potentially suitable nesting habitat may be present if near large waterbodies, outside breeding range
	244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Potentially suitable nesting habitat may be present if near large waterbodies, outside breeding range
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Not an associated PCT Potentially suitable nesting habitat may be present if near large waterbodies, outside breeding range
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	No breeding habitat present – prefers breeding along large creeklines
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable nesting habitat present, outside breeding range
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lack of canopy trees

Black-breasted Buzzard (*Hamirostra melanosternon*)		
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable nesting habitat may be present, outside breeding range
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Not suitable habitat – lack of canopy trees
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – lack of canopy trees
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Not suitable breeding habitat – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines

Black-breasted Buzzard (*Hamirostra melanosternon*)			
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potentially suitable nesting habitat present at permanent waterbodies, outside breeding range
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Potentially suitable nesting habitat present, outside breeding range
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines

Black-breasted Buzzard (*Hamirostra melanosternon*)			
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable nesting habitat may be present, outside breeding range
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	168	Derived Copperburr shrubland – 168 (Good)	Associated PCT No breeding habitat present – lack of canopy trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines

Black-breasted Buzzard (*Hamirostra melanosternon*)			
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potentially suitable nesting habitat present at permanent waterbodies, outside breeding range
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Potentially suitable nesting habitat present, outside breeding range
	435	White Box - White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	435	White Box - White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not an associated PCT No breeding habitat present – lack of canopy trees
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT No breeding habitat present – lack of canopy trees
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable nesting habitat may be present, outside breeding range
	168	Derived Copperburr shrubland – 168 (Good)	No breeding habitat present – lack of canopy trees

Table I41 Eastern Osprey

Eastern Osprey (*Pandion cristatus*)	
BC Act Status	Vulnerable
Credit type	Species (breeding)/Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea (EES 2021c). • The Osprey may use the same nest year after year. The nest is made from sticks and driftwood and may be huge after many years. It is usually placed on a cliff, a dead tree, telegraph poles or radio masts (Birdlife 2021).
Habitat requirements	• Favour coastal areas, especially the mouths of large rivers, lagoons and lakes (EES 2021c). • Feeds on fish over clear, open water (EES 2021c).
Habitat in the study area	• Potential habitat is present along permanent rivers in the study area, such as the Macquarie River. This species may occur on rare occasions in the area, but is unlikely to be a breeding resident.
Known populations	• Eastern Ospreys are found right around the Australian coastline, except for Victoria and Tasmania (EES 2021c). • They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia (DAWE 2021b).
Survey requirements	Survey months: April to November

Eastern Osprey (*Pandion cristatus*)	
	 Eastern Osprey distribution in NSW as mapped by Birdlife International (2021)
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September (5 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment, not including the Pilliga). • November (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga). • March (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). All surveys included diurnal bird surveys, nest searches and listening for calls.
Survey results	No individuals were recorded during surveys. No records of the species occur within 20 kilometres of the alignment (EES 2021).

Eastern Osprey (*Pandion cristatus*)			
Species polygon guidance	Habitat constraint: Presence of stick-nests in living and dead trees (>15 metres) or artificial structures within 100 metres of a floodplain for nesting. Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). This species can nest in isolated trees. Nests are distinctive but easiest to identify when birds are in attendance (EES 2020).		
Species polygon justification	No (surveyed). No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. No stick nests were observed in suitable habitat along the Macquarie River. The species only occasionally occurs in inland areas. It is highly unlikely to nest in the study area.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: Not in BAM-C case – not a candidate species Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	No breeding habitat present
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable habitat for breeding, not recorded during surveys and outside usual distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No breeding habitat present
	56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT No breeding habitat present
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not an associated PCT No breeding habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Potential for breeding habitat to occur, not recorded during surveys and outside usual distribution

Eastern Osprey (*Pandion cristatus*)			
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT Potentially suitable habitat for breeding given location near Macquarie River, not recorded during surveys and outside usual distribution
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT No breeding habitat present, not recorded during surveys and outside usual distribution
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT Suitable habitat for breeding, not recorded during surveys and outside usual distribution

Table I42 Major Mitchell's Cockatoo

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• The Major Mitchells Cockatoo is a monogamous species and forms life-long pair bonds. The same nest is often used year after year. Pairs are very territorial and must nest at least one kilometre from other breeding pairs. • Juveniles join their parents to form small groups that remain together for some time after the young reach independence. • Juveniles reach sexual maturity at three to four years. • Live to be 50 to 60 years old in the wild (del Hoyo, et al., 1997).
Habitat requirements	• Major Mitchell cockatoos are found across inland Australia, in a wide variety of arid and semi-arid environments from forest to mallee scrub. Their main requirements are fresh surface water and trees that have large hollows for nesting. • Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. • Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)	
	• Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. • Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least one kilometre apart, with no more than one pair every 30 square kilometres. (OEH 2019).
Habitat in the study area	May forage in the study area (not including the Pilliga) when conditions suitable. This species may occur on rare occasions in the area but is unlikely to be a breeding resident.
Known populations	The species is considered to be extinct in the Pilliga area (Date et al 2002).
Survey requirements	Survey months: September to December
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). Surveys included diurnal bird surveys, and searches for nest trees. Incidental observations of birds were also made while driving along the alignment between survey sites.
Survey results	No individuals were recorded in the study area or surrounds during field surveys.
Species polygon guidance	None. Assumed to be 100 metres around each nest tree as per other large cockatoos. Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). Living or dead tree with hollows greater than 10 centimetre diameter.

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
Species polygon justification	Not a candidate species. No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. The proposal site is outside the usual breeding range of this species. Given the lack of evidence during field surveys, the fact the species is extinct from the Pilliga area, and limited number of records in the region, the breeding habitat for the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding vagrants. This conclusion was confirmed by the BCS accountable officer.		
Relevant IBRA subregions	Inland Slopes: Vagrant Bogan Macquarie: Vagrant Castlereagh Barwon: Vagrant Pilliga Outwash: Vagrant Pilliga: Vagrant Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Inland Slopes	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (DNG)	No hollow-bearing trees
	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (Good)	Few hollow-bearing trees, outside breeding range
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT No breeding habitat present – lack of canopy trees, outside breeding range
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	248	Mixed box eucalypt woodland – 248 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Not suitable breeding habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT No breeding habitat present – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT No breeding habitat present – lack of canopy trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Not suitable breeding habitat – lack of hollows
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Associated PCT No breeding habitat present – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT No breeding habitat present – lack of canopy trees

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT No breeding habitat present – lack of canopy trees

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)		
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No breeding habitat present – lack of canopy trees
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Not suitable breeding habitat – lack of hollows
168	Derived Copperburr shrubland – 168 (Good)	Associated PCT No breeding habitat present – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
256	Green Mallee tall mallee woodland – 256 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
			No breeding habitat present – lack of canopy trees
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Potential foraging habitat present only, outside breeding range.
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Potential foraging habitat present only, outside breeding range.
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Suitable breeding habitat present
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
			Potential foraging habitat present only, outside breeding range.
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Associated PCT Not suitable breeding habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Not suitable breeding habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Associated PCT Not suitable breeding habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable breeding habitat – lack of canopy trees
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Associated PCT Not suitable breeding habitat – lack of hollows
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Associated PCT Not suitable breeding habitat – lack of canopy trees
	168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Not suitable breeding habitat – lack of canopy trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)			
			Potential foraging habitat present only, outside breeding range.
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Potential foraging habitat present only, outside breeding range.
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT Not suitable breeding habitat – lack of canopy trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Associated PCT Not suitable breeding habitat – lack of canopy trees
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT Not suitable breeding habitat – lack of canopy trees

Table I43 Powerful Owl

Powerful owl (*Ninnox strenua*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False

Powerful owl (*Ninnox strenua*)	
EPBC Act Status	Not listed
Breeding requirements	• The species can breed and forage in very small patches of vegetation, although this is hugely variable across their range (EES 2020). • Moist forest in unlogged corridors in gully systems is used for nesting and roosting, and also preferentially for foraging although much foraging is also conducted in dry and regrowth forest (Kavanagh 1997). • Large eucalyptus that are at least 150 years old with large hollows (at least 0.5 metres deep) are required for nesting Powerful Owls. • While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 metres) guarding them. • Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter (DRRSPIE 2020a).
Habitat requirements	• The Powerful Owl inhabits a variety of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. • The species typically requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. • The Powerful Owl breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. • It roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species (DPIE 2020a).
Habitat in the study area	While associated PCTs and large hollows are present in the study area, the proposal is located outside the range of this species.
Known populations	• The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range (Birdlife Australia 2021). • There are scattered Powerful Owl records on the western slopes and plains suggesting occupancy prior to land clearing. According to the Recovery Plan for the species, the current range extends as far west as Mudgee and Bathurst (DEC 2006).

Powerful owl (*Ninnox strenua*)

Distribution of the Powerful Owl as mapped in the recovery plan (DEC 2006).

Survey requirements	Survey months: May to August
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, three days in the Pilliga to Bohena Creek area, two ecologists). • Surveys included diurnal bird surveys, spotlighting, call playback and searches for nest trees.
Survey results	No individuals were recorded in the study area or surrounds during field surveys.

Powerful owl (*Ninnox strenua*)	
Species polygon guidance	Patch size: <5 hectares. Percent native vegetation cover: fragmented (between 11 percent and 30 percent retained). **Polygon** The species can breed and forage in very small patches of vegetation, although this is hugely variable across their range. Where any nest tree(s) for which high fidelity is known to occur on site (eg known from existing data, studies or other documented evidence), a species polygon providing a circular buffer with a 100 metre radius should be drawn around the known nest tree(s). In addition, or where there are no known nest trees on site, assessors should apply the following process; 1. Look for signs of breeding on site as follows; suitable habitat AND (a) presence of male and female OR (b) calling to each other (duetting) OR (c) find nest. Note that this species does not respond as well to call-play-back and could require stagwatching and other evidence of nesting. 2. Where signs of breeding on site are present, potential nest trees should be identified. Potential nest trees are living or dead trees with hollows greater than 20 centimetre diameter. 3. Where potential nest trees are identified on site, night monitoring at the identified potential nest locations for a minimum of two nights should be undertaken to detect the presence of any owl of this species using a potential nest tree or demonstrating behaviour focussed on a potential nest tree (eg investigating the hollow or roosting within 10 metres). DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements). 4. If monitoring of potential nest trees detects this owl species using, or demonstrating behaviour focussed on the trees (eg investigation of the hollow or roosting within 10 metres) on site, the species polygons should be drawn around those trees (ie the identified potential nest trees where any owl of this species is observed using, or focussing behaviour around the tree). The species polygons should be circular in shape and must include a buffer radius of 100 metres around each tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for male roosts, feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear, and the nest tree is already located near the edge of the wooded area.

Powerful owl (*Ninnox strenua*)			
Species polygon justification	Not a candidate species. The Powerful Owl mainly occurs along the coast of NSW and the Great Dividing Range, with only sparse records further west (Birdlife Australia 2020, Debus and Chafer 1994). The recovery plan does not map the Powerful Owl as occurring as far west as the proposal site (DEC 2006). No individuals were recorded during surveys.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: Vagrant Liverpool Plains: Vagrant Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable habitat – lacks canopy
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lacks canopy
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows
	56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows

Powerful owl (*Ninnox strenua*)			
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable habitat – lacks canopy
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – lacks canopy
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – lacks canopy
	202	Fuzzy Box woodland – 202 (Good)	Associated PCT Suitable nesting habitat present if near riparian areas with large hollow-bearing trees
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas, lack of hollows

Powerful owl (*Ninnox strenua*)			
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable nesting habitat present if near riparian areas with large hollow-bearing trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable nesting habitat present if near riparian areas with large hollow-bearing trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not suitable habitat – lacks canopy
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas

Powerful owl (*Ninnox strenua*)			
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Nesting habitat unlikely to occur away from riparian areas
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present in riparian areas with large hollow-bearing trees
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable nesting habitat – lack of canopy

Table I44 Red-backed Button-quail

Red-backed Button-quail (*Turnix maculosus*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• Red-backed Button-quail usually breed in dense grass near water, and nests are made in a shallow depression sparsely lined with grass and ground litter (EES 2021b). • The timing of breeding is not well known. In NSW, clutches recorded October to mid-February, but elsewhere in Australia, clutches recorded from late November to as late as May-June (EES 2021b). • It appears only the male incubates the clutch and tends the young, which are precocial (EES 2021b).

Red-backed Button-quail (*Turnix maculosus*)	
Habitat requirements	• It is mainly a species of coastal and subcoastal regions. • Red-backed Button-quail inhabit grasslands, open and savannah woodlands with grassy ground layer, pastures and crops of warm temperate areas, typically only in regions subject to annual summer rainfall greater than 400 millimetres (EES 2021b). In NSW, said to occur in grasslands, heath and crops, and to prefer sites close to water, especially when breeding (EES 2021b). • Observations of populations in other parts of its range suggest the species prefers sites near water, including grasslands and sedgelands near creeks, swamps and springs, and wetlands (EES 2021b).
Habitat in the study area	• No preferred (coastal) habitat is present in the study area. • Native grasslands near water occur throughout parts of the study area.
Known populations	• Red-backed Button-quail extends discontinuously from the Kimberley region of Western Australia, through the Top End of the Northern Territory and the southern Gulf of Carpentaria, to Cape York Peninsula and eastern Queensland and central-eastern and north-eastern NSW. • The Red-backed Button-quail is recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW (a breeding record from Finley in 1954; the Macquarie Marshes in 1955; and Coolabah in 2000).
Survey requirements	Survey months: All year
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). All surveys included diurnal and/or nocturnal surveys and listening for calls.
Survey results	No individuals were recorded during surveys. No records of the species occur within 100 kilometres of the alignment (EES 2021).

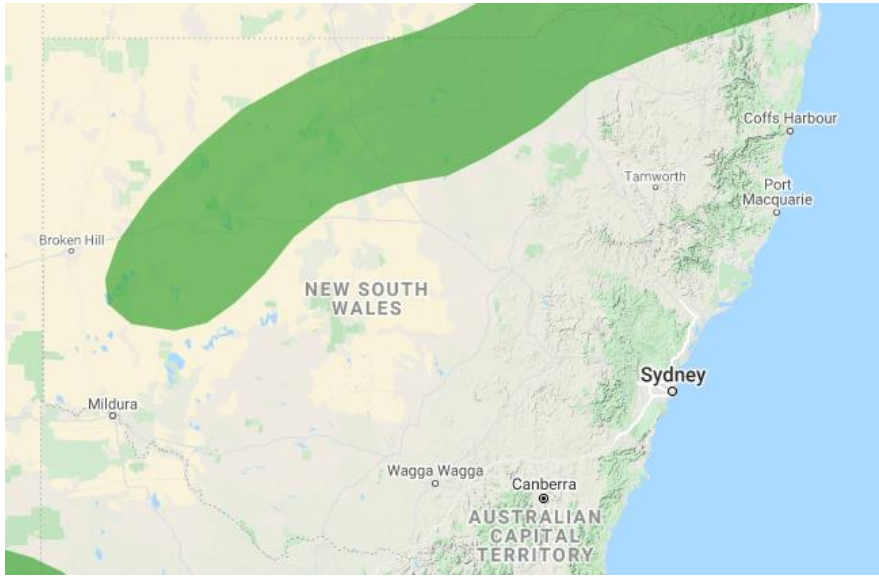
Red-backed Button-quail (*Turnix maculosus*)			
Species polygon guidance	Habitat constraints: none Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). It is a cryptic species with little known about its ecology and response to management not well known anywhere in its range – threats have not been identified (see Final Determination), therefore it is not possible to determine the effectiveness of management actions in controlling (any) threats. Population in NSW may always have been small, but data lacking. Dispersal distance relates to the fact that this species turns up in odd locations all the time. Nocturnal surveys to flush birds from habitat should be used however identification is difficult and may require photos or handling individuals to distinguish from other more common species. Also important to note that call surveys including playback and songmeters not known to be effective as not known whether it responds, in what months it mostly calls, identification from button-quail species (EES 2020).		
Species polygon justification	No (surveyed). No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. The study area is well outside the usual distribution of this species. The Red-backed Button-quail is recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW (a breeding record from Finley in 1954; the Macquarie Marshes in 1955; and Coolabah in 2000).		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: Not in BAM-C case – not a candidate species Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Suitable habitat if near permanent water
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential habitat, outside usual distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Potential habitat if near permanent water, outside usual distribution
	56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Suitable habitat if near permanent water

Red-backed Button-quail (*Turnix maculosus*)			
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not an associated PCT Suitable habitat if near permanent water
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – lack of water
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT Not suitable habitat – lack of water
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – lack of water
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Not an associated PCT Potential habitat if near permanent water, outside usual distribution

Table I45 Red-tailed Black-cockatoo (Inland subspecies)

Red-tailed Black-cockatoo (*Calyptorhynchus banksii samueli*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only) and ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• Breeds in large hollows near the tops of old-growth eucalypts, living or dead (NSW SC. 2008). • Usually, a clutch of one egg is laid between spring and autumn, followed by an incubation period of one month, nestling period 10-14 weeks, and post-fledging dependence period of at least three to four months, Juveniles stay with their parents until the start of following breeding season (NSW SC. 2008). • Breeds semi-colonially, defending only the immediate area of the nest hollow, although the species' ranges widely to forage (EES 2021a). • Highly mobile and able to disperse widely, up to tens of kilometres, and commute up to 40 kilometres to foraging areas (Higgins 1999).
Habitat requirements	• Found in a wide variety of habitats. Prefer Eucalyptus forest and woodlands, particularly river red gum and coolabah lined water courses (EES 2021a). In the arid zone usually occur mainly near eucalypts along larger watercourses and associated Acacia and Casuarina woodlands nearby (EES 2021a). Also utilise grasslands, scrublands, wetlands and vegetation on floodplains. • Inhabits mature riparian eucalypt woodland, with some old growth trees providing large hollows, and adjacent open plains and she-oak woodland. Its habitat is under increasing pressure from dryland cultivation (eg cotton), and denial of water by irrigation schemes upstream (NSW SC. 2008). • Feeds on a variety of seeds obtained from trees and the ground, including agricultural weeds, and also on wood-boring insect larvae, cultivation of riparian flats may adversely affect its food supply (NSW SC. 2008).
Habitat in the study area	• Riparian woodland is present along a number of rivers and creeks, however this habitat is outside the distribution of this species.

Red-tailed Black-cockatoo (*Calyptorhynchus banksii samueli*)	
Known populations	• Essentially confined to the Darling Riverine Plain Bioregion: the Darling River south to about Menindee, and its northern tributaries upstream to about Nyngan on the Bogan River, and Walgett or possibly Boggabilla on the Barwon River (Higgins 1999). • Given the mobility of this species (Higgins 1999), these birds are likely to constitute a single subpopulation, with possible interchange with the Queensland population (NSW SC. 2008). • The Red-tailed Black-cockatoo (inland subspecies) is known to occur around watercourses and overflows of the Darling, Paroo, Bogan, Macquarie and Barwon Rivers extending in an arc along the Darling River from Wentworth (though rare south of Menindee) in the south to Bourke and thence through to Brewarrina in the north. It extends east to Walgett and perhaps Boggabilla on the Barwon and south through to the Macquarie Marshes. • The inland subspecies of the Red-tailed Black-cockatoo is neither known, or predicted to occur in the Pilliga forests (NSW BioNet Atlas).
Survey requirements	Survey months: May to July, September – December
Survey effort	Fauna surveys were conducted in the following months in the Castlereagh-Barwon IBRA subregion: • September 2018 (5 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). All surveys included diurnal bird surveys and listening for calls.
Survey results	No individuals were recorded during surveys.
Species polygon guidance	Habitat constraints: Hollow-bearing trees (Living or dead tree with hollows greater than 15 centimetre diameter and greater than five metres above ground). Paddock trees with hollows greater than 12 centimetre diameter and greater than two metres above the ground AND any trees within riparian zones (EES 2020).

Red-tailed Black-cockatoo (*Calyptorhynchus banksii samueli*)	
	Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). **Polygon** Breeding will be identified by the presence of suitable habitat AND 1. presence of nest OR; 2. pairs exhibiting courtship behaviour; OR 3. observing/hearing begging juveniles. Note that the species can nest as isolated pairs or in a colony; it can have two breeding seasons in a single year, survey will be required in the second season if not found in the first (EES 2020).
Species polygon justification	Not a candidate species – vagrant. No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. The study area is outside the geographic constraint for this species in the Bogan-Macquarie IBRA subregion, as the study area is not located north of Nyngan. The Red-tailed Black-Cockatoo is known to occur around watercourses extending in an arc along the Darling River from Wentworth in the south to Bourke and then through to Brewarrina in the north. It extends east to Walgett and perhaps Boggabilla on the Barwon and south through to the Macquarie Marshes. This is mapped by Birdlife International (2021) – see below. The proposal site in the Castlereagh-Barwon IBRA subregion is located at the eastern edge of the IBRA subregion, well away from the large rivers associated with the Darling River.
	 Birdlife International (2021) map of the distribution of the Red-tailed Black-Cockatoo in NSW.

Red-tailed Black-cockatoo (*Calyptorhynchus banksii samueli*)			
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Geographic constraint – south of Nyngan Castlereagh Barwon: No – surveyed/vagrant Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: Not in BAM-C case – not a candidate species Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Not suitable breeding habitat – prefers riparian habitat, outside breeding range
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Not suitable breeding habitat – lack of canopy
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Not suitable breeding habitat – lack of canopy, outside breeding range
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Not suitable breeding habitat – prefers riparian habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potentially suitable breeding habitat present, outside breeding range
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable breeding habitat – lack of canopy, outside breeding range
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable breeding habitat – prefers riparian habitat, outside breeding range

Red-tailed Black-cockatoo (*Calyptorhynchus banksii samueli*)			
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable breeding habitat - lack of suitable hollows, outside breeding range
	206	Dirty Gum – White Cypress Pine tall woodland - 206 (Good)	Not an associated PCT Not suitable breeding habitat – prefers riparian habitat, outside breeding range
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Not suitable breeding habitat – prefers riparian habitat, outside breeding range
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Not an associated PCT Not suitable breeding habitat – prefers riparian habitat, outside breeding range

Table I46 Regent Honeyeater

Regent Honeyeater (*Anthochaera phrygia*)	
BC Act Status	Critically Endangered
Credit type	Species and Ecosystem
SAII entity/threshold	True
EPBC Act Status	Critically Endangered
Breeding requirements	• There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests (OEH 2019). • Regent Honeyeaters start breeding in August and chicks can be produced through to January.
Habitat requirements	• The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. • Non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. • In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. • The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. • Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark and other Stringybark species, and Broad-leaved Ironbark can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii*, *A. pendula* and *A. cambagei* are also utilised. • When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15 percent of the total diet and are important components of the diet of nestlings.
Habitat in the study area	• No important habitat for the Regent Honeyeater occurs in the proposal site. • The Pilliga forests contain the following key eucalypt species: Yellow Box, White Box, Mugga Ironbark, Red Ironbark. • Road-side reserves and TSRs contain large number of Box-Gum woodland also containing these species. • Patchy distribution of Mistletoes recorded in Pilliga forests.

Regent Honeyeater (*Anthochaera phrygia*)	
Known populations	• The nearest breeding area is in Bundarra-Barraba region north of Tamworth/Gunnedah. • The Baradine/Yearinan Creek in the central Pilliga (south-east of the proposal site) is noted as being important habitat for the Regent Honeyeater (Birdlife International 2020).
Survey requirements	No targeted surveys required under the BAM (see species polygon guidance below. Area searches in suitable habitat, preferably in the morning but other times may also be appropriate. Detection by call is possible when birds are most vocal (outside the breeding season). Otherwise, detection is by sighting. Targeted searches of woodland patches with heavily flowering trees is useful, especially around waterpoints such as dams and creeklines. Also check among flocks of other blossom nomads such as lorikeets and other honeyeaters. Broadcast surveys immediately before and during the breeding season may also be useful (DEWHA 2010).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). All surveys included area searches for diurnal birds in woodland and riparian areas.
Survey results	No individuals were recorded during surveys.
Species polygon guidance	Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). **Polygon** Mapped important areas are a species credit, these areas do not require survey and any impact from development could be potentially serious and irreversible. Ecosystem credit areas are unlikely to be potential serious and irreversible impacts. Important habitat maps (formally Important Mapped Area): Only select species have important habitat maps. These maps identify land that is considered important to support critical life stages of the species and are classed as species credits. Mapping is in accordance with the Guide for mapping threatened species for inclusion in the NSW regulatory framework. Maps may include breeding areas, key

Regent Honeyeater (*Anthochaera phrygia*)			
	areas that migratory species forage/over-winter in, or sites where multiple records have been located over multiple years. Important habitat maps are generally restricted to species that are highly mobile and difficult to reliably detect by survey, and where long-term location data exists. If the subject land is within a mapped area, no survey is required for that species and it is assumed present. The part of the subject land within the important habitat map forms the species polygon used to generate species credits. Where only part of the subject land is mapped as important habitat, the remaining areas are assessed for ecosystem credits.		
Species polygon justification	Not a candidate species. No species polygon is required as no important habitat for the species was identified by OEH in the study area (email correspondence January 2019, EES 2020).		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: No important habitat Liverpool Plains: No important habitat Northern Basalts: Not in BAM-C case – not a candidate species		
Inland slopes	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (DNG)	No suitable foraging habitat – lack of canopy trees
	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (Good)	May provide foraging habitat
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Suitable foraging habitat – mistletoes present
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT May provide foraging habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees

Regent Honeyeater (*Anthochaera phrygia*)		
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT May provide foraging habitat
56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT May provide foraging habitat
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT May provide foraging habitat
81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT May provide foraging habitat
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT May provide foraging habitat
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable foraging habitat – lack of canopy trees
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT May provide foraging habitat
168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Associated PCT May provide foraging habitat
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT May provide foraging habitat
244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Suitable foraging habitat – mistletoes present
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT May provide foraging habitat

Regent Honeyeater (*Anthochaera phrygia*)			
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT May provide foraging habitat
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Suitable foraging habitat – mistletoes present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT May provide foraging habitat
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	No suitable foraging habitat – lack of canopy trees
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Suitable foraging habitat – preferred feed trees present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Not an associated PCT Suitable foraging habitat – preferred feed trees present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT May provide foraging habitat
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT May provide foraging habitat
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT May provide foraging habitat
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT May provide foraging habitat
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT May provide foraging habitat
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT May provide foraging habitat

Regent Honeyeater (*Anthochaera phrygia*)			
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT May provide foraging habitat
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Associated PCT May provide foraging habitat
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland - 78 (DNG)	No suitable foraging habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT May provide foraging habitat
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT May provide foraging habitat
	141	Broombush - wattle very tall shrubland – 141 (Good)	No suitable foraging habitat – lack of canopy trees
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	No suitable foraging habitat – lack of canopy trees
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	No suitable foraging habitat – lack of canopy trees
	168	Derived Copperburr shrubland – 168 (Good)	No suitable foraging habitat – lack of canopy trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT May provide foraging habitat
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Suitable foraging habitat – preferred feed trees present

Regent Honeyeater (*Anthochaera phrygia*)			
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Not an associated PCT Suitable foraging habitat – preferred feed trees present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT May provide foraging habitat
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	No suitable foraging habitat – lack of canopy trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT May provide foraging habitat
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	No suitable foraging habitat – lack of canopy trees
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Not an associated PCT May provide foraging habitat
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Associated PCT No suitable foraging habitat – canopy removed
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT May provide foraging habitat
	168	Derived Copperburr shrubland – 168 (Good)	No suitable foraging habitat – lack of canopy trees

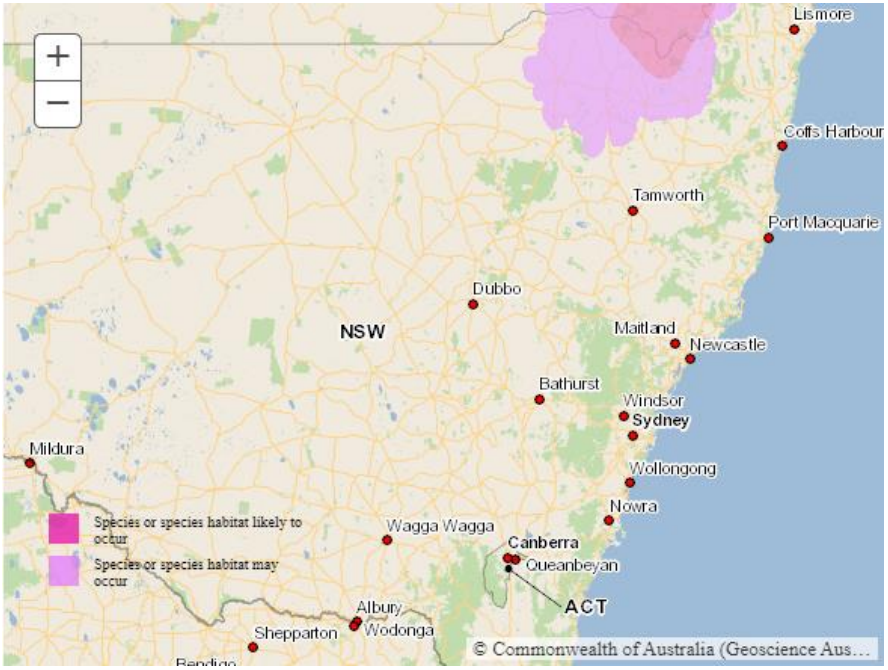
Table I47 Squatter Pigeon (southern subspecies)

Squatter Pigeon (*Geophaps scripta scripta*)	
BC Act Status	Critically endangered
Credit type	Species
SAII entity/threshold	Yes (0 ha)
EPBC Act Status	Vulnerable
Breeding requirements	• Forages on a wide range of seeds from grasses, legumes, herbs, trees and shrubs, as well as insects (Higgins and Davies 1996). • The species diet may vary seasonally depending on food availability. Drinking occurs every day, usually in the morning (Crome 1976). • Nests are located on the ground, sometimes among, or sheltered by vegetation, including short, dry grass, grass tussocks or bushes (Frith 1982). • Nests are usually shallow depressions in the ground, lined with grass and leaves (Frith 1982). Breeding is greatly influenced by heavy rainfall and a clutch, generally of two eggs, incubated for a period of 15-17 days (Higgins and Davies 1996).
Habitat requirements	• Squatter Pigeon ranges in tropical, open, dry sclerophyll woodlands and, savannahs of north-eastern Australia (Higgins and Davies 1996). Shows a preference for grassy woodlands and plains, preferring sandy areas and usually close to water (NPWS 1999). • Sightings are generally in the grassy understorey of eucalypt woodland, close to permanent water bodies (Garnett 1992). • Feed on the ground, on seeds of grasses, herbs and shrubs, as well as insects (EES 2021b).
Habitat in the study area	Potential habitat occurs in grassy woodland near permanent water in the study area, however the proposal site is outside the known distribution of this species.

Squatter Pigeon (*Geophaps scripta scripta*)

Known populations

- The range once extended from southern NSW to the Burdekin River in northern Queensland, occurring over most of NSW (NPWS 1999). The subspecies has disappeared from the southern half of its historical range (DAWE 2021).
- The current potential distribution of the Squatter Pigeon (southern) extends southwards from the Burdekin-Lynd divide to south-east Queensland, south-west to Stanthorpe, near the Queensland-NSW border, south along the western slopes of the Great Dividing Range to the area around Glen Innes, NSW, west through the Gwydir River region to Bellata, and north-westwards through Goondiwindi and the Brigalow Belt in Queensland to Charleville (Cooper et al. 2014; Squatter Pigeon Workshop 2011, in DAWE 2021).
- Overall, the subspecies' known distribution is estimated to occur within the latitudes, 17° to 30° S, and the longitudes, 141° to 153° 30' E (Cooper et al. 2014; Squatter Pigeon Workshop 2011).
- At present, the Squatter Pigeon is widespread in the north-east and north of the Queensland. Within NSW, previous records of the species are concentrated on the northwestern slopes, Bourke and Cobar, near Louth west of White Cliffs, and 150 kilometres NNE of Broken Hill (Higgins and Davies 1996).
- Since 1975 there have only been nine records of the Squatter Pigeon in NSW (Morris 1993). Recent records are all located on the Queensland border north-east of Moree (EES 2021)



Distribution of the Squatter Pigeon as mapped by DAWE (2021)

Squatter Pigeon (*Geophaps scripta scripta*)	
Survey requirements	Survey months: All year
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). All surveys included diurnal bird surveys and listening for calls.
Survey results	No individuals were recorded during surveys. No records of the species occur within 20 kilometres of the alignment (EES 2021).
Species polygon guidance	Habitat constraints: none Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). Species is critically endangered, impacts on the species from development could be potentially serious and irreversible. Note that whilst this is a partnership species in NSW it is listed nationally and therefore retained as a potential SAII species (EES 2020).
Species polygon justification	No (surveyed)/outside distribution. No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. There are no local records and this species is only rarely recorded in NSW. Recent records are all located on the Queensland border north-east of Moree (EES 2021). The species is not known to occur as far south as Narrabri (Cooper et al. 2014; Squatter Pigeon Workshop 2011). This species is highly unlikely to occur.

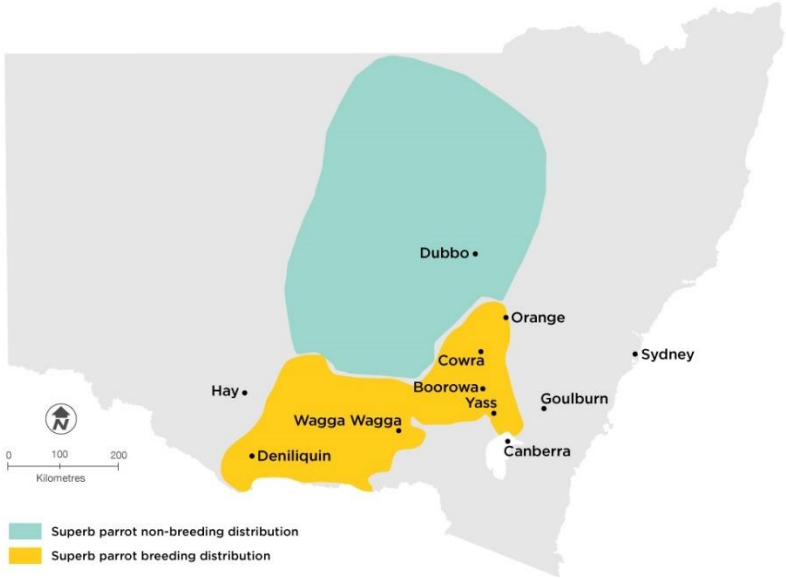
Squatter Pigeon (*Geophaps scripta scripta*)			
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: No – surveyed Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: Not in BAM-C case – not a candidate species Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential habitat present, outside current distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – prefers grassy woodland
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential habitat present, outside current distribution
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not an associated PCT Potential habitat present, outside current distribution
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – prefers grassy woodland
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT Potential habitat present, outside current distribution
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – prefers grassy woodland
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	No suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Potential habitat present, outside current distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – prefers grassy woodland

Squatter Pigeon (*Geophaps scripta scripta*)			
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Not suitable habitat – prefers grassy woodland
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential habitat present, outside current distribution
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – prefers grassy woodlandt
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable habitat – prefers grassy woodland
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – prefers grassy woodland
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Potential habitat present, outside current distribution
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Potential habitat present, outside current distribution
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potential habitat present, outside current distribution
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Potential habitat present, outside current distribution

Table I48 Superb Parrot

Superb Parrot (*Polytelis swainsoni*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only) and ecosystem
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Breeding requirements	• The breeding range of the Superb Parrot is divided into three main areas: the first, along the Murray and Edward Rivers; the second, along the Murrumbidgee River; and the third, in a triangle bounded by Molong, Yass and Young (DEE 2019a). • Superb Parrots breed in either River Red Gum forests and woodlands or box woodlands (Webster 1998). • In the Riverina Region of NSW and adjacent areas of Victoria, the Superb Parrot usually breeds in forests dominated by large mature River Red Gums (*Eucalyptus camaldulensis*), typically close to watercourses, though nests are also occasionally located in Blakely's Red Gum (E. blakelyi), Grey Box (*E. microcarpa*), Red Box (*E. polyanthemos*) and Inland Red Box (*E. intertexta*) (Webster 1988). • There is a positive correlation between the locations of Superb Parrot nest sites and the occurrence of extensive tracts of suitable foraging habitat (Webster 1988). • Nest sites are always within 10 kilometres of areas of suitable foraging habitat, and usually near a watercourse (DEE 2019a).
Habitat requirements	• The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums (*Eucalyptus camaldulensis*) and box eucalypts. The species also seasonally occurs in box-pine (*Callitris*) and Boree (*Acacia pendula*) woodlands (DEE 2019a). • The Superb Parrot feeds mainly on the ground, on the seeds of grasses as well as cereal crops and spilt grain. They also eat the seed-pods of many understorey species of wattles, and flowers and fruits of eucalypts, berries of mistletoe and lerps (EES 2019a). • At least part of the population of the Superb Parrot undertakes regular seasonal movements, vacating the breeding area after the conclusion of the breeding season, and then returning in spring, while others remain in the breeding areas throughout the year. • In central NSW, movements are said to occur when eucalypts flower, and when food becomes scarce due to drought and birds seek alternative sources of food (Higgins 1999).

Superb Parrot (*Polytelis swainsoni*)	
Habitat in the study area	• River Red Gum and Blakely's Red Gums occur along the major rivers and watercourses in the study area. • Box Gum and Callitris woodland occurs in much of the study area, and can comprise extensive patches of vegetation and small roadside remnants. • The recovery plan for the species maps the southern portion of the study area (south-west of Mount Tendandra) as where the species is likely to occur, while the northern portion is mapped as where the species may occur. No areas mapped as 'breeding likely to occur' are located in the study area, however there are scattered records of birds breeding outside these mapped areas (Baker-Gabb 2011).
Known populations	• The Superb Parrot mainly inhabits the Riverina, the South-west Slope and Southern Tableland Regions. Its range extends north to around Narrabri and Wee Waa (DEE 2019a). • Birds breeding in the SW slopes are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers (DEE 2019a).



Breeding and non-breeding distribution of the Superb Parrot as mapped by DPIE (2021).

Superb Parrot (*Polytelis swainsoni*)	
Survey requirements	Survey months: September to November The Superb Parrot can be surveyed using area searches or transect surveys of suitable habitat, preferably in the early to mid-morning and evening. Vehicle-based transects are appropriate in areas where most habitat is restricted to roadside remnants. It can be detected by sight, usually while in flight, or by its distinctive call (Manning et al. 2004).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). Surveys included area searches for birds, as well as opportunistic observations while driving or undertaking other survey types (eg flora surveys).
Survey results	Four individuals were observed flying into roadside Box – Callitris woodland north-east of Gilgandra. A large patch of remnant vegetation is located on private property to the east of this location.

Superb Parrot (*Polytelis swainsoni*)			
Species polygon guidance	Habitat constraints: Hollow-bearing trees (living or dead *E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta* with hollows greater than five centimetre diameter; greater than four metres above ground or trees with a DBH of greater than 30 cm). Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). **Polygon** Breeding habitat can be identified by the presence of habitat features and observed nest OR two or more birds seen on site (EEC 2020). Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer of 100 metres around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear and the nest tree is already located near the edge of the wooded area (EEC 2020).		
Species polygon justification	Not a candidate species Given the location of the proposal outside the breeding range of the species (see map by DPIE 2021), breeding habitat for the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding individuals. This conclusion was confirmed by the BCS accountable officer.		
Relevant IBRA subregions	Inland Slopes: Known – Not in BAM-C case – not a candidate species Bogan Macquarie: Known – Vagrant Castlereagh Barwon: Known – Vagrant Pilliga Outwash: Known – Vagrant Pilliga: Known – Vagrant Liverpool Plains: Known – Vagrant Northern Basalts: Not present – Not in BAM-C case – not a candidate species		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.

Superb Parrot (*Polytelis swainsoni*)			
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Potential foraging habitat present.
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	248	Mixed box eucalypt woodland – 248 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Potential foraging habitat present.
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Potential foraging habitat present.

Superb Parrot (*Polytelis swainsoni*)			
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Potential foraging habitat present.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.

Superb Parrot (*Polytelis swainsoni*)			
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Associated PCT Potential foraging habitat present.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Potential foraging habitat present.
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Potential foraging habitat present.
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable habitat.

Superb Parrot (*Polytelis swainsoni*)			
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat.
	202	Fuzzy Box woodland – 202 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT Potential foraging habitat present only.

Superb Parrot (*Polytelis swainsoni*)			
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Potential foraging habitat present only, outside breeding range.
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.

Superb Parrot (*Polytelis swainsoni*)			
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Associated PCT Potential foraging habitat present only, outside breeding range.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Potential foraging habitat present.
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Associated PCT Potential foraging habitat present.
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable habitat.
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Associated PCT Potential foraging habitat present only.
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148	Associated PCT Potential foraging habitat present only, outside breeding range.
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat.

Superb Parrot (*Polytelis swainsoni*)			
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Potential foraging habitat present only, outside breeding range.
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	435	White Box - White Cypress Pine shrub grass hills woodland – 435 (DNG)	Not an associated PCT Potential foraging habitat present only.
	435	White Box - White Cypress Pine shrub grass hills woodland – 435 (Good)	Not an associated PCT Potential foraging habitat present only, outside breeding range.
	473	Red gum - Rough-barked Apple – Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Associated PCT Potential foraging habitat present.
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not an associated PCT Potential foraging habitat present only, outside breeding range.

Superb Parrot (*Polytelis swainsoni*)			
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential foraging habitat present only, outside breeding range.
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT No suitable habitat.

Table I49 Swift Parrot

Swift Parrot (*Lathamus discolor*)	
BC Act Status	Critically Endangered
Credit type	Species and Ecosystem
SAII entity/threshold	True
EPBC Act Status	Critically Endangered
Breeding requirements	• The Swift Parrot only breeds in Tasmania, arriving in August to nest in hollows in old trees of a range of eucalypt species. Nest sites in eastern Tasmanian are usually located near the coast in dry forests on upper slopes and ridge tops. While on the mainland, they are nomadic, spending weeks or months at some sites and only a few hours at others, determined by the supply of nectar (Parks 2010). • After the breeding season, in February and March, the entire population flies north. They disperse throughout Victoria and NSW where they are semi nomadic, foraging on flowering eucalypts and lerps (Parks 2010).
Habitat requirements	• Migrates to the Australian south-east mainland between February and October (EES 2019b). • On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations (EES 2019b). • Favoured feed trees include winter flowering species such as Red Bloodwood (*C. gummifera)*, Forest Red Gum (*E. tereticornis)*, Mugga Ironbark (*E. sideroxylon)*, and White Box (*E. albens)* (EES 2019b). • Commonly used lerp infested trees include Inland Grey Box (*E. macrocarpa)*, Grey Box (*E. moluccana)*, Blackbutt (*E. pilularis)*, and Yellow Box (*E. melliodora).* • Return to some foraging sites on a cyclic basis depending on food availability (EES 2019b).

Swift Parrot (*Lathamus discolor*)	
	• Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum (*Eucalyptus globulus)* (EES 2019b).
Habitat in the study area	• Foraging is limited to areas containing flowering Red Bloodwood, Mugga Ironbark and White Box. • Lerp-infested trees in the study area include Grey Box and Yellow Box. • Would not breed in the study area.
Known populations	• Patchy distribution of records in the locality. • Local records around Dubbo, Ulan, Gunnedah, Warrumbungle's National Park and Mt Kaputar National Park. • No important habitat for the species has been mapped by OEH in the study area (email correspondence January 2019).
Survey requirements	No targeted surveys required under the BAM (see species polygon guidance below. Surveys on the mainland should be conducted between March and July. Area searches or transect surveys of suitable habitat, preferably in the early morning and afternoon when birds are most active and vocal. Detection by sighting or call. Slow-moving vehicle transects also effective in expansive areas, detecting loud, distinctive 'clinking' call that can be heard over noise of engine. Targeted surveys of patches of heavily flowering eucalypts may be useful (DEWHA 2010).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • March 2019 (5 days, six zoologists – diurnal bird surveys in the Pilliga). • March 2019 (5 days, two zoologists – diurnal bird surveys in the Narrabri and north Pilliga). • March 2019 (5 days, two zoologists – diurnal bird surveys in the Gilgandra area). • August 2019 (5 days, two zoologists – diurnal bird surveys along the alignment, one day in the Pilliga). • July 2021 (2 days, two ecologists – – diurnal/nocturnal surveys in the Narromine area). • August 2021 (two ecologists, two days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area – diurnal surveys). All surveys included area searches for diurnal birds in woodland and riparian areas.
Survey results	No individuals were recorded during surveys for the proposal.
Species polygon guidance	Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). **Polygon** The species credit component is mapped as an important area. These mapped areas do NOT require survey as it is presumed that the species is present. Any impact from development could potentially be serious and irreversible. Ecosystem credit areas are unlikely to have potential serious and irreversible impacts.

Swift Parrot (*Lathamus discolor*)			
	Important habitat maps (formally Important Mapped Area): Only select species have important habitat maps. These maps identify land that is considered important to support critical life stages of the species and are classed as species credits. Mapping is in accordance with the Guide for mapping threatened species for inclusion in the NSW regulatory framework. Maps may include breeding areas, key areas that migratory species forage/over-winter in, or sites where multiple records have been located over multiple years. Important habitat maps are generally restricted to species that are highly mobile and difficult to reliably detect by survey, and where long-term location data exists. If the subject land is within a mapped area, no survey is required for that species and it is assumed present. The part of the subject land within the important habitat map forms the species polygon used to generate species credits. Where only part of the subject land is mapped as important habitat, the remaining areas are assessed for ecosystem credits.		
Species polygon justification	Not a candidate species No species polygon is required as no important habitat for the species has been mapped by OEH in the study area (email correspondence January 2019).		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: No important habitat Pilliga: No important habitat Liverpool Plains: No important habitat Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT May provide foraging habitat where mistletoes are present
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable foraging habitat present
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees

Swift Parrot (*Lathamus discolor*)		
55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable foraging habitat
56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT May provide foraging habitat
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable foraging habitat present
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable foraging habitat present
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	No suitable foraging habitat – lack of canopy trees
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable foraging habitat
168	Derived Copperburr shrubland - 168 (Good)	Not an associated PCT No suitable foraging habitat – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Associated PCT Suitable foraging habitat present
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT May provide foraging habitat
244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT May provide foraging habitat
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Associated PCT Suitable foraging habitat present
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT May provide foraging habitat

Swift Parrot (*Lathamus discolor*)			
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable foraging habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Associated PCT Suitable foraging habitat present
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	No suitable foraging habitat – lack of canopy trees
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable foraging habitat – preferred feed trees present
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT Suitable foraging habitat – preferred feed trees present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable foraging habitat – preferred feed trees present
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Suitable foraging habitat present
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Suitable foraging habitat present
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Suitable foraging habitat present
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Suitable foraging habitat present
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Suitable foraging habitat present
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Associated PCT Suitable foraging habitat present

Swift Parrot (*Lathamus discolor*)			
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT May provide foraging habitat
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Not an associated PCT Not suitable foraging habitat
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable foraging habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Not suitable foraging habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable foraging habitat present
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT Suitable foraging habitat – preferred feed trees present
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable foraging habitat – lack of canopy trees
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Not an associated PCT Not suitable foraging habitat – lack of canopy trees
	148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not an associated PCT Not suitable foraging habitat – lack of canopy trees
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable foraging habitat – lack of canopy trees
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Associated PCT Suitable foraging habitat present
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT Suitable foraging habitat – preferred feed trees present

Swift Parrot (*Lathamus discolor*)			
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT Suitable foraging habitat – preferred feed trees present
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable foraging habitat – preferred feed trees present
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Associated PCT Not suitable foraging habitat – lack of canopy trees
	435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT Suitable foraging habitat present
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Associated PCT Not suitable foraging habitat – lack of canopy trees
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Associated PCT Suitable foraging habitat present
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Not suitable foraging habitat –canopy trees removed
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable foraging habitat present
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable foraging habitat – lack of canopy trees

Table I50 White-bellied Sea-eagle

White-bellied Sea-eagle (*Haliaeetus leucogaster*)	
BC Act Status	Vulnerable
Credit type	Species and ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Breeding requirements	• Breeding habitat of the White-bellied Sea-eagle consists of mature tall open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. The species nests are large structures built from sticks and lined with leaves or grass (DEE 2020a). • White-bellied Sea-eagle pairs defend a territory of about three square kilometres around the nest, with nests about two to three kilometres apart. Up to seven pairs have been recorded living in the same territories. • Pairs usually return to the same breeding territory each year, and often the same nest, although territories tend to contain one or two additional, less developed nests (Favaloro 1944; Marchant and Higgins 1993). • It is thought that birds inhabiting inland waterbodies may be more dispersive than those along the coast, as they must move as waters disappear (Favaloro 1944).
Habitat requirements	• White-bellied Sea-eagle habitat is typically characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea (DEE 2020a). • The species occurs at sites near the sea, such as around bays, inlets, and estuaries; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarshes (DEE 2020a). • Terrestrial habitat of the species include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest) (DEE 2020a).
Habitat in the study area	Large rivers with permanent water and riparian vegetation are potential foraging and breeding habitat for this species.
Known populations	In NSW the White-bellied Sea-eagle is widespread along the east coast, and along all major inland rivers and waterways (DEE 2020a).
Survey requirements	Survey months: July to December

White-bellied Sea-eagle (*Haliaeetus leucogaster*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal bird surveys along the alignment, not including the Pilliga). • November 2018 (10 days, two ecologists – diurnal bird surveys along the alignment but not including the Pilliga). • March 20219 (10 days, four zoologists – diurnal bird surveys in the Pilliga and Gilgandra area). • August 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • September/October 2019 (five days – two ecologists – diurnal bird surveys along the alignment). • June 2020 (two ecologists, two days in the Gilgandra area). • November 2020 (two ecologists, four days along the alignment). • July 2021 (2 days in the Narromine area, two ecologists). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, two ecologists). All surveys included diurnal bird surveys, nest searches and listening for calls.
Survey results	No individuals were recorded in the study area. No suitable nests were recorded near any major watercourses or large dams.
Species polygon guidance	Habitat constraints: Living or dead mature trees within suitable vegetation within one kilometre of rivers, lakes, large dams or creeks, wetlands and coastlines. Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). **Polygon** Where a breeding site has been identified in accordance with the BAM, the species polygon buffer should be established by one of two methods: where the breeding site is within an urban or peri-urban area, a circular polygon with a 250 metre radius from the breeding site is applied. Where the breeding site is 500 metres or more from an urban or peri-urban area, a circular polygon with a 500 metre radius from the breeding site is applied. The purpose of the buffers is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for feeding/grooming/lookout perches and fledgling requirements. It does not account for foraging habitat as the White-bellied Sea-eagle forages on water. The polygons are in accordance with published literature on nesting requirements of the species (DPIE 2020a).
Species polygon justification	No (surveyed). No evidence of the species was recorded during multiple field surveys conducted between September 2018 and August 2021. No large stick nests observed near any waterways.

White-bellied Sea-eagle (*Haliaeetus leucogaster*)			
Relevant IBRA subregions	Inland Slopes: No – surveyed Bogan Macquarie: No – surveyed Castlereagh Barwon: No – surveyed Pilliga Outwash: No – surveyed Pilliga: No – surveyed Liverpool Plains: No – surveyed Northern Basalts: Not in BAM-C case – not a candidate species		
Inland Slopes	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (DNG)	Associated PCT Not within one kilometre of rivers, lakes, large dams or creeks, wetlands and coastlines. No nest trees present.
	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland – 185 (Good)	Associated PCT Not within one kilometre of rivers, lakes, large dams or creeks, wetlands and coastlines. No nest trees present.
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Not suitable habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Potential breeding habitat present. No nests recorded.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT No breeding habitat present – lack of canopy
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines

White-bellied Sea-eagle (*Haliaeetus leucogaster*)			
	248	Mixed box eucalypt woodland – 248 (Good)	Associated PCT Potential breeding habitat present. No nests recorded.
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
Castlereagh-Barwon	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Not suitable nesting habitat – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Not suitable nesting habitat – lack of canopy trees
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential nesting habitat present. No nest trees observed.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Not suitable nesting habitat – lack of canopy trees
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines

White-bellied Sea-eagle (*Haliaeetus leucogaster*)			
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	244	Poplar Box grassy woodland – 244 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Associated PCT Suitable nesting habitat present. No nest trees observed.
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Associated PCT Not suitable habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Not suitable habitat – lack of canopy trees
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines

White-bellied Sea-eagle (*Haliaeetus leucogaster*)		
78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential nesting habitat present. No nest trees observed.
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Associated PCT Not suitable habitat
141	Broombush - wattle very tall shrubland – 141 (Good)	Associated PCT Not suitable habitat – lack of canopy trees
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Not suitable habitat – lack of canopy trees
202	Fuzzy Box woodland – 202 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
244	Poplar Box grassy woodland – 244 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines

White-bellied Sea-eagle (*Haliaeetus leucogaster*)		
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT Not suitable habitat – lack of canopy trees
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable nesting habitat present. No nest trees observed.
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines

White-bellied Sea-eagle (*Haliaeetus leucogaster*)			
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
Pilliga Outwash	0	Crop and/or introduced grassland – 0	Not suitable habitat
	35	Brigalow - Belah open forests / woodland – 35 (DNG)	Associated PCT Not suitable habitat – lack of canopy trees
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Associated PCT Not suitable habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (DNG)	Associated PCT Not suitable habitat – lack of canopy trees
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Potential nesting habitat present. No nest trees observed.
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
	141	Broombush - wattle very tall shrubland – 141 (Good)	Associated PCT Not suitable habitat – lack of canopy trees
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (DNG)	Associated PCT Not suitable habitat – lack of canopy trees

White-bellied Sea-eagle (*Haliaeetus leucogaster*)		
148	Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland – 148 (DNG)	Not an associated PCT Not suitable habitat – lack of canopy trees
168	Derived Copperburr shrubland – 168 (Good)	Associated PCT Not suitable habitat – lack of canopy trees
394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Mod_shrubs_removed)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Suitable nesting habitat present. No nest trees observed.
435	White Box – White Cypress Pine shrub grass hills woodland – 435 (DNG)	Associated PCT Not suitable habitat – lack of canopy trees
435	White Box – White Cypress Pine shrub grass hills woodland – 435 (Good)	Associated PCT No breeding habitat present – prefers breeding along large creeklines
473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (DNG)	Not an associated PCT Not suitable habitat – lack of canopy trees
473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines – 473 (Good)	Not an associated PCT No breeding habitat present – prefers breeding along large creeklines
589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland – 589 (Moderate_logged)	Associated PCT Not suitable habitat – lack of canopy trees

White-bellied Sea-eagle (*Haliaeetus leucogaster*)			
Liverpool Plains	0	Crop and/or introduced grassland – 0	Not suitable habitat
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Associated PCT Suitable nesting habitat present. No nest trees observed.
	168	Derived Copperburr shrubland – 168 (Good)	Associated PCT No suitable nesting habitat – lack of canopy

Table I51 Pink-tailed Legless Lizard

Pink-tailed Legless Lizard (*Aprasia parapulchella*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Breeding requirements	The Pink-tailed Legless Lizard is commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites (EES 2019b).
Habitat requirements	• The Pink-tailed Legless Lizard inhabits sloping, open woodland areas on foothills with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks (EES 2019b). • The occurrence of the species appears to be correlated to the underlying geology with most occurrences on intermediate volcanics. Records suggest that the Pink-tailed Legless Lizard is sometimes found where the underlying geology is basalt, almost never on sedimentary rocks and never on alluvial soils (Corkery and Co 2016). • Records at Gunnedah and Dubbo are associated with the Mitchell Slopes physiographic region. This is a transitional landscape from tablelands, stepping down the slopes and breaking into detached hills. The regolith is dominated by highly weathered bedrock and residual materials with smaller areas of moderately weathered bedrock (Pain et al 2011), providing suitable rocky habitat for the Pink-tailed Legless Lizard. • The species tends not to occur where there is a cover of trees or tall shrubs (Osborne and Jones 1995). • Pasture improvement or intensive livestock grazing is known to result in lower abundance of the species (Osborne and Jones 1995).

Pink-tailed Legless Lizard (*Aprasia parapulchella*)	
Habitat in the study area	• Much of the study area is located in the Upper Darling Plains physiographic region, which is characterised by branching rivers incised into a regolith of predominantly alluvial sediments (>50%) with minimal saprolite (weather rock) (<20%) (Pain et al 2011). • Rocky woodland habitat is present at Borrow Pit A. This site is located on the edge of the Inland Slopes subregion and Mitchell Slopes physiographic region. • Topographic relief is low, potentially suitable habitat is patchy, and there is minimal connectivity to better quality potential habitat located to the east. • The proposal site passes near three small outlying volcanic hills to the west of the Warrumbungles. Potential habitat is associated with these hillsides, however there are no records of the species associated with the Warrumbungles. • Rocky habitat in the Pilliga forests and Jacks Creek area south-west of Narrabri (located in the Mitchell Slopes physiographic region) are associated with the Pilliga Sandstone, and are not suitable habitat for this species.
Known populations	• This species was thought to be confined to the Canberra region, however the species has more recently been recorded near Bathurst and Bendigo, indicating a wider distribution. • A disjunct small population at Gunnedah is known and is very vulnerable to bush rock removal, feral predation and housing subdivision (EES 2020). The Gunnedah population was found in a multilayered immature woodland/low open forest on a rocky conglomerate ridge (Corkery and Co 2016). • A large population is known from the Toongi area south of Dubbo. This population is associated with volcanic rocky habitat on and near foothills (Corkery and Co 2016).
Survey requirements	Survey months: September to November Survey in spring, avoiding hot days in November.
Survey effort	Active searches were conducted throughout the alignment. In particular, checks under rocks and timber was undertaken at various locations during the following survey periods: • September 2018. • November 2018. • September 2019 (including surveys near rocky outcrops west of the Warrumbungles). • October 2019. • November 2020.
Survey results	No individuals were recorded during surveys.

Pink-tailed Legless Lizard (*Aprasia parapulchella*)			
Species polygon guidance	Habitat constraints: rocky areas or within 50 metres of rocky areas Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained).		
Species polygon justification	No species polygon has been prepared for this species. No individuals were recorded during any active searches. Volcanic habitat in the Pilliga subregion is associated with outlying hills of the Warrumbungles. The proposal skirts around the outside of these, and the geology within the proposal site near these hills is sedimentary rock. There are no known records in this area. No suitable rocky habitat on hillsides is located in the Liverpool Plains area (Narrabri). There are no local records in this region. No suitable habitat is therefore considered to be present in the proposal site.		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: Not in BAM-C case – not a candidate species Castlereagh Barwon: Not in BAM-C case – not a candidate species Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: No – surveyed Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Pilliga	0	Crop and/or introduced grassland – 0	Not suitable habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)

Pink-tailed Legless Lizard (*Aprasia parapulchella*)			
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	56	Poplar Box - Belah woodland – 56 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Potential habitat present where it occurs close to rocky outcrop
	168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (alluvial)

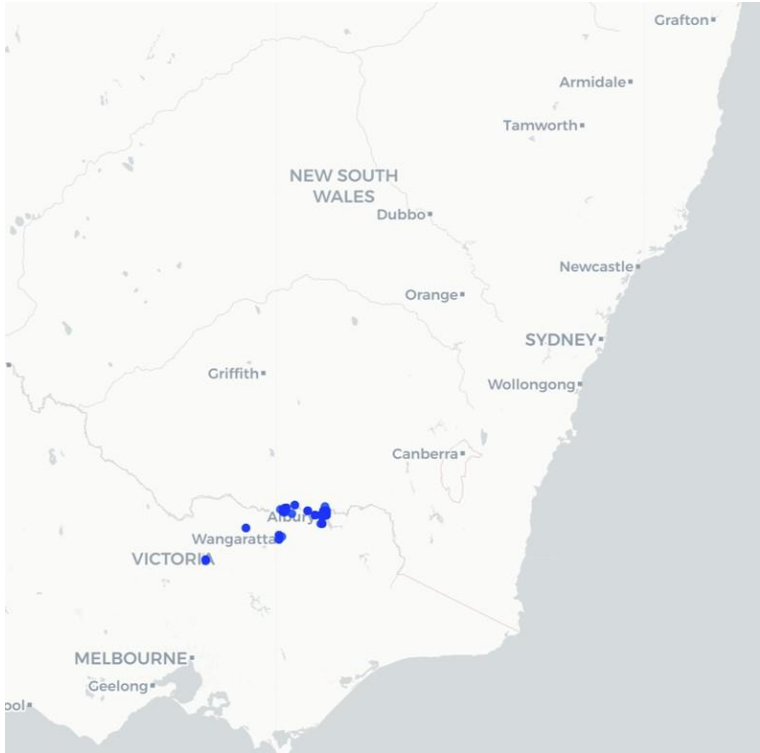
Pink-tailed Legless Lizard (*Aprasia parapulchella*)			
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	394	Narrow-leaved Ironbark - White Cypress Pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats - 398 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Associated PCT Not suitable habitat – lack of appropriate geology (alluvial)
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Associated PCT Not suitable habitat – lack of appropriate geology (sandy)
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Associated PCT Not suitable habitat – lack of appropriate geology (limited outcropping rock)

Pink-tailed Legless Lizard (*Aprasia parapulchella*)			
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Associated PCT Not suitable habitat – lack of appropriate geology (sandy)
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Associated PCT Not suitable habitat – lack of appropriate geology (sandy)
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Associated PCT Not suitable habitat – lack of appropriate geology (sandy)
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (sandy)
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Not suitable habitat – lack of appropriate geology (sandy)

Table I52 Sloane's Froglet

Sloane's Froglet (*Crinia sloanei*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Endangered
Breeding requirements	• Sloane's Froglet breeds in temporary and permanent waterbodies including oxbows off creeks and rivers, farm dams, large and small natural wetlands constructed frog ponds and temporary puddles. It prefers wetlands that contain riparian and aquatic vegetation. • It has been found in waterbodies that contain grasses and reeds that are of medium height and have small stem diameters, such as couch, watercouch or the common spikerush (*Eleocharis acuta*). Waterbodies containing this type of vegetation are essential for Sloane's Froglet as it lays its eggs attached to vegetation rather than as a frothy mass on the surface of the water like some other frogs (Knight 2013b). • Gilgai and other depressions are favoured habitat on clay plains, while elsewhere they are generally restricted to temporary ponds in the river valley and up to eight kilometres on either side of large rivers (Littlejohn 1958). • The species breeds in winter, and generally require a shallow body of water (approximately 20 cm) (A. Knight 2013). • Breeding habitat consists of still or very slow sections of permanent and temporary streams as well as pools (eg farm dams) with vegetation located on the subject land (DPIE 2020).
Habitat requirements	• The Sloane's Froglet is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats (DPIE 2020a). • Non-breeding habitat includes waterbodies and areas of native and non-native vegetation (including areas of cleared rural grazing land) (DPIE 2020). • Sloane's Froglet is also known to move between breeding and non-breeding waterbodies; connectivity between these habitats is important to maintain population processes (DPIE 2020). • The coincidence of Sloane's Froglet distribution with the Box-gum woodland is of interest. This region has a high rate of species decline, high rates of land clearing and fragmentation and altered water regimes. The perceived decline of Sloane's Froglet could well be correlated with the overall decline in biodiversity of this region (Knight, 2013).
Habitat in the study area	• Potentially suitable habitat located south of Narromine, where gilgai and drainage lines are located.

Sloane's Froglet (*Crinia sloanei*)	
Known populations	• Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in NSW (DPIE 2020a). • Nearly three quarters of the records are from the Riverina Bioregion, with a further 18 percent of records within the NSW South Western Slopes. Records for Sloane's froglet north of Dubbo in NSW are likely to be misidentification of other *Crinia* species (Spark 2015). • Sloane's Froglet has disappeared from much of its former range and now appears to be restricted to a very small area of NSW near Albury and Corowa, and a series of disjunct populations at Wangarratta, Chiltern, Little Lake Charm and Moodies Swamp near Cobram (Knight 2013a; Spark 2015). • 95 percent of all Sloane's froglets recorded since 2000 have been from the Albury – Thurgoona, Howlong and Corowa - Wahgunyah and Rutherglen areas (DPIE 2020). All records of this species in the FrogID dataset (>1,500 records) are from this area (FrogID 2021).



Sloane's Froglet records in the FrogID dataset (FrogID, 2021)

Sloane's Froglet (*Crinia sloanei*)	
Survey requirements	Survey months: July to August Aural-visual or acoustic recorder surveys are completed as transects running around potential breeding habitat. This species is highly detectable if surveys are undertaken at the right time (in winter after wetland breeding habitat has filled) (Knight 2015). The survey may be completed using aural-visual surveys alone or combined with acoustic recorders. The call is very similar to that of the plains froglet (*Crinia parinsignifera*) and may be hard to distinguish in a large chorus of *Crinia* spp. (DPIE 2020).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – diurnal surveys). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys). • Late September-early October 2019 (6 days, two ecologists – diurnal and nocturnal surveys). • July 2021 (2 days, two ecologists – diurnal/nocturnal surveys in the Narromine area, focussing on gilgai habitat). • July 2021 (two ecologists, four nights in the Pilliga and one night in the Bohena Creek area). • August 2021 (2 days from Narromine to Baradine, two days in the Pilliga to Bohena Creek area, one ecologist). All surveys included recording of frog calls using FrogID where possible.
Survey results	No individuals were recorded during surveys.
Species polygon guidance	Habitat constraints: semi-permanent/ephemeral wet areas (containing relatively shallow sections with submergent and emergent vegetation, or within 500 metres of wet area), swamps (within 500 metres of swamps), waterbodies (within 500 metres of waterbody) Patch size: <5 hectares. Percent native vegetation cover: relictual (with less than 10 percent retained). <u>Polygon</u> Potential habitat is riparian areas (including dry river/creek beds) within the PCTs associated with the species. All habitat on the subject land where the subject land is within 500 metres of a river, creek or riparian area must be mapped. Use aerial imagery to map river, creek or riparian areas (including dry creek channels, former creek channels, billabongs etc.) on or within 500 metres of the subject land. Species polygon boundaries should align with PCTs on the subject land to which the species is associated that are within 500 metres of waterbodies mapped (EES 2020).

Sloane's Froglet (*Crinia sloanei*)			
Species polygon justification	No – surveyed/outside current distribution No evidence of Sloane's Froglet was recorded in the study area, despite targeted surveys in appropriate season (July) in gilgai habitat south of Narromine. No evidence of the species was recorded in surveys in July and August in any waterways elsewhere along the alignment. Limited Box-Gum Woodland is present in the study area. It is noted that records for Sloane's Froglet north of Dubbo in NSW are likely to be misidentification of other *Crinia* species (Spark 2015). Sloane's Froglet has disappeared from much of its former range and now appears to be restricted to a very small area of NSW near Albury and Corowa, as well as the Wahgunyah and Rutherglen regions in Victoria (Knight 2015). 95 percent of all Sloane's froglets recorded since 2000 have been from the Albury – Thurgoona, Howlong and Corowa - Wahgunyah and Rutherglen areas (DPIE 2020). All records of this species in the FrogID dataset (>1,500 records) are from this area (FrogID 2021).		
Relevant IBRA subregions	Inland Slopes: Not in BAM-C case – not a candidate species Bogan Macquarie: No – surveyed Castlereagh Barwon: No – surveyed Pilliga Outwash: Not in BAM-C case – not a candidate species Pilliga: No – surveyed Liverpool Plains: Not in BAM-C case – not a candidate species Northern Basalts: Not in BAM-C case – not a candidate species		
Bogan-Macquarie	0	Crop and/or introduced grassland – 0	Marginal habitat
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Potential habitat present along drainage lines Surveyed – not detected
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Potential habitat present near gilgai Surveyed – not detected
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Limited potential habitat near waterbodies
	81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Associated PCT Limited potential habitat near waterbodies

Sloane's Froglet (*Crinia sloanei*)			
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	248	Mixed box eucalypt woodland – 248 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills – 599 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
Castlereagh Barwon	0	Crop and/or introduced grassland – 0	Marginal habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	56	Poplar Box - Belah woodland – 56 (DNG)	Associated PCT Limited potential habitat near waterbodies
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Limited potential habitat near waterbodies
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Potentially suitable habitat if near waterbodies
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies

Sloane's Froglet (*Crinia sloanei*)			
	244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	444	Silver-leaved Ironbark grassy tall woodland – 444 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
Pilliga	0	Crop and/or introduced grassland – 0	Marginal habitat
	27	Weeping Myall open woodland – 27 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	36	River Red Gum tall to very tall open forest/woodland wetland – 36 (Good)	Not an associated PCT Potential habitat present along drainage lines, outside current distribution
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (DNG)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland – 49 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	55	Belah woodland on alluvial plains and low rises – 55 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	56	Poplar Box - Belah woodland – 56 (Good)	Associated PCT Limited potential habitat near waterbodies
	78	River Red Gum riparian tall woodland / open forest wetland – 78 (Good)	Not an associated PCT Potential habitat present along drainage lines Not detected in targeted surveys, outside current distribution
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland – 88 (DNG)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies

Sloane's Froglet (*Crinia sloanei*)		
141	Broombush - wattle very tall shrubland – 141 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland – 145 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
168	Derived Copperburr shrubland – 168 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
202	Fuzzy Box woodland – 202 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
206	Dirty Gum - White Cypress Pine tall woodland – 206 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
244	Poplar Box grassy woodland – 244 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland – 255 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
256	Green Mallee tall mallee woodland – 256 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (Good_Fire_Affected)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats – 394 (DNG)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
397	Poplar Box - White Cypress Pine shrub grass tall woodland – 397 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats – 398 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies

Sloane's Froglet (*Crinia sloanei*)			
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) – 399 (Good)	Not an associated PCT Potential habitat present along drainage lines Not detected in targeted surveys, outside current distribution
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland – 404 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest – 406 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland – 409 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	414	White Mallee - Dwyer's Red Gum mallee heath – 414 (Good_Fire_Affected)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	469	White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	746	Brown Bloodwood - cypress - ironbark heathy woodland – 746 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies
	1384	White Cypress Pine - Bulloak - ironbark woodland – 1384 (Good)	Not an associated PCT Not suitable habitat – lack of suitable waterbodies

TECHNICAL REPORT

01

Biodiversity development assessment report

Appendix J Preliminary fauna connectivity strategy

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

ARTC Inland Rail

Narromine to Narrabri

Preliminary Fauna Connectivity Strategy

Revision J

2-0001-250-EAP-00-RP-406

Document control	
Client	Australian Rail Track Corporation
Project:	Inland Rail Narromine to Narrabri
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Revision	Date issued	Description
A	20/04/2021	Preliminary fauna connectivity strategy – draft
B	22/04/2021	Minor edits to address ARTC review comments
C	19/05/2021	Updates to address consultation with BCS
D	08/06/2021	Minor edits to address ARTC review comments and consultation with BCS
E	30/06/2021	Minor edits to address ARTC review comments
F	17/09/2021	Minor edits to address BCS review
G	05/10/2021	Final version for submission to BCS
H	14/01/2022	Updated final to address ARTC review comments
I	08/02/2022	Updated final for issue
J	06/07/2022	Updated final to address BCS comments

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Appendices

1. Introduction

This report provides the Preliminary Fauna Connectivity Strategy for the Inland Rail Narromine to Narrabri proposal. This strategy is to be further developed and finalised during detailed design and in consultation with Biodiversity, Conservation and Science Directorate as a condition of consent.

1.1 Proposal overview

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail is a major national program that will enhance Australia's existing national rail network and serve the interstate freight market.

The Narromine to Narrabri section of Inland Rail (the proposal) consists of about 306 kilometres of new single-track standard gauge railway with crossing loops. The proposal also includes changes to some roads to facilitate construction and operation of the new section of railway, and ancillary infrastructure to support the proposal. Bridges would be constructed over rivers and other major watercourses (including the Macquarie River, Castlereagh River, and the Namoi River/Narrabri Creek system), with culverts over minor water crossings.

Much of the southern and central portion of the proposal site is in land predominantly cleared for agriculture. At the northern end, the proposal site passes through about 70 kilometres of the Pilliga forests. Various other patches of native vegetation, including riparian corridors and travelling stock reserves, would be impacted by the construction and operation of the proposal.

The proposal would be constructed to accommodate double-stacked freight trains up to 1,800 metres long and 6.5 metres high. It would include infrastructure to accommodate possible future augmentation and upgrades of the track, including a possible future requirement for 3,600 metre long trains. It is estimated that Inland Rail would be trafficked by an average of 10 trains per day (both directions) in 2026, increasing to about 14 trains per day (both directions) in 2040. Train speeds would vary according to axle loads and range from 80 to 115 kilometres per hour.

1.2 Route design

Various options assessments have been undertaken during development of the proposal, and the preferred option was chosen based on the outcome of various multi-criteria assessments. During the phase 1 concept design process, about 50 route options were considered for the Narromine to Narrabri section of Inland Rail. This included routes via Dubbo and Coonamble and others that avoided the Pilliga. The routes through the Pilliga forests were identified as preferable due to a combination of lower construction cost, avoidance of prime farming land, and reduced transit time during operation. As such, impacts on biodiversity values in the Pilliga forests have not been able to be avoided.

The approach taken in developing the preferred route design regarding connectivity outcomes was to:

- minimise impact on threatened ecological communities
- minimise impact on key habitat areas
- minimise impact on local and regional fauna movement corridors.

1.3 Proposal status

The proposal is State significant infrastructure and is subject to approval by the NSW Minister for Planning and Public Spaces. An environmental impact statement (EIS) has been prepared which addresses the environmental assessment requirements of the Secretary of the Department of Planning, Industry and Environment ('the SEARs') (SSI 18-9487) finalised on 9 September 2020. The proposal is also determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) (EPBC Referral 2018/8259) and requires approval from the Australian Minister for the Environment. The EIS focuses on the key assessment requirements specified by the SEARs. It is supported by specialist technical assessment reports. The proposal was declared critical state significant infrastructure on 19 March 2021.

1.4 Impacts of linear infrastructure

1.4.1 Habitat loss and fragmentation

Land clearance consists of the destruction of the above ground biomass of native vegetation and its substantial replacement by non-local species or by human artefacts, such as the rail line. Construction of the proposal would require the permanent removal of a woodland and forest habitat, shrubland and grassland areas, as well as land already cleared for crops. Clearing of this forest and woodland vegetation would permanently remove foraging and breeding resources for native fauna.

Clearing of vegetation also results in habitat fragmentation. Habitat fragmentation can result in reduced dispersal and reproductive success of biota within the fragment, a decline in populations resulting from increased predation by introduced species or native species that do not normally occur in the community, and an increased probability that stochastic events (eg fire) may reduce population numbers below critical levels required for their survival (Andrew 1990). Some species are at greater risk in fragmented landscapes than others as a result of their ecological requirements and/or behaviour. The threat posed by fragmentation is increased for species with large home ranges, which migrate or disperse over long distances, those that have specialised dietary or habitat requirements (Jackson 2000) and those with poor dispersal ability (Forman et al 2003, Neibuhr et al 2015). In general, larger fragments are less susceptible to adverse impacts than are smaller fragments.

Fragmentation impacts will be more significant in the Pilliga forests, where large expanses of connected vegetation occur. The rail corridor varies in width, with the narrowest sections being around 33 metres wide, and the widest in the Pilliga forests being around 120 metres wide. Around 29 percent of the Pilliga segment is in the range 50-59 metre wide (see Figure 1), and around 36 percent of the Pilliga segment is less than 60 metres in width (see Table 1).The average width of the alignment is 89 metres in the Pilliga forests. Note that these calculations include the rail line, as well as crossing loops and compound sites, some of which are over 400 metres wide. Around 30 kilometres of the alignment through the 73 kilometre section through the Pilliga forests is located adjacent to Pilliga Forest Way. In these areas, the clearing for the proposal will exacerbate the existing gap crated by the road. In some locations, a thin linear strip of vegetation will be retained between the rail corridor and the road, creating a small stepping stone between the two clearings.

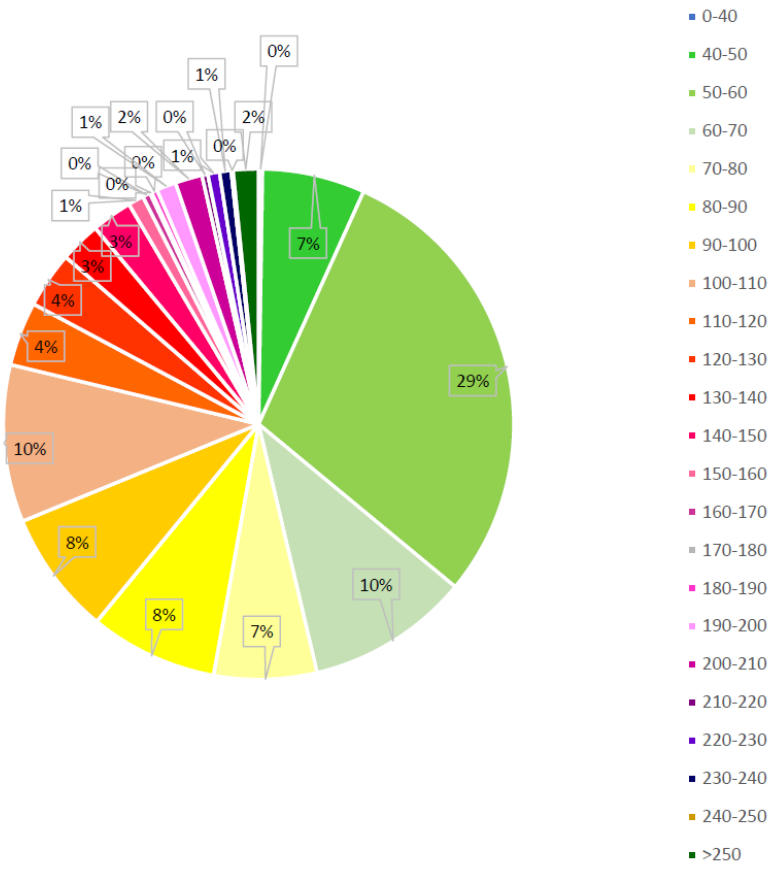

Figure 1 Gap width ranges of the proposal through the Pilliga forests

Table 1 Clearing widths along the rail alignment

	Percent (%) of CIZ		
Width (m)	Pilliga segment	Non-Pilliga segments	Total
<50	7	10	9
<60	36	34	32
<70	46	45	42
<100	69	65	61
<150	92	87	82
<200	95	93	94
>200	5	7	6

1.4.2 Mortality through train-strike

Mortality of fauna can occur as a result of direct mortality from collisions with trains, as well as electrocution and wire strikes, and rail entrapment (some species of small body size can become trapped between the rails and die from dehydration or hunger) (Santos et al 2017). Some behaviours can contribute to the high mortality rate of mammals on railways. Animals may use the railway as a movement route (Kaczensky et al. 2003) or may be attracted by food resources (such as spilled grain) in railway verges (Gibeau and Herrero 1998; Waller and Servheen 2005). Train lights are likely responsible for the majority of owl kills, causing individuals to become disoriented with the approaching train, hence increasing the likelihood of

being killed (Peña and Llama 1997; SCV 1996, in Borda de Agua et al 2017). Birds of prey were frequently registered as train casualties in Spanish railways, being 19.2 percent of all birds killed (SCV 1996, in Borda de Agua et al 2017). One possible explanation is the attractiveness of perches along the rails and of railway verges as a hunting ground for birds of prey and owls (SCV 1996, in Borda de Agua et al 2017; van der Grift and Kuijsters 1998). Moreover, some species scavenge regularly along the rail corridor for food carcasses, increasing their vulnerability to collisions (SCV 1996, in Borda de Agua et al 2017).

Train speeds for Inland Rail are likely to reach 115 kilometres per hour. Freight trains cannot stop quickly when encountering animals on the rails, given their speed, mass and braking power. This obviously leads to high mortality numbers on railways that could be avoided more easily on roads (Dorsey et al. 2015; Heske 2015). The height of trains (for example those carrying double-stacked containers) also increases the risk of injury and mortality of fauna that may fly or glide into the train.

Most train-strike impacts are likely to occur in the Pilliga, given the extensive area of native vegetation surrounding the proposed route and limited fencing of the rail corridor. These include species such as the Black-striped Wallaby, Koala, Squirrel Glider, Barking Owl, Glossy Black-cockatoo and Pale-headed Snake. There is also potential for train strike of microbats and birds at locations such as river and creek crossings and in patches of woodland if individuals are flying across the gap in vegetation cover when the train is passing. Frogs are at risk of train strike during rain events when individuals are more likely to be active. Lights from trains may also disturb diurnal animals and flush them from roost sites, increasing risk of train-strike of these species at night.

Besides possible population decreases, railway kills may cause shifts in the age structure of populations. In general, most reported victims are common species, which suggests that the effects on population levels should be small for species with large and widespread populations (van der Grift and Kuijsters 1998). However, the death of a few individuals of a rare or endangered species may further increase species extinction risk (van der Grift 1999). This is particularly true for long-lived, slow breeding (K-selected) species (Oli 2004), such as the Koala and Squirrel Glider (eg Lunney et al. 2002, 2007; Goldingay and Sharpe 2004). Species at most risk at a bioregional perspective are those with limited distribution such as the Rufous Bettong and Black-striped Wallaby.

1.5 Goals of this preliminary strategy

Posing good questions is essential to effective monitoring (Nichols and Williams 2006), and requires a well-developed partnership among scientists, statisticians and policy makers (Lindenmayer et al 2013). This preliminary strategy has been prepared to establish the objectives that are to be implemented in the management and mitigation of fauna connectivity during the design and construction of the N2N proposal. It provides the framework for the continued development of the design and management measures that will continue into the subsequent phases of the proposal.

The goals of this Preliminary Fauna Connectivity Strategy are to:

- provide for continued movement of fauna species within regional, local and riparian corridors
- minimise the risk of train-strike as far as practicable
- allow for adaptive management and response to improve connectivity and reduce mortality.

1.6 Commitments to mitigate fauna impacts

The following commitments are made by ARTC regarding fauna connectivity for the proposal:

- detailed design of dedicated fauna culverts with fauna furniture
- installation of fauna furniture and canopy bridges at viaducts and rail bridges over key riparian corridors
- installation of canopy bridges, predominantly in the Pilliga forests
- provision of dedicated fauna culverts to encourage movement of the Pilliga Mouse
- increasing habitat cover at culverts to facilitate movement
- strategic fencing to minimise mortality from rail strike and direct fauna towards crossing structures.

1.7 Purpose of this report

The purpose of this report is to:

- describe the existing environment including current movement corridors
- identify key fauna species that would benefit from provision of fauna connectivity measures
- describe fauna connectivity structures and measures that are proposed
- outline proposed monitoring and reporting.

It is recommended that refinement of crossing structures during detailed design, preparation of threatened species management plans and consultation with the Biodiversity Conservation and Science Directorate (BCS) of the Department of Planning, Industry and Environment would all feed into the development of a robust monitoring program to be outlined in the Final Fauna Connectivity Strategy. The preparation of the Final Fauna Connectivity Strategy detailing this information would be a condition of consent for the proposal.

2. Landscape context

2.1 Existing environment

The study area for the proposal is located between the towns of Narromine and Narrabri in western NSW within a new section of the proposed rail corridor for Inland Rail. The proposal passes through areas dominated by cleared agricultural land and large sections of forested areas associated with the state forests of the Pilliga. The following State Forests are located in the study area:

- Baradine State Forest
- Cumbil State Forest
- Euligal State Forest
- Pilliga East State Forest.

The proposal also passes through heavily vegetated areas associated with travelling stock reserves, such as at Bohena Creek near Narrabri and the Macquarie River at Narromine.

Native vegetation cover represents about 52 percent of the proposal site. The proposal site includes about 1,120 hectares of native woodland and forest vegetation and 565 hectares of native and derived native grassland. Native vegetation generally comprise woodland, with the dominant canopy species including Pilliga Grey Box (*Eucalyptus pilligaensis*), Baradine Gum (*Eucalyptus chloroclada*), Poplar Box (*Eucalyptus populnea*) and White Cypress Pine (*Callitris glaucophylla*). The most extensive plant community type (PCT) is Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South bioregion (PCT 88).

The proposal crosses three rivers (Macquarie River, Castlereagh River and Namoi River) and up to 121 creeks and other intermittent unnamed watercourses and canals constructed to convey irrigation waters. This includes 5th, 6th and 7th order ephemeral creeks and streams. The study area does not cross any important wetlands listed in the Directory of Important Wetlands in Australia (DIWA) or Ramsar wetlands.

2.2 Key habitats

The Pilliga forests comprise a significant area of connected vegetation and fauna habitat (see Appendix A). The 3,000 square kilometres of semi-arid woodland is the largest continuous woodland remnant in NSW. Extensive areas of connected vegetation such as the Pilliga provide habitat for large fauna and flora assemblages as they provide a mosaic of habitat types, and large areas of habitat for species that occur in low densities. The Pilliga provides a regional corridor, linking with the Warrumbungles National Park, the vegetated riparian corridor associated with the Namoi River, and via these links to areas such as Mount Kaputar National Park.

Birdlife International (2019) has identified the Pilliga (also incorporating the Warrumbungles National Park) as an important bird and biodiversity area (IBA). IBAs are places of international significance for the conservation of birds and other biodiversity. The Pilliga forests provide an important area of habitat for a wide range of fauna and flora species. In total, over 200 bird species have been recorded in the Pilliga. In addition, at least 36 native mammal species (including 16 bat species), 50 reptile species and at least 15 amphibian species have been recorded, including at least 21 species listed as threatened in NSW. In particular, the area supports the largest population of Barking Owls (*Ninox connivens*) in NSW (Birdlife International 2019) and is identified as habitat critical to the survival of the Painted Honeyeater (*Grantiella picta*) (DAWE 2020).

Forests of the Pilliga are impacted by logging, fire and grazing. Logging in the Pilliga is associated with habitats which have high frequencies of Narrow-leaved Ironbark and/or White Cypress Pine. Fire is also excluded from commercially valuable stands but is used for fuel reduction in non-commercial stands. Grazing is also used to thin cypress pine regeneration (Date et al 2002). Date et al. (2002) found that many bird species are declining in the Pilliga as a result of these disturbance regimes and will continue to do so without adaptive management for maintaining and rehabilitating their habitats. Species already considered to be extinct in the Pilliga include the Malleefowl (*Leipoa ocellata*) and Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) (Date et al 2002).

Surveys of the Pilliga forests in the 1990s suggested that the forests were carrying the largest population of Koalas (*Phascolarctos cinereus*) west of the Great Dividing Range in NSW, with the numbers estimated at approximately 15,000 (Kavanagh and Barrott 2001). Since then, repeat surveys for Koalas within the Pilliga forests showed a decline of over 80 percent (Lunney et al. 2017) and evidence provided to the recent inquiry in Koala populations in NSW noted that the Pilliga Koala population was 'completely unviable' or already extinct (Legislative Council Portfolio Committee no. 7 2020). The decline of Koalas is likely to have occurred as a result of a combination of prolonged droughts, heatwaves and wildfire (Lunney et al. 2017).

The NSW Government's Saving Our Species program has partnered with the Australian Wildlife Conservancy to reintroduce several mammal species to the Pilliga that are extinct in the wild in NSW. The reserve comprises a 5,822 hectare area in the Pilliga State Conservation Area, enclosed by a feral predator-proof fence (EnviroKey 2017). This reserve is located about seven kilometres from the proposal site at its closest point and would not be affected directly by the proposal.

2.3 Local corridors

Local corridors may include riparian and roadside vegetation as well as remnants. Local corridors provide connectivity between small fragments of native vegetation and often are bisected by clearing for agriculture in the study area. Corridors may also provide living habitat for some species, with some fauna populations residing in corridor habitat. Local corridors are mapped in Appendix A.

2.3.1 Linear roadside remnants and travelling stock reserves

Areas of Crown land (including travelling stock reserves) occur throughout the proposal site and buffer. These often occur along road reserves, paper roads (eg 'laneways' along property boundaries) or in association with creeks and rivers, and provide continuous linear strips of vegetation. In some locations these connect to larger patches of vegetation, providing habitat connectivity in the landscape. In publicly accessible areas such as travelling stock reserves, vegetation and habitats are impacted by creation of tracks for dirt-bike riding and rubbish dumping.

Woodland remnants in travelling stock reserves generally support more species of birds and arboreal mammals than those on private land (Davidson et al 2005). Species such as the Koala and Squirrel Glider may rely on these areas for foraging and dispersal in the Narrabri area.

2.3.2 Small patches of vegetation in agricultural land

Small, isolated patches of woodland within farmland exist throughout the study area. Woodland patches in agricultural land comprise a canopy of eucalypts and cypress pine, often with a sparse understory and grassy ground layer. Connectivity between patches varies. Some patches in agricultural land are isolated from other areas while vegetation along creek lines and roads can provide narrow strips of connecting habitat between other patches. This vegetation tends to be impacted by grazing, clearing for firewood and fencing. Without adequate connectivity, small patches may be under-utilised by some fauna species if the patch size is smaller than the minimum home-range areas.

2.3.3 Stepping stones (paddock trees)

Many fauna species use small patches of isolated vegetation and isolated paddock trees as stepping stones to move through predominantly cleared agricultural land. Such species include birds, bats, Koalas and the Squirrel Glider (depending on distance between trees). Large, hollow-bearing trees occur in these areas, and provide important roosting habitat for hollow-dependant fauna such as microbats. For example, the threatened Yellow-bellied Sheath-tail bat is known to roost in isolated paddock trees (Rhodes and Hall 1997).

2.3.4 Riparian corridors

In extensively cleared areas, where riparian vegetation may form the majority of the remnant native vegetation, it may be considered a critical landscape component (Fisher and Goldney 1997). Many fauna species use riparian vegetation to move through predominantly cleared agricultural land. Other fauna species rely on these habitats for their survival because it is often the only remaining area of native vegetation. Riparian vegetation has been shown to be a key element for avian diversity, even in massively altered landscapes (Johnson et al 2007). These areas are particularly important as drought refuges (Morton 1990 in Macleod 2002).

In the study area, vegetated riparian corridors often form links with larger tracts of vegetation, including areas of state forest and linear roadside remnants and providing important movement corridors for species. These areas provide habitat for a range of fauna groups, including birds, possums and gliders, bats, reptiles, and frogs.

2.3.5 Major riparian corridors

Major vegetated riparian corridors exist along the Macquarie River, Kickabil Creek, Castlereagh River, Bohena Creek and Narrabri Creek. Dominant tree species comprise River Red Gum (*Eucalyptus camaldulensis*) in the south and Blakely's Red Gums (*Eucalyptus blakelyi*) in the north. The riparian corridors often contain many hollow-bearing trees. Riparian vegetation along the major rivers provides regional connectivity for species such as the Koala, Squirrel Glider, woodland birds and the Pale-headed Snake. When making local foraging movements, Superb Parrots usually move along wooded corridors, rarely crossing large areas of open ground (Baker-Gabb 2011).

2.3.6 Minor riparian corridors

Minor riparian corridors occur along creeks in agricultural land where native vegetation comprises a narrow band of vegetation. These narrow linear remnants are likely to be important for the movement of small woodland birds and may also provide habitat for larger fauna including macropods and the Koala and Squirrel Glider.

Creek lines in the Pilliga forests also provide movement corridors for a range of species. Blakely's Red Gum woodlands associated with these creeks have been found to be characterized by 36 bird species that were virtually absent from the nearby box-ironbark forests away from the creeks, including 10 threatened and declining species (Date et al 2002). Creek line vegetation has been subject to less logging and grazing, but moderate fire impacts (Date et al 2002). Microbats and owls are likely to use the open area above the creek lines as flyways.

2.3.7 Riparian corridors with limited vegetation and connectivity

Many drainage lines with limited or no remnant vegetation present occur in cleared agricultural land in the proposal site. These provide limited connectivity; however the presence of water may encourage movement of small terrestrial animals such as frogs and reptiles, and fast flying aerial foragers who use waterways to navigate.

3. Threatened species

3.1 Threatened biota recorded or likely to occur

Twenty-one threatened fauna species listed under the *Biodiversity Conservation Act 2016* (BC Act) and/or EPBC Act were recorded during surveys for the proposal. A number of additional threatened fauna species are likely to occur. These are identified in Table 2. The gap threshold (gap above which the species is unlikely to cross) for these species is based on a review of literature (see Appendix D). Species that require connectivity structures or mitigation (based on gap threshold or other ecological traits) are also identified.

Table 2 Summary of threatened species identified in the proposal site during survey or considered likely to occur and benefit from connectivity measures

Common name	BC Act	EPBC Act	Gap threshold (m)	Recorded during surveys	Require connectivity structures or mitigation
Barking Owl	Vulnerable	-	>250	Yes	Yes
Black Falcon	Vulnerable	-	>250	Yes	No
Black-chinned Honeyeater (eastern subspecies)	Vulnerable	-	>250	Yes	No
Brown Treecreeper (eastern subspecies)	Vulnerable	-	<60	Yes	Yes
Bush Stone-curlew	Vulnerable	-	>250	No	Yes
Diamond Firetail	Vulnerable	-	<100	No	Yes
Flame Robin	Vulnerable	-	<100	Yes	Yes
Glossy Black-cockatoo	Vulnerable	-	>250	Yes	No
Grey-crowned Babbler (eastern subspecies)	Vulnerable	-	<200	Yes	Yes
Little Eagle	Vulnerable	-	>250	Yes	No
Speckled Warbler	Vulnerable	-	<100	Yes	Yes
Spotted Harrier	Vulnerable	-	>250	Yes	No
Square-tailed Kite	Vulnerable	-	>250	No	No
Superb Parrot	Vulnerable	Vulnerable	>250	Yes	No
Varied Sittella	Vulnerable	-	<100	Yes	Yes
White-throated Needletail	-	Vulnerable	>250	Yes	No
Corben's Long-eared Bat	Vulnerable	Vulnerable	>250	Yes	Yes
Large Bent-winged Bat	Vulnerable	-	>250	Yes	No
Large-eared Pied Bat	Vulnerable	Vulnerable	>250	Yes	Yes
Little Pied Bat	Vulnerable	-	>250	Yes	Yes
Yellow-bellied Sheathtail-bat	Vulnerable	-	>250	Yes	Yes

Common name	BC Act	EPBC Act	Gap threshold (m)	Recorded during surveys	Require connectivity structures or mitigation
Black-striped Wallaby	Vulnerable	-	<100	No	Yes
Eastern Pygmy-possum	Vulnerable	-	<50	No	Yes
Koala	Vulnerable	Vulnerable	>250	Yes	Yes
Rufous Bettong	Vulnerable	Vulnerable	<60	No	Yes
Pilliga Mouse	Vulnerable	Vulnerable	<50	No	Yes
Squirrel Glider	Vulnerable	-	<70	Yes	Yes
Five-clawed worm skink	Vulnerable	Vulnerable	<40	No	Yes
Pale-headed Snake	Vulnerable	-	<200	Yes	Yes

3.2 Migratory species listed under the EPBC Act

No mapped important habitat for migratory waders is located in or near the proposal site. There is habitat for migratory flycatchers that breed in eastern Australian forests and non-breeding migratory birds from Asia. No species that would benefit from connectivity structures are relevant to this strategy.

3.3 Key threatened species relevant to this strategy

3.3.1 Large mammals

Connectivity issues for large terrestrial mammals

The proposal would require the clearance of a gap ranging between 33 metres to 400 metres wide (with about 29 percent in the 50-60 metres category, and averaging a width 89 metres) along a 73 kilometre alignment in the Pilliga forests. This would create a major barrier to movement of large terrestrial mammals such as the Koala and Black-stiped Wallaby. Operation of the rail line would also create a risk of injury and mortality from train strike.

Koala

The Koala occurs in a range of forest and woodland communities throughout NSW associated with vegetation containing nutritionally desirous Myrtaceous species capable of maintaining a positive nitrogen balance of slightly above one percent. Preferred browse trees are also low in anti-herbivore toxins, such as formylated phloroglucinol compounds (Moore et al. 2005). Habitat in the study area lies primarily within the Pilliga forests. The Pilliga Area of Regional Koala Significance (ARKS) covers much of the alignment in the Pilliga area (OEH 2019). There are large areas of foraging habitat primarily close to drainage lines with deeper soils and lower occurrence of fire. Despite this, the Koala population in the Pilliga has undergone a significant (five-fold) decline in occupancy in the previous two decades (Lunney et al. 2017). Patchy and isolated records occur elsewhere in the Narromine and Dubbo districts, with a roadside record south of Narromine (EES 2019a).

The movements of Koalas showed a wide variation in patterns, from highly localised movements to long-range dispersal over 20 kilometres (Matthews et al 2016). Koalas are known to use scattered paddock trees (Barth et al 2019), and mobility between patches in rural areas does not appear to be compromised by the absence of corridors of trees (White, 1999). For the purposes of the prescribed impact assessment, it is assumed the Koala can cross gaps of over 200 metres, given their ability to cross paddocks.

Genetic research has identified major roads as a barrier to gene flow for Koalas (Lee et al 2010), and rail is likely to have a similar impact, although is unlikely to be as intense given shorter width to cross and less traffic. The disruption of home-ranging patterns as a result of habitat fragmentation and degradation, the loss of home-range trees and creation of barriers to movement may result in changes to social structure, potentially contributing to the decline of the population (Phillips 2000). Wider gaps may also make the Koala more susceptible to predators such as wild dogs, as individuals would spend more time on the ground. Operation of the rail line would affect movement of Koalas and create a risk of injury and mortality from train strike if there are no suitable connectivity structures or if individuals cross away from connectivity structures. Koalas are at risk of train strike while moving between forage trees or during dispersal.

Black-striped Wallaby

The Black-striped Wallaby occurs on the far north coast and western slopes of NSW in scattered discrete populations on reserves and in the Pilliga forests (EES undated). The main distribution for the Black-striped Wallaby in the study area occurs in the Pilliga and forested areas near Narrabri (Segments 10 and 11).

Preferred habitats are characterised by dense low (up to three metres) woody or shrubby vegetation, near open grassy foraging areas. Groups tend to use well-established pathways to access foraging areas which are generally in more open areas with grassy understory (EES 2019b). For the purposes of the prescribed impact assessment, it is assumed this species can cross gaps of up to 100 metres. Around 69 percent of the rail corridor in the Pilliga would be less than 100 metres wide.

Based on the habitat requirements of this species, train strike risk would be highest in areas where shrubby forest (shelter habitat) occurs near grassy areas (foraging habitat). This habitat type is likely to be restricted to small areas within the Pilliga forests, and potentially be focussed at the interface between the Pilliga forests and adjacent agricultural land.

3.3.2 Small terrestrial mammals

Connectivity issues for small terrestrial mammals

The gap ranging between 33 metres to 400 metres wide (with about 29 percent in the 50 to 60 metres category, and averaging a width 89 metres) along a 73 kilometre alignment in the Pilliga would create a major barrier to movement of small, terrestrial mammals such as the Pilliga Mouse, Eastern Pygmy-possum and Rufous Bettong. Operation of the rail line would also create a risk of injury and mortality from train strike.

Pilliga Mouse

The Pilliga Mouse is restricted to the Pilliga forests and Timallallie National Park, with one record from the Warrumbungles National Park (EES 2019a). The Pilliga Mouse is found in greatest abundance in recently burnt moist gullies, areas dominated by Broombush (*Melaleuca uncinata*) and areas containing an understorey of *Acacia burrowii* with a *Corymbia trachyphloia* overstorey. The potential distribution of 'important habitat' for the Pilliga Mouse was mapped by Paull et al (2014) based on floristic and structural preferences and presented as a predictive map. Much of this habitat is located to the south-east of the proposal site in the Pilliga forests, with some to the north-west. Much of the alignment appears to pass through gaps in important habitat, however the proposal would impact some areas mapped by Paull et al (2014). It is not known how much migration occurs between these habitat areas, but the proposal is likely to create a barrier to movement between them. For the purposes of the prescribed impact assessment, it is assumed the Pilliga Mouse can cross gaps of up to 50 metres (which is around seven percent of the rail corridor in the Pilliga forests).

Eastern Pygmy-possum

Although the Eastern Pygmy-possum is broadly distributed, recent studies have shown that within this range the species appears to be patchily distributed and its overall abundance is low. The species is found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred (EES 2019b). The Eastern Pygmy-possum feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable (EES 2019b). Habitat within the study area comprises heathy woodland within the Pilliga forests and areas of open woodland with a dense shrub layer, particularly in the north-east end of Pilliga Forest Way. For the purposes of the prescribed impact assessment, it is assumed the Eastern Pygmy-possum can cross gaps of up to 50 metres (which is around seven percent of the rail corridor in the Pilliga forests).

Rufous Bettong

Rufous Bettongs inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter (EES 2019b). The species has largely vanished from inland areas of NSW with sporadic, unconfirmed records from the Pilliga and Torrington districts.

The Rufous Bettong is likely to occur in low numbers in the Pilliga in woodland with a grassy understory, with populations unevenly distributed depending on availability of suitable habitat. As such, risk of train strike is low, but could occur on occasion.

For the purposes of the prescribed impact assessment, it is assumed this species can cross gaps of up to 60 metres. Around 36 percent of the rail corridor in the Pilliga forests would be within this width.

3.3.3 Gliders

Connectivity issues for gliders

The proposal would create a major barrier to movement of the Squirrel Glider in the Pilliga forests and other vegetated areas. For much of the alignment, the width of the operational corridor would be over 40 metres, with wider gaps where the corridor is directly adjacent to Pilliga Forest Way and other roads, sediment basins and other infrastructure. The Squirrel Glider has a mean glide distance in a horizontal plane of 21.5 +/- 0.9 metres (with a maximum of 47 metres) and a mean glide angle of 28.5 +/- 0.8°. In order to cross a 40 metre gap, trees would need to be around 25 metres tall (see Goldingay and Taylor 2009). Note also that the maximum glide distance is less for females, and thus wider gaps can filter females (van der Ree 2006). The clearing width for the proposal would be close to, or exceed, the usual maximum gliding ability for the species, although in some areas where trees are sufficiently tall and the corridor is narrow, some individuals may still successfully cross the rail corridor. Operation of the rail line would, however, create a risk of injury and mortality from train strike. The height of trains (for example those carrying double-stacked containers) further increases the risk of injury and mortality as this species may collide with a train if attempting to glide across the rail corridor. Given the gliding range varies from 25 metres to 70 metres, a maximum distance of 50 metres is used for the purposes of the assessment of prescribed impacts.

Squirrel Glider

The Squirrel Glider is sparsely distributed along the east coast and immediate inland districts from western Victoria to north Queensland (NPWS 1999). The species requires sufficient density of hollow-bearing trees and a high floristic diversity can also be important, including the presence of smooth-barked and winter/spring flowering tree species and a good winter supply of nectar (Menkhorst et al. 1988; Sharpe and Goldingay 1998, NSW Scientific Committee 2008). In agricultural areas, the Squirrel Glider is known to rely on narrow linear remnants and small clumps of adjacent woodland in fam paddock, and abundance was found to correlate positively with density of *Acacia* species and canopy width (van der Ree and Bennett 2003).

The Pilliga forests provides large areas of foraging, breeding and denning habitat for this species. The Squirrel Glider will den in ironbarks and along creeklines where there is an abundance of large hollow-bearing River Red Gums. Shrubby areas with acacias and other myrtaceous plants provide foraging habitat in the study area. Linear remnants and adjacent patches of woodland in farmland may provide habitat elsewhere in the study area, particularly where there is connectivity to larger remnants and appropriate understory species.

Given the gliding range varies from 25 metres to 70 metres, a maximum distance of 50 metres is used for the purposes of the assessment of prescribed impacts. Only seven percent of the rail corridor in the Pilliga forests is less than 50 metres wide.

3.3.4 Microbats

Connectivity issues

The proposal will create a new linear gap through the Pilliga forests, exacerbating the existing impacts on connectivity created by Pilliga Forest Way and the Newell Highway. Microbat species are at risk of train strike when foraging or travelling along flyways in the Pilliga and other areas of the proposal site. Train strike risk would be highest at night and for species which forage in clearings and below the canopy, with minimal risk during the day given the usually nocturnal habits of these species. Microbat movement and behaviour is also affected by artificial light. Some bat species are attracted to insects that gather at lights, while other species avoid illuminated areas (Patriarca and Debernardi 2010). Lights from trains may attract some species, increasing their risk of mortality from train strike, but may deter other species from the vicinity of the rail line. Noise from trains may also affect gleaning microbats, which could alter foraging patterns for some species, such as Corben's Long-eared Bat. These highly mobile species are assumed to be able to cross all gaps created by the rail corridor and associated infrastructure.

Corben's Long-eared Bat

Corben's Long-eared Bat inhabits a variety of vegetation types, including mallee, Bulloke (*Allocasuarina leuhmanni*) and box eucalypt dominated communities. The Pilliga is considered a stronghold for this species EES 2019b). Corben's Long-eared Bat is a slow flying agile bat, utilising the understorey to hunt non-flying prey such as beetles and caterpillars (EES 2019b), as well as moths and flies (Law et al 2016). This species has a relatively high risk of mortality from train strike given its preference for flying in the understory.

Large-eared Pied Bat

The Large-eared Pied Bat frequents low to mid-elevation dry open forest and woodland close to these features. This species is a slow flying agile bat that forages below the canopy (DERM 2011). This species has a relatively high risk of mortality from train strike given its preference for flying below the canopy.

Little Pied Bat

The Little Pied Bat occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Little Pied Bats have been recorded foraging almost exclusively along a major dry creek channel in western NSW (Law et al 2011), and would likely similarly use creeklines and tracks in the Pilliga. This species has a relatively high risk of mortality from train strike given its preference for flying along riparian corridors.

Yellow-bellied Sheath-tail bat

The Yellow-bellied Sheath-tail-bat is a wide-ranging species found across northern and eastern Australia. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country (EES 2020b). A strong association with the flyway on large stream-beds in the Pilliga has also been shown for this species (Law et al 2011). This species has a relatively low risk of mortality from train strike in forested areas given its preference for flying above the canopy, but may be at a higher risk in more open country or along creeks in the Pilliga. This species may also use the rail corridor for foraging or movement, and may be at a higher risk of mortality in these instances.

Large Bentwing Bat

Large Bentwing Bats occur in a broad band along eastern and inland NSW. Large Bentwing Bats fly quickly above treetops in valleys, making fast dives to catch prey (EES 2020b). There are few records in the Pilliga (Atlas of Living Australia 2021). This species has a relatively low risk of mortality from train strike given its preference for flying above the canopy.

3.3.5 Owls and raptors

Connectivity issues

Limited information on impacts of railways exists for Australian fauna. Birds of prey were frequently registered as train casualties along Spanish railways, comprising 19.2 percent of all birds killed (SCV 1996). One possible explanation is the attractiveness of perches along the trails and of railway verges as a hunting ground for birds of prey and owls (SCV 1996; van der Grift and Kuijsters 1998). Moreover, some species scavenge regularly along the rail corridor for carcasses, increasing their vulnerability to collisions (SCV 1996). Train lights are likely responsible for the majority of owl kills, causing individuals to become disoriented with the approaching train, hence increasing the likelihood of being killed (Peña and Llama 1997; SCV 1996).

These highly mobile species are assumed to be able to cross all gaps created by the rail corridor and associated infrastructure.

Barking Owl

The Barking Owl inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses (EES 2019b). The main area of habitat for the Barking Owl in the proposal site is associated with the western and northern sections of the Pilliga. Potential breeding habitat is present along creek lines that are crossed by the proposal in this area.

Birds such as the Barking Owl are likely to use gaps in vegetation such as roads, creeklines and the rail corridor for movement. These species are at risk of train strike as a result of travelling across or along the rail corridor, particularly in forested areas such as the Pilliga. Train strike risk would be highest at night, with negligible risk during the day given the nocturnal habits of this species. Given its large territory and high mobility, it is unlikely that the proposal would cause habitat fragmentation for the Barking Owl (eg Keitt et al. 1997).

Raptors

Mortality of species such as the Wedge-tailed Eagle may occur as this species is a scavenger, but it less likely for threatened species such as the Little Eagle and Square-tailed Kite, which hunt live prey. These species are unlikely to be affected by fragmentation caused by the rail line.

3.3.6 Parrots and cockatoos

Connectivity issues

A number of threatened parrot and cockatoo species were recorded, or are known from the Pilliga, including the Glossy Black-cockatoo, Turquoise Parrot and Superb Parrot. These species are considered to be at some risk of injury and mortality from train strike during operation of the rail line, particularly as the seed-eating species may be drawn to feed in the open clearing of the rail alignment. The risk of a disruption to population connectivity is generally low for these highly mobile species, which are not likely to find the clearance area a barrier to movement and would continue to utilise resources and move across the woodland as a single contiguous area.

Glossy Black-cockatoo

Glossy Black-cockatoos are known from the Pilliga, Goonoo Forest and other larger forests in the wider region. Few records are known from predominantly cleared land (EES 2021a). The Glossy Black-cockatoo is highly mobile and able to disperse widely (up to 60 kilometres), but habitat fragmentation may mean that it is energetically inefficient to commute long distances between feeding patches (NSW Scientific Committee 2008). This highly mobile species is assumed to be able to cross all gaps created by the rail corridor and associated infrastructure within the Pilliga. It is considered to have a low susceptibility to train strike given it tends to fly above the canopy.

Superb Parrot

The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums (*Eucalyptus camaldulensis*) and box eucalypts. The species also seasonally occurs in box-pine (*Callitris*) and Boree (*Acacia pendula*) woodlands (DEE 2019a). At least part of the population of the Superb Parrot undertakes regular seasonal movements, vacating the breeding area after the conclusion of the breeding season, and then returning in spring, while others remain in the breeding areas throughout the year (Higgins 1999). The Superb Parrot feeds mainly on the ground, on the seeds of grasses as well as cereal crops and spilt grain. They also eat the seed-pods of many understorey species of wattles, and flowers and fruits of eucalypts, berries of mistletoe and lerps (EES 2019a). This highly mobile species is assumed to be able to cross all gaps created by the rail corridor and associated infrastructure within the Pilliga, however as it spends much of its time foraging on the ground, this species may be susceptible to mortality from train strike.

Turquoise Parrot

The Turquoise Parrot inhabits open eucalypt woodlands and forests, typically with a grassy understorey. It feeds on the seeds of native and introduced grasses and other herbs. Grasslands and open areas provide important foraging habitat for this species while woodlands provide important roosting and breeding habitat. The Turquoise Parrot forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed (EES 2021a). As it spends much of its time foraging on the ground, this species may be susceptible to mortality from train strike. Given the more sedentary nature of this species compared to the Superb Parrot, it is assumed that it can cross gaps of up to 100 metres (about 69 percent of the rail corridor in the Pilliga).

3.3.7 Small woodland birds

Connectivity issues

Many threatened woodland bird species were recorded or are well known from the Pilliga forests (see Table 2). These species are at risk of injury and mortality from train strike during operation of the rail line. Some less mobile species may find the new open clearing of the rail alignment, or widening of the road gap where the alignment parallels existing roads, to present a barrier to localised movement in the short term, and potentially to gene flow between populations in the longer term. The majority of woodland birds studied in a systematic literature review by CSIRO exhibit similar gap crossing and inter-patch crossing distance thresholds (Doerr et al. 2010). When moving between stepping-stones (eg paddock trees) the majority of species did not cross gaps greater than ~100 metres. Also, many species were unable to disperse between patches of habitat (≥10 hectares) separated by more than 1100 metres, even where structural connectivity existed between the patches (Barrett and Love 2012).

As noted in section 1.4.1, the rail corridor would vary in width. The gap created by the proposal would range between 33 metres to 400 metres wide (with about 29 percent in the 50-60 metres category, and averaging a width 89 metres) along the 73 kilometre alignment in the Pilliga. In areas where roads are adjacent to the rail corridor (eg Pilliga Forest Way), the clearing for the proposal would exacerbate the existing gap created by the road. In some locations, a thin linear strip of vegetation would be retained between the rail corridor and the road.

The risk of a disruption to population connectivity is considerable for smaller, less mobile species, or those which avoid crossing larger open areas. Species which may suffer some population fragmentation by restriction of movement across the new rail alignment are likely to include the Brown Treecreeper, Diamond Firetail, Flame Robin, Grey-crowned Babbler, Hooded Robin, Speckled Warbler, and Varied Sittella. These species are considered less mobile due to one or more factors, including their small home ranges, weaker flight, or an aversion to large clearings or openings in the forest. All of these species are likely to be able to cross the rail corridor where is narrow (eg less than 60 metres wide), and individuals may also cross wider sections. It is likely that these species could on occasion make use of the areas of continuous riparian habitat at the proposed bridge crossings within the Pilliga forests, and these are likely to provide some gene flow between populations of these species over the medium to long term.

Species that predominantly forage on the ground would be at higher risk of train strike, particularly while flying from perches to feeding areas. These include species such as the Diamond Firetail, Flame Robin, Grey-crowned Babbler, Hooded Robin, and Speckled Warbler. Most of these species would be more likely to forage adjacent to the rail line rather than on the rail line. Given the low numbers of trains that would travel through the Pilliga, and the large areas of available habitat, the impact of train strike at a population level is considered to be low. Species that forage in the canopy or on trunks, such as the Varied Sittella and Brown Treecreeper, would have a lower risk of train-strike.

Brown Treecreepers and several other bird species have been recorded moving into sites where coarse woody debris has been added (Mac Nally et al. 2002; Mac Nally and Horrocks 2007). This may be a useful mitigation measure to make some areas of the rail corridor more attractive and therefore encourage movement of this and other species at these locations. However, this treatment may also increase the risk of mortality from train-strike. Given the low numbers of trains that would travel through the Pilliga, and the large areas of available habitat, the increased risk of train strike is unlikely to outweigh the benefit of increasing movement options.

Other more mobile threatened woodland bird species such as the Dusky Woodswallow and Regent, Painted and Black-chinned Honeyeaters are not likely to find the clearance area a barrier to movement, and would continue to utilise resources and move above the rail corridor between patches of vegetation.

Brown Treecreeper

The Brown Treecreeper occurs in woodlands and dry open forest, usually dominated by stringybarks or rough-barked species with open grassy understorey. Fallen timber is important foraging habitat. The Brown Treecreeper nests in hollows in standing trees or stumps (EES 2021). It spends about half of its foraging time on the ground, and the other half on tree trunks (Northeast 2013). Brown Treecreepers use scattered trees to move outside their natal remnants more than they used corridors, but only rarely crossed gaps of more than about 100 metres between trees (Doerr and Doerr 2007a). Robertson and Radford (2009) found that treecreepers appeared reluctant to cross gaps of more than ~60 metres between patches of vegetation. Around 36 percent of the rail corridor in the Pilliga would be less than 60 metres wide, a gap that this species would be able to cross. In more fragmented rural landscapes, the clearing along the rail corridor may reduce connectivity between small fragments of habitat. As it spends part of its time foraging on the ground, this species may be susceptible to mortality from train strike.

Diamond Firetail

The Diamond Firetail occurs in grassy eucalypt woodlands including Box Gum communities, as well as open forest, mallee and natural and derived grasslands. It is often found in riparian areas and occasionally in lightly wooded farmland (EES 2021). Diamond Firetails forage on the ground, with grass seeds making up a high proportion of their diet (Hodder, 2002). This species also benefits from the presence of coarse woody debris. Given this species can occur in open areas, it is likely to be able to cross the gap created by the rail corridor. It is assumed for the purpose of the prescribed impact assessment that this species can cross a gap of up to 100 metres. About 69 percent of the rail corridor in the Pilliga would be less than 100 metres wide. The Diamond Firetail's preference for foraging on native grass seeds makes it susceptible to mortality from train strike in areas with a native ground-cover.

Flame Robin

The Flame Robin forages from low perches, feeding on invertebrates taken from the ground, tree trunks, logs and other coarse woody debris. Fallen logs and coarse woody debris are important habitat components. The species breeds in upland moist eucalypt forests and woodlands and migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains (EES 2021). At lower elevations outside the breeding season Flame Robins are often conspicuous in open habitats such as farmland, especially pasture and recently ploughed paddocks. They also occur in other grassy areas, such as golf courses, ovals or parkland in built-up areas (Birdlife Australia 2021). It is assumed for the purpose of the prescribed impact assessment that this species can cross a gap of 100 metres. About 69 percent of the rail corridor in the Pilliga would be less than

100 metres wide. The Flame Robin's ground-foraging habit may make it susceptible to mortality from train strike.

Grey-crowned Babbler

The Grey-crowned Babbler inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Family groups have territories between 1-50 (generally around 10) hectares. Grey-crowned Babbler flight is laborious, so birds prefer to hop to the top of a tree and glide down to the next one. Grey-crowned Babblers in and around Dubbo have been recorded occasionally crossing open areas of up to 200 metres between trees, including treeless sports grounds (Lambert and Ford 2016). About 95 percent of the rail corridor in the Pilliga would be under 200 metres wide. In more fragmented rural landscapes, the clearing along the rail corridor may reduce connectivity between small fragments of habitat. However, the Grey-crowned Babbler would be subject to train-strike due to its ground-foraging nature and laborious and low flight.

Hooded Robin

The Hooded Robin is considered a sedentary species, but local seasonal movements are possible. It prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas, and forages on or near the ground for insects (EES 2021). The Hooded Robin is positively associated with the edges of open vegetation dominated by ungrazed or lightly grazed native grassy ground cover and adjoining timbered native vegetation cover (Priday 2010). The Hooded Robin has been identified as the focal species for the threats of area and resource limitation because it had the most demanding requirements for area (>100 ha) and habitat complexity (Watson et al 2008). Given this species can occur in open areas, it is likely to be able to cross the gap created by the rail corridor, particularly where the corridor is narrow. It is assumed for the purpose of the prescribed impact assessment that this species can cross a gap of up to 100 metres (which comprises about 69 percent of the rail corridor in the Pilliga). The Hooded Robin's ground-foraging habit may make it susceptible to mortality from train strike.

Speckled Warbler

The Speckled Warbler inhabits a wide range of Eucalyptus-dominated communities with a grassy understorey, a sparse shrub layer, often on rocky ridges or in gullies. It forages on the ground for seeds and insects, and nests in a slight hollow in the ground or at the base of a low dense plant. The Speckled Warbler is sedentary and requires large, relatively undisturbed remnants to persist in an area (EES 2021). This species is likely to be affected by gaps of more than 100 metres between patches (as shown in Doerr et al. 2010) and small patch size. About 69 percent of the rail corridor in the Pilliga would be less than 100 metres wide. The proposal may affect this species to varying degrees depending on local patch size and width of the rail corridor. It may be subject to train-strike due to its ground-foraging nature.

Varied Sittella

The Varied Sittella is sedentary and is sensitive to habitat isolation and loss of structural complexity. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Cleared agricultural land is potentially a barrier to movement. The species lives in small groups and travels between tree canopies (ACT Scientific Committee 2019). While there is little information on the gap distance this species is able to cross, it is known to be threatened by fragmentation. It is assumed for the purpose of the prescribed impact assessment that this species can cross a gap of up to 100 metres (which comprises about 69 percent of the rail corridor in the Pilliga). In more fragmented rural landscapes, the clearing along the rail corridor may reduce connectivity

between smaller fragments of habitat. This species is unlikely to be at risk of mortality through train strike.

3.3.8 Reptiles

Connectivity issues

The removal of vegetation is an issue for sedentary species such as the Five-clawed Worm-skink and Pale-headed Snake. Linear barriers such as a rail has the potential to bisect populations of the Five-clawed Worm-skink, and operation of the rail line would also create a risk of injury and mortality from train strike for the Pale-headed Snake. Appropriate fencing is recommended in riparian areas to minimise access of this latter species to the rail corridor.

Five-clawed Worm-skink

The Five-clawed Worm-skink has a patchy distribution on the North West Slopes and Plains of north-east NSW and is known to occur in the Narrabri area (EES 2019b). The Five-clawed Worm-skink is found in open woodland areas with low grass cover (usually between 5 to 10 centimetres) and scattered eucalypts, generally supported by red-black to black clay-loam soils (NPWS 1999). It uses fallen logs and timber as sheltering sites and digs in loose soil to create permanent tunnel-like burrows (NPWS 1999). The proposal is located at the southern edge of the species' known range.

About 6.7 kilometres of the proposal intersects with appropriate soil habitat for this species. The construction of the proposal has the potential to fragment habitat for this species, however much of the preferred habitat is located where the viaduct over the Namoi River and Narrabri Creek would be constructed. This would provide substantial connectivity underneath the bridge for this species. Given this viaduct, the Five-clawed Worm-skink is not included in the connectivity assessment for additional credits.

Pale-headed Snake

The Pale-headed Snake appears to favour habitats close to riparian areas (EES 2019b). Radio-tracking of snakes on the Namoi River (Fitzgerald et al. 2010) found individuals were sedentary and moved only short distances (up to 134 metres in that study). This species is likely to use riparian corridors to move under the rail line, but there is potential for the species to be subject to train strike if traversing the tracks. It is assumed for the purpose of the prescribed impact assessment that this species can cross a gap of up to 150 metres (which comprises about 92 percent of the rail corridor in the Pilliga).

3.3.9 Fish

Connectivity issues

Connectivity and habitat diversity are critical components of aquatic ecosystems and fish habitats. Some native fish species travel up and down rivers and by utilising the tributaries, wetlands, and floodplains that connect different habitat areas. Structural barriers, including waterway crossings can impede natural flows and create physical and hydrological barriers to fish movement (DPI 2013). The proposal includes the construction of many bridges and culverts over major and minor waterways.

All waterway crossings have been designed in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge 2003).

Threatened fish

A number of threatened species and endangered populations listed under the *Fisheries Management Act 1994* (FM Act) and/or EPBC Act may occur in the study area. Species considered to have the potential to occur within watercourses in and around the proposal site include:

- Silver Perch (*Bidyanus bidyanus*) (listed as critically endangered under the FM Act and EPBC Act) – likely to occur within the proposal site in Macquarie River and Namoi River
- Murray Cod (*Maccullochella peelii*) (listed as vulnerable under the EPBC Act) – likely to occur within the proposal site in Macquarie River, Namoi River and Narrabri Creek based on recent sightings
- Purple Spotted Gudgeon (*Mogurnda adspersa*) (listed as endangered under the FM Act and EPBC Act) – likely to occur within the proposal site in numerous watercourses
- Flathead Galaxias (*Galaxias rostratus*) (listed as critically endangered under the FM Act and EPBC Act) – likely to occur within the proposal site in Narrabri Creek, Namoi River and Boggy Cowal.

The Trout Cod (*Maccullochella macquariensis*) (listed as endangered under the FM Act and EPBC Act) may also occur within the proposal site in the Macquarie River. However, there has been no recent sightings and this species is often confused with the Murray Cod.

Database searches also identified two endangered populations listed under the FM Act. These include:

- Olive Perchlet (*Ambassis agassizii*) (western population) – likely to occur within the proposal site in numerous watercourses
- Eeltail Catfish (*Tandanus tandanus*) (Murray Darling Basin population) – likely to occur within the proposal site in Namoi River, Narrabri Creek, Macquarie River and Barrone Creek.

4. Connectivity structures and measures – terrestrial fauna

4.1 Introduction

Animals use both non-wildlife passes (ie those located and designed for purposes other than to allow wildlife crossing, like drainage culverts), or wildlife passes specifically designed on the basis of the target species traits (small tunnels for amphibians or small mammals; canopy bridges and gliding poles for arboreal mammals; underpasses, overpasses, ecoducts or green bridges for large mammals) (Smith et al. 2015).

Large passes (such as extended bridge structures) mimicking natural habitat are more expensive, but they are also the most effective technique for reducing barrier effects and are suitable for most species.

Fauna connectivity measures will be incorporated into the design of the proposal. These comprise several dedicated fauna structures, including dedicated culverts, canopy bridges and barrier poles ,and drainage structures that would also be used by fauna, such as bridges and culverts. Revegetation to the start of a crossing structure is important to encourage use while reducing predation risk (eg Hunt et al. 1987; Harris et al. 2010). The structures proposed below will be revised and refined during detailed design, in consultation with the designers and BCS and with respect to flooding constraints and the requirements of the target species.

Proposed connectivity measures are summarised in Table 3 and detailed in sections 4.2 and 4.3. Proposed locations are mapped in Appendix B. A register of proposed structures and treatments is provided in Appendix C. The connectivity, train strike and mitigation assessment for prescribed impacts (see section 10.3 of the BDAR) is provided in Appendix D.

Table 3 Connectivity measures

Category	Item	Description
Connectivity structure	Bridges and viaducts	Provision of relatively connected vegetation and areas of dry passage.
	Dedicated culverts	Culverts specifically included in the design to encourage movement by fauna. Would include a variety of fauna furniture targeted to key species. Dry passage provided all of the time.
	Combined drainage/fauna culverts	Drainage culverts that are located in appropriate habitat and are of a size that may also be used by fauna. Raised ledges recommended to be included in the construction of the culverts to encourage use by fauna. Dry passage provided most of the time.
	Incidental fauna underpasses	Drainage culverts that are not located in appropriate habitat areas or are of small size, and may only be used occasionally by fauna. Dry passage provided most of the time.
	Canopy bridges	Rope bridges strung between poles and tying into nearby trees to allow arboreal animals to cross above the rail corridor.

Category	Item	Description
	Barrier poles or mesh fencing	Barriers installed on bridges in vegetated areas to prevent aerial species that are flying along creek corridors from flying into the side of trains.
	Ballast removal	Targeted removal of ballast between sleepers to allow movement of small terrestrial animals under the rail tracks.
Supporting measures	Fencing	Fencing specifically constructed to funnel fauna towards crossing structures, but prevent access to the rail line. The need for fencing in the Pilliga forests will be balanced against the risk of increasing the barrier effect of the rail line,
	Revegetation	Revegetation near crossing structures and other locations to encourage fauna to move across the rail corridor.

4.2 Connectivity structures and devices

4.2.1 Bridges and viaducts

Background

Bridges typically traverse watercourses and are the preference for fauna connectivity when passing through flood-prone areas (VicRoads 2012). Bridges have the least impact on aquatic and riparian fauna habitat as they usually involve minimal disturbance to water flow and aquatic habitat and allow some retention of riparian habitat. Bridges can also be designed to incorporate dry areas along banks to provide dry passage for terrestrial fauna species (TMR 2010).

Bridges with dry passage have been shown to provide habitat connectivity for a range of fauna species. Extensive revegetation works was carried out under a raised bridge structure over Slaty Creek on the Calder Freeway at Macedon in Victoria. Surveys showed that the vegetation under the bridge could support a comparable number of species of mammal, bird, reptile and amphibian as the forest immediately adjacent to the freeway (Abson 2004). Fauna monitoring for the Bonville Pacific Highway Upgrade identified many species utilising bridge underpasses including species of wallabies, possums, Koala, echidna, bandicoots, rats, antechinus, bats, foxes, cats, and a variety of birds, lizards and snakes (RTA 2009). A study at Brunswick Heads recorded a greater number of complete passages made through bridge underpasses than box culverts (AMBS 2002). Waterways provide important flyways for microbats, and riparian vegetation provides important roosting and breeding habitat in agricultural landscapes (McKenzie et al 2020).

Proposed structures

A total of 73 rail bridges are included in the proposal, of which 23 are located in the Pilliga segment (see Appendix B and Appendix C). Large viaducts are proposed at the Macquarie River and Namoi River floodplains and would provide substantial areas of dry passage for fauna to pass underneath for much of the time. Larger bridge crossings are detailed in Table 4.

Table 4 Larger bridge crossings providing fauna connectivity

Crossing type	Location	Length	Comment
Major crossings	Macquarie River	Over 1 kilometre long	Provides clearance over river of 19.6 metres and over Mitchell Highway of 7.7 metres. Crosses above the Narromine travelling stock reserve, retaining connectivity within this patch. Provision of connectivity for fauna including Koalas, macropods, possums, echidnas, emus, small birds, reptiles and frogs.
	Castlereagh River	Over 600 metres long	Provides clearance of 10.9 metres over river. Connectivity of riparian vegetation retained on the floodplain. Provision of connectivity for fauna including Koalas, macropods, possums, echidnas, emus, small birds, reptiles and frogs.
	Namoi River and Narrabri Creek	About 4 kilometres long	Provides clearance of 12.7 metres over Narrabri Creek and 12 metres over Namoi River creek. Has a clearance of over 5 metres over various roads and large areas of agricultural land. Provision of connectivity for fauna including Koalas, macropods, possums, echidnas, emus, small birds, reptiles and frogs.
Pilliga forests	Baradine Creek	Over 200 metres long	Provision of connectivity for threatened species, including the Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, and birds. Provision of connectivity for more common and widespread fauna, including macropods, echidnas, emus, small birds, reptiles and frogs.
	Etoo Creek	Over 300 metres long	
	Stockyard Creek	Over 50 metres long	
	Rocky Creek	Over 100 metres long	
	Talluba Creek	Over 50 metres long	
	Rocky Creek*	Over 50 metres long	
	Coghill Creek	Over 150 metres long	
	Mollieroi Creek	Over 50 metres long	
	Goona Creek	Over 50 metres long	
	Bundock Creek	Over 100 metres long	
Drainage lines in agricultural land	Ewenmar Creek	Over 300 metres long	Provision of connectivity along riparian corridors which provide important links in the predominantly cleared agricultural landscape.
	Emogandy Creek	Over 300 metres long	

Crossing type	Location	Length	Comment
	Pint Pot Creek	Over 100 metres long	Provision of connectivity for fauna including Koalas, microbats, macropods, possums, echidnas, emus, small birds, reptiles and frogs.
	Kickabil Creek	Over 200 metres long	
	Bundijoe Creek	Over 150 metres long	
	Gulargambone Creek	Over 400 metres long	
	Baronne Creek	About 100 metres long	
	Bucklanbah Creek	Over 100 metres long	
	Teridgerie Creek	Over 100 metres long	
	Bohena Creek	Over 300 metres long	

* Note that there are two Rocky Creeks in the Pilliga

Bridges in the Pilliga segment range in length from 14-33 metres long. Clearance under bridges varies along the length, however the average clearance ranges from 1.2-10.9 metres from the ground to the underneath of the bridge, and maximum clearance ranges from 1.8-12.6 metres, allowing suitable passage for fauna. Connectivity at bridges would be limited to varying degrees during rain or flood events but this disruption to connectivity would be relatively short-lived and infrequent. Given the ephemeral nature of the creeks in the Pilliga and the length and clearance of bridges, all bridges are considered to provide suitable dry passage for terrestrial fauna. Bridges with over three metres average clearance are considered to provide movement habitat for microbats and woodland birds A summary of bridge characteristics, suitability for fauna, and location of bridges in areas of suitable habitat is provided in Table 5.

Connectivity at bridges would be enhanced through use of fauna furniture and canopy bridges where height allows and appropriate habitat values are present, provided these do not interfere with flooding. Fauna furniture (horizontal wooden poles attached to appropriate piers) is recommended particularly for bridges in the Pilliga area and larger riparian corridors to encourage movement of Koalas and other scansorial fauna (where height allows). Canopy bridges are also recommended at larger riparian corridors to maintain connectivity for arboreal fauna such as the Squirrel Glider. Proposed locations for fauna furniture and canopy bridges are shown in Appendix B and detailed in Appendix C. Pole barriers are also recommended for some bridges in the Pilliga to prevent train-strike of aerial fauna (see section 4.2.5 and Appendix C).

Revegetation under bridges and at the approaches to the bridges would also assist with increasing the efficacy of these structures for connectivity.

The overarching connectivity strategy for Inland Rail (see section 4.3.1) recommends fencing 500 metres either side of bridges to direct fauna to the crossing location. Lengths of fencing should be further investigated in the Final Fauna Connectivity Strategy to allow a balance between fenced and unfenced sections, and the associated barrier effect of fencing, as well as to take into account risk of flooding and damage.

Table 5 Pilliga bridge crossings and suitability for fauna connectivity

Chainage	Length (m)	Creek	Average Clearance (height from ground to soffit/beams)	Maximum clearance (m)	Minimum clearance (m)	Suitability for fauna passage	Clearance summary	Koala polygon	Rufous Bettong polygon	Eastern Pygmy-possum polygon	Microbat habitat	Small bird habitat
747.77	241.9	Baradine	6.3	11.2	3.0	Excellent	>3	Yes	Yes	Yes	Yes	Yes
749.28	43.7	Unnamed	4.1	4.8	3.7	Excellent	>3	Yes	Yes	Yes	Yes	Yes
752.71	69	Coolangala	3.0	4.7	1.1	Excellent	>3	Yes	Yes	Yes	Yes	Yes
756.79	45.3	Curbo Creek	2.7	2.9	2.5	Excellent	>3			Yes	Yes	Yes
763.46	344.3	Etoo	3.4	6.0	1.3	Excellent	>3	Yes			Yes	Yes
767.94	75.1	Stockyard	1.2	1.9	0.2	Moderate	>1.8		Yes	Yes		
769.14	113.8	Rocky	4.5	5.7	3.5	Excellent	>3				Yes	Yes
773.37	55.4	Tinegie	2.0	2.1	1.9	Moderate	>1.8			Yes		
779.64	57	Talluba	3.4	5.0	2.0	Excellent	>3			Yes	Yes	Yes
779.83	70.4	Unnamed	2.7	3.8	1.8	Excellent	>3			Yes	Yes	Yes
781.52	84.2	Unnamed	4.8	5.7	4.5	Excellent	>3			Yes	Yes	Yes
783.65	114.9	Unnamed	10.9	12.6	7.9	Excellent	>3		Yes	Yes	Yes	Yes
786.81	82.3	Unnamed	5.7	7.2	4.7	Excellent	>3		Yes	Yes	Yes	Yes
789.38	188.4	Rocky 2	7.4	9.7	6.2	Excellent	>3		Yes	Yes	Yes	Yes
796.41	181.5	Coghill	2.9	5.6	1.4	Excellent	>3		Yes	Yes	Yes	Yes
800.45	91	Mollieroi	3.0	4.2	2.1	Excellent	>3			Yes	Yes	Yes
805.74	41.4	Unnamed	2.1	2.7	1.9	Good	>2.2		Yes	Yes		
809.11	55.3	Goona	2.3	2.9	1.7	Good	>2.2		Yes	Yes		
817.06	27.7	Unnamed	2.9	3.0	2.8	Good	>2.2	Yes	Yes	Yes		
817.26	28.7	Unnamed	3.4	3.4	3.4	Excellent	>3	Yes	Yes	Yes	Yes	Yes
817.33	204.5	Unnamed	3.4	3.5	3.2	Excellent	>3	Yes	Yes	Yes	Yes	Yes
817.57	27.9	Unnamed	3.4	3.5	3.4	Excellent	>3	Yes	Yes	Yes	Yes	Yes
817.65	137.1	Bundock	3.3	4.5	1.7	Excellent	>3	Yes	Yes	Yes	Yes	Yes

4.2.2 Dedicated underpasses

Background

Dedicated culverts are positioned to directly benefit fauna rather than to channel water. These dedicated underpasses are used where connectivity is required in dry woodland with few creek crossings.

Dedicated culverts have been shown to be used by a wide variety of fauna groups. A study of dedicated underpasses along the Brunswick Heads Bypass identified Koalas, possums, macropods, introduced carnivores, frogs, reptiles, birds, small mammals, rodents and echidnas using these underpasses. This study recommended increasing habitat cover surrounding culverts to facilitate movement by particular species such as potoroos (Taylor and Goldingay 2003).

Koalas have been shown to use structures as small as 2.4 metres by 1.2 metres near Brunswick Heads (Taylor and Goldingay 2003), and up to 100 metres long (SKM 2013). Dedicated culverts under the M1 (Sydney to Newcastle freeway) were found to be used by the Spotted-tailed Quoll, Koala and Eastern Pygmy-possum (RTA 2009). A study of box culvert usage by Koalas for the Bonville Koala study identified 20 records of Koalas using a dedicated underpass; comprising four complete passages (equates to eight records), two probable complete passages, seven unlikely passages and three non-passages (AMBS 2009).

Purpose-built tunnels were constructed under road within a ski resort at Mt Hotham for the Mountain Pygmy-possum. Habitat continuity was restored for the species by constructing a corridor leading to the tunnels. The corridor and tunnels were filled with rocks that imitated the natural habitat of scree (Mansergh and Scotts 1989).

The size or “openness” of an underpass appears to be the primary factor influencing fauna crossing rates. Wherever possible, the height and width of underpasses should be maximised so that fauna can see habitat on the other side (VicRoads 2012). The optimal relative aperture (height or width related to length) should have a length/opening width or height ration of less than eight (TMR 2010). The openness of a dedicated culvert will need to increase as length increases (VicRoads 2012). The openness ratio is calculated as height times width divided by length, and the suitability of the ratio depends on the fauna using the culvert. The minimum openness ratio required for large mammals is at least 0.75, but preferably 0.9. Medium mammals need an openness ratio of at least 0.4, and small mammals such as rats and mice need culverts of at least 30 centimetres high (Clevenger et al 2001).

Landscaping treatments must ensure that the entrance of the culvert is not covered by vegetation.

Proposed structures

Dedicated fauna culverts are proposed in the Pilliga and Bohena Creek area. These culverts would target the Koala, Rufous Bettong, Black-striped Wallaby, Eastern Pygmy-possum and Pilliga Mouse in particular, but would also allow movement of non-threatened fauna species. An assessment of the location of dedicated culverts has been undertaken (see Appendix C). A length of 50 metres either side of proposed locations was assessed. Potential locations were reviewed with respect to the depth of the embankment with a view to maximising culvert height, and flooding risk. Culverts would typically match the width of the top of formation (not the entire earthworks width). As such most culverts would be about seven metres wide (perpendicular to the rail). Longer culverts would occur in some locations, such as beneath crossing loops where they would be about 16 metres wide. The batter of the embankment has been taken into account when assessing openness of dedicated culverts as this increases shading of the culverts. The batter slope is a 1:3 ratio for most of the alignment, with a 4:1 slope at passing

loops. The openness of dedicated structures has been assessed based on the maximum height of a standard culvert that can be installed at a location, total width (based on being able to include a bank of three culverts of 2.4 metres wide each at each location) and length of the culvert including the embankment batter. Culverts that were too small (<0.6 metres high), were subject to flooding and/or had a poor openness ratio were discounted. Suitability for fauna species has depended on height of the culvert, openness as per Clevenger et al (2001), and location with respect to potential habitat or location of the species polygon. For this strategy large mammals include Koala and Black-striped Wallaby, medium mammals include the Rufous Bettong, and small mammals include the Eastern Pygmy-possum and Pilliga Mouse. Details of dedicated culverts are provided in Appendix C.

Following the assessment above, at least 51 dedicated culverts are proposed in the Pilliga forests. The proposed locations are shown in Appendix B. These dedicated culverts are included in the mitigation assessment for prescribed impacts. Fauna furniture relevant to the target species would be included. The final number, size and locations of dedicated structures would be confirmed during detailed design and detailed in the Final Fauna Connectivity Strategy, with an aim to increasing the total number of dedicated culverts to further improve connectivity. These would be located in key habitat areas and where there are few combined drainage structures or suitable bridges.

Dedicated culverts targeting the Koala would be included in the areas mapped as having generational persistence. These areas are located in the south-western portion of the Pilliga (Baradine Creek to Etoo Creek area) and in the north-east of the Pilliga. Dedicated Koala culverts would have appropriate fauna furniture, including horizontal logs and refuge poles. These dedicated culverts would also provide crossing opportunities for a range of other terrestrial and arboreal species. Other large culverts would also include similar fauna furniture to encourage movement of other arboreal fauna. An example of a dedicated Koala crossing with fauna furniture is shown in Photo 1.

Photo 1 Dedicated Koala culvert with fauna furniture under the Pacific Highway at Glenugie

Dedicated culverts targeting the Rufous Bettong, Eastern Pygmy-possum, Black-striped Wallaby, and Pilliga Mouse would be located throughout the Pilliga within the species polygons or areas of suitable habitat. Culverts would have natural substrate and contain a variety of fauna furniture, depending on their size. Lift-holes in any larger dedicated culverts (eg for the Koala or macropods) should be left unsealed as microbats are known to roost in these features. This would replace some lost roost habitat for these species in the proposal site.

Fauna furniture (such as horizontal wooden poles) is recommended at dedicated culverts in the Pilliga area to encourage movement of Koalas and other climbing fauna. This would mainly be culverts near larger waterways, as well as to provide connectivity elsewhere in the Pilliga where fewer bridges are included in the design. Low wooden horizontal poles are proposed for medium sized culverts. Small logs placed on the floor of the culvert or attached to the base of the culvert walls are recommended to encourage movement of the Pilliga Mouse and other small terrestrial fauna (similar to those constructed for the Mountain Pygmy-possum). Small rocks could also be included and some debris such as leaves and sticks allowed to accumulate to encourage use of these culverts. Fauna furniture is also recommended elsewhere in the alignment where larger patches of native vegetation are present either side of the culvert. A summary of fauna furniture options for various culvert heights is provided in Table 6. Different options are relevant to different culverts, depending on habitat values and target fauna. Proposed treatments are detailed in Appendix C.

Table 6 Fauna furniture recommendations

Culvert height	Proposed furniture	Target fauna
900 mm	Low ledge, timber and rocks to be included	Small terrestrial mammals
1200 mm	Low ledge, timber and rocks to be included	Small terrestrial mammals Insectivorous bats
1500 mm	Low ledge to be included AND/OR	Small terrestrial mammals Insectivorous bats
	Low timber log to be attached	Small terrestrial mammals, scansorial mammals Insectivorous bats
1800 mm	Low ledge to be included in outside culverts AND/OR	Small terrestrial mammals Wallabies Insectivorous bats and birds
	Low timber log to be attached to outside culvert(s)	Small terrestrial mammals, scansorial mammals Wallabies Insectivorous bats and birds
	Timber poles and logs to be fitted to outside culvert(s) around 1300 mm or higher	Scansorial and arboreal mammals (eg Koala) Wallabies Insectivorous bats and birds
2400 mm	Low ledge to be included in outside culverts AND/OR	Small terrestrial mammals Wallabies and kangaroos Insectivorous bats and birds
	Low timber log to be attached to outside culvert(s)	Small terrestrial mammals, scansorial mammals Wallabies and kangaroos Insectivorous bats and birds

Culvert height	Proposed furniture	Target fauna
	Timber poles and logs to be fitted to outside culvert(s) around 1500 mm or higher	Scansorial and arboreal mammals (eg Koala) Wallabies and kangaroos Insectivorous bats
3000 mm 3300 mm	Low ledge to be included in outside culverts AND/OR	Small terrestrial mammals Wallabies and kangaroos Insectivorous bats and birds
	Low timber log to be attached to outside culvert(s)	Small terrestrial mammals, scansorial mammals Wallabies and kangaroos Insectivorous bats and birds
	Timber poles and logs to be fitted to outside culvert(s) around 1500 mm or higher	Scansorial and arboreal mammals (eg Koala) Wallabies and kangaroos Insectivorous bats and birds

Revegetation at the approaches to dedicated culverts would also assist with increasing the efficacy of these structures for connectivity while reducing predation risk.

The overarching connectivity strategy for Inland Rail (see section 4.3.1) recommends fencing 500 metres either side of culverts to direct fauna to the crossing location. Lengths of fencing should be further investigated in the Final Fauna Connectivity Strategy to allow a balance between fenced and unfenced sections, and the associated barrier effect of fencing, as well as to take into account risk of flooding and damage.

No artificial lighting should be located along the rail corridor within at least 200 metres of the dedicated underpasses.

4.2.3 Combined drainage/fauna underpasses

Background

Combined culverts are constructed to maintain water flow, encourage the movement of aquatic animals and allow terrestrial fauna movement (VicRoads 2012). A dry ledge or similar structure can provide safe passage for terrestrial fauna species (VicRoads 2012).

Culverts have been shown to be used by a wide variety of fauna groups. At Compton Road, Brisbane, 16 species were found to use underpasses. The most abundant tracks were from small mammals (probably rodents), followed by lizards. About a third of tracks recorded were along shelves installed in the underpasses to provide raised passage (Bond and Jones 2008). During large monitoring projects for Brunswick Heads to Yelgun Pacific Highway Upgrade and Bulahdelah to Coolongolook upgrade many species were recorded using box culverts including a variety of mammals (wallabies, kangaroos, bandicoots, possums, antechinuses, cats, dogs, foxes, echidnas, bats, and rodents), reptiles (skinks, goannas, dragons and snakes), many bird species and the Cane Toad (AMBS 2001, AMBS 2002). Rufous Bettongs have been clearly identified using culverts during surveys for the Glenugie upgrade (RMS 2014). Fauna underpass monitoring for the Bulahdelah to Coolongolook project identified a Tiger Quoll using a box culvert (AMBS 2001).

Proposed structures

Culverts for the proposal typically match the width of the top of formation (not the entire earthworks width). Most culverts will be seven metres wide (perpendicular to the rail), but culverts beneath crossing loops will be around 16 metres wide. This distance is well within the distance fauna will travel through culverts (which are often used successfully under multi-lane highways) and provide a suitable relative aperture. Of the almost 600 drainage culverts included in the design, 280 culverts have been identified that should include raised ledges (see Appendix C). Many culverts comprise multiple cells (up to 32 cells, at an average of 5.4 cells per location). Dry ledges are proposed for the outside cells of all 'combined' drainage and fauna passage multicell culverts throughout the Pilliga and Bohena Creek areas, as well as other locations where better quality habitat is present either side of the culvert. Combined culverts would be dry most of the time as most drainage lines are subject to ephemeral flows only. Lift-holes in large culverts should be left unsealed as microbats are known to roost in these features. This would replace some lost roost habitat for these species in the proposal site. Potential combined culverts are mapped in Appendix A.

4.2.4 Incidental fauna underpasses

Three hundred culverts are included in the design that are less likely to provide crossing opportunities for fauna, mainly due to their small size and/or lack of native vegetation and may only provide incidental passage for some species (see Appendix B and Appendix C). Incidental culverts may still provide some connectivity for fauna as culverts would be dry the majority of the time as most drainage lines in the region are subject to ephemeral flows only. As such, connectivity opportunities will be maintained to some degree along much of the alignment. 92 drainage culverts are considered to have potential to provide connectivity for the Pale-headed Snake due to preference of this species for riparian areas. Some additional culvert locations assessed as unsuitable for dedicated culverts due to flooding may be considered for installation in order to provide connectivity when not subject to flooding. These latter culverts are not included in the mitigation assessment for prescribed impacts.

4.2.5 Canopy bridges and glider poles

Background

Canopy bridges provide for genetic connectivity, dispersal movements and home range movements of arboreal species such as possums and gliders (VicRoads 2012). Canopy bridges can be used by non-gliding arboreal fauna, such as the Brush-tailed Phascogale, Antechinus species, and possums (Sandpiper Ecological Surveys 2013), as well as gliders including Squirrel Gliders and Feathertail Gliders. Quick uptake of a canopy bridge near Busselton was recorded for Western Ringtail Possums (Yokucki and Bencini 2015).

Vertical glider poles have been used to provide connectivity for gliders across roads and cleared areas by enabling gliders to cross large roads which create forest canopy gaps that are beyond their glide capacity (Sandpiper Ecological Surveys 2014). In road situations these have been placed in the centre median, on the road verge or on overpasses provide gliders with intermediate landing points and/or multiple launch opportunities (TMR 2010). In the rail situation, these would be placed in the rail verge or on bridges (potentially as part of the pole barriers for aerial species).

Squirrel Gliders were frequently recorded utilising glider poles at Compton Road, Brisbane, within a year of construction. This species was recorded at sites at this location where they had not previously occurred, likely as a result of the glider poles providing connectivity (Robinson-Wolrath 2007, in TMR 2010). Squirrel Gliders were shown to use poles within a 70 metre clearing to traverse agricultural land between two forest patches (Ball and Goldingay 2008).

Monitoring of wildlife road crossing structures by Soanes et al. (2013) found the rate of glider crossing increased over several years as animals habituated to the structure.

Canopy bridges may be preferred to glider poles as they provide crossing opportunity for a greater range of species and use by several glider species has been confirmed in a highway setting (Goldingay et al. 2013). Canopy bridges also provide greater flexibility as they can be designed to fit the forest gap and ae therefore suitable at locations where gliding poles would be too far apart (Sandpiper Ecological Surveys 2014).

Proposed structures

Canopy bridges are recommended at 67 locations along the alignment, with the majority in the Pilliga forests. Canopy bridges are also proposed at major river crossings and other large creek crossings, if there is suitable height above the waterway (see Appendix B and Appendix C). The precise locations would be determined during detailed design as part of the Final Fauna Connectivity Strategy, and would take into account locations of suitable trees for attaching ropes to.

No glider poles are proposed as much of the rail corridor is at or beyond the gliding distance of the Squirrel Glider, there is a high risk of mortality due to double-stacked containers on trains, and glider poles only benefit this species.

4.2.6 Barrier poles or mesh fencing

Background

Bridges can represent a risk for flying species as they tend to cross above them. Bridges can be flanked by barrier poles to ensure safe passage for aerial species well above moving rail traffic (Zuberogoitia et al. 2015). These structures have been successful in reducing bird mortality in Florida (Bard et al 2002). Alternatively, mesh fencing may be preferred in some locations.

Proposed structures

The use of barrier poles or mesh fencing should be investigated for the larger creek crossings in the Pilliga (see Appendix B), however additional bridges may need to be fitted with these measures in response to the results of the proposed ongoing monitoring of wildlife-train collisions. Barrier poles would need to be higher than maximum train height, and would be set at regular intervals along either side of the bridge where the main gap in vegetation (ie the flyway) is located. Barrier poles are recommended at the following locations:

- Baradine Creek (bridge length over 200 metres long)
- Coolangala Creek (bridge length over 60 metres long)
- Etoo Creek (bridge length over 300 metres long)
- Rocky Creek (bridge length over 100 metres long)
- Mollieroi Creek (bridge length over 90 metres long)
- Goona Creek (bridge length over 50 metres long).

Poles at either end of these bridges could be taller and be fitted with launch platforms to provide crossing opportunities for gliders, as long as poles are high enough to prevent mortality of gliders through train-strike when attempting to cross the rail line. Alternatively, poles may need to be fitted with metal sleeves to prevent use by gliders, or mesh fencing installed.

The effectiveness of this measure for birds should be monitored by comparing fauna mortality at bridges where there are no barriers poles or mesh fencing.

4.2.7 Removal of ballast

Background

Removing the ballast (gravel) below pairs of sleepers to create a gap has been used to allow small vertebrates, like spotted turtles (*Clemmys guttata*) in the USA, to cross under the sleepers (Pelletier et al. 2006). This method may have relevance to movement of small fauna such as the Pilliga Mouse.

Proposed structures

This measure should be considered for sections where there are larger distances between culverts, with a particular focus on areas of habitat for the Pilliga Mouse.

4.2.8 Alarm calls

Background

Devices that reduce wildlife-train collisions without having barrier effects provide an innovative alternative to traditional connectivity measures. For example, a Canadian study found trains equipped with ultrasonic warning were involved in fewer moose fatalities than those without (Muzzi and Bisset 1990). More recently, Babińska-Werka et al. (2015) reported the development of a device in Poland that uses alarm calls from several wild animals in advance (30 seconds to 3 minutes) of an oncoming train that allows animals near the railway to react and escape in a natural way. The proportion of wildlife escaping from the tracks was higher, and individuals reacted faster, when the device was switched on and, importantly, animals did not show evidence of habituation to the warning signals (Babińska-Werka et al. 2015). Fox et al (2018) have tested the use of virtual fences in Tasmania at reducing road-kill. These virtual fences consisted of an electronic system that generates sound and light stimuli when activated by the headlights of approaching vehicles. This study found the total roadkill rate reduced, and there was a reduction in roadkill of 50 percent for the most common species, although Coulson and Bender (2019) noted issues with the study design. Currently, alarm calls are not recommended for preventing wildlife strike (D'Angelo and van der Ree 2015).

Proposed use

The use of train warning devices in the Pilliga is not recommended as part of the connectivity strategy. This is because there is only limited support for the efficacy this method. It is likely that some fauna would habituate and develop tolerances to the noise, while the noise may adversely affect others (such as some foraging microbats). In addition, maintenance costs have not been explored. There are risks of lasers (which trigger the alarm calls) being impeded by growth of vegetation, requiring regular clearing maintenance, as well as risk of loss and damage to items due to the ease of access to the rail corridor in the Pilliga.

4.2.9 Recommendations

The Final Fauna Connectivity Strategy will identify the type and location of all connectivity structures included in the detailed design of the proposal. Details of proposed fauna furniture will also be included. These features will be included in relevant design drawings for construction and the vegetation rehabilitation plan.

4.3 Supporting measures

4.3.1 Fencing

Background

Fencing is used to minimise mortality of fauna as a result of vehicle strike, and to funnel fauna to crossing structures. Fauna crossings work most effectively where they are installed in conjunction with barrier fencing as this stops animals getting on to the rail line and funnels them to crossing points.

Several studies have tested fencing to prevent animal crossings of railways. These can reduce wildlife-train collisions but, on the other hand, they can increase barrier effects (eg, Ito et al. 2005, 2008, 2013). Thus, they should only be implemented in areas of high concentration of wildlife-train collisions and, combined with wildlife passes to maintain railway permeability (van der Grift 1999).

Proposed locations

Fauna fencing is recommended at dedicated fauna culverts and may also be used at some combined culverts and bridges. The type of fencing at each location will need to take into consideration the following factors:

- land use
- property access requirements
- flooding risk
- fauna species of concern
- specific purpose (ie prevention of fauna access to roads, directing fauna into connectivity structures etc)
- maintenance considerations
- cost-effectiveness
- topography
- vegetation.

In agricultural land the rail corridor would be fenced to prevent mortality of stock. This may minimise mortality of fauna species such as kangaroos and emus, however these animals can cross stock fences and may still be subject to injury and mortality through train strike.

Fauna fencing is proposed at bridges and dedicated culverts in the Pilliga to direct fauna to these crossing locations. Fencing would extend 500 metres either side of bridges and outer culvert cells. Where there are multiple bridges and culverts close together, the length of fencing may need to be varied. Lengths of fencing should be further investigated in the Final Fauna Connectivity Strategy to allow a balance between fenced and unfenced sections, minimise the associated barrier effect of fencing and take into account flooding risk and damage.

Koala exclusion fencing, such as floppy top fencing or metal sheets (Queensland-style Koala fence) (see Plate 1), may be recommended in some locations to prevent Koalas from climbing over fences. Fence ends should angle away from the rail corridor to encourage fauna to move towards vegetation.

Stock fencing would be used in parts of Cumbil State Forest and Baradine State Forest where stock is used to manage regrowth and fuel loads. Use of barbed wire in the Pilliga should be avoided if possible, or plain wire is to be used for the top and bottom strand to reduce injury to fauna.

Complete fencing of the rail line in the Pilliga is not recommended. This is due mainly to the low train traffic rate, which is proposed to be an average of 10 trains per day (both directions) in 2026, increasing to about 14 trains per day (both directions) in 2040. The increased negative barrier effect that would be caused by fencing would outweigh the potential reduction in train strike mortality.

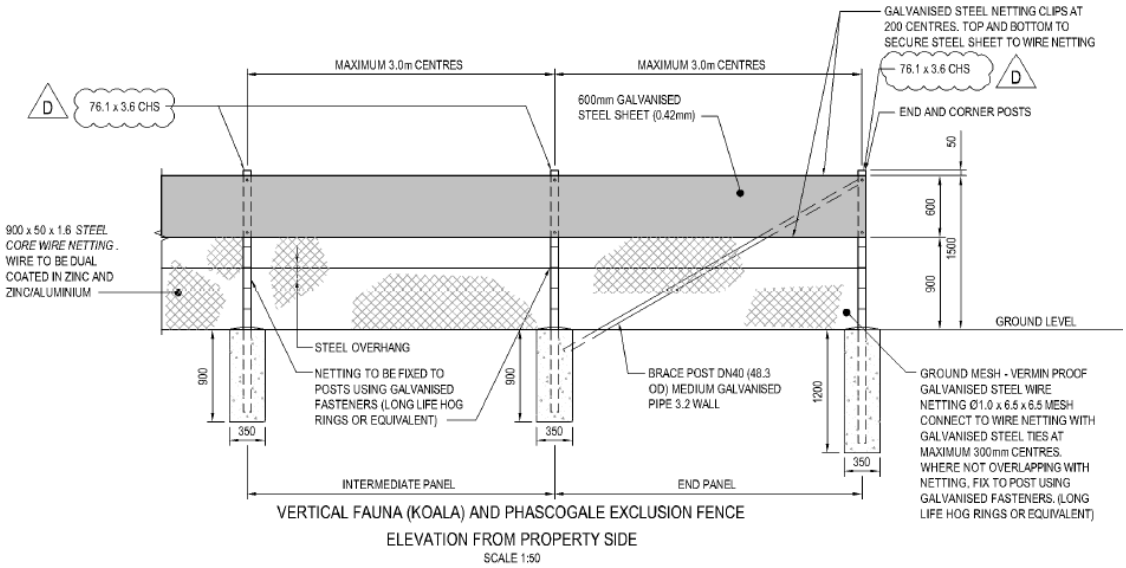

Plate 1 Example of fauna fencing with metal sheeting used in the Woolgoolga to Ballina Pacific Highway Upgrade (Pacific Complete 2016)

4.3.2 Landscaping

The goal of landscaping is to maintain connectivity and encourage fauna use of crossing structures. ARTC's landscape design specification notes that development within ecologically sensitive landscapes should consider the existing flora and fauna and take opportunities to enhance the quality of habitat for species within the rail corridor through rehabilitation (ARTC 2021).

Rehabilitation will be particularly important in the Pilliga forests, larger areas of connected vegetation along the alignment, and at riparian corridors, as these are the main areas where connectivity for fauna will be retained or encouraged. Rehabilitation within the corridor in areas of connected vegetation and leading to dedicated culverts would encourage fauna to utilise the habitat provided and assist with reducing the impact of the cleared gap. Rehabilitation could increase the risk of mortality from train strike by encouraging species into the rail corridor, however the benefits of increased connectivity are considered to outweigh this risk. Rehabilitation at riparian corridors must also take into account flooding risk and potential damage.

The following guidelines should be taken into consideration in the vegetation rehabilitation plan:

- Revegetation near dedicated crossings, combined crossings and bridges must be commenced as soon as practicable after clearing of existing vegetation and construction of the structure.
- Habitat linkages will be included in the operational corridor with a focus on the Pilliga forests and other areas of connected vegetation where feasible and consistent with the safe operation and maintenance of the railway. Linkages would involve retention or rehabilitation of groundcovers, low shrubs and coarse woody debris to provide landscape connections between larger areas of established vegetation. These habitat linkages aim to

minimise the area of unvegetated land in the operation corridor, and encourage movement of small woodland birds and terrestrial mammals. Rehabilitation should use flora species typical of the adjacent vegetation and include key fauna food resources to encourage fauna use either side of the structure and thus provide habitat linkages to the structure and reduce predation risk.

- Habitat linkages are to be commenced as soon as practicable in areas where the rail line is at grade, near or below grade, to encourage movement of woodland birds across the rail corridor. Revegetation where the rail line is located on an embankment may follow later, unless a dedicated underpass is present.
- Entrances to combined and dedicated culverts should not be obscured.
- Riparian groundcover species should be planted in the riparian corridor under bridges (subject to suitability) to encourage movement of fauna in these areas.
- Tree planting is to be undertaken in the Pilliga and other forested areas where the construction footprint is larger than the operational footprint, in order to minimise gap in the canopy (eg site compounds etc). This is to occur as soon as construction is completed in that location and extraneous areas are no longer required in order to minimise the lag between impact and mitigation.

4.3.3 Recommendations

The Final Fauna Connectivity Strategy will identify the type and location of fauna fencing and appropriate vegetation rehabilitation included in the detailed design of the proposal. These features will be included in relevant design drawings and rehabilitation plans for construction.

4.4 Flooding risk

4.4.1 Context

The concept design for the proposal was developed to meet specific flood immunity criteria and flood management objectives. All bridges and culverts in the proposal are designed to achieve a minimum flood immunity level above the 100 year average recurrence interval (ARI) flood level. An assessment of flooding risk was undertaken for all structures proposed for drainage as part of the EIS (JacobsGHD 2020).

The inclusion of fauna furniture in combined drainage structures and beneath bridges has the potential to result in blockage, and damage to fauna furniture and efficacy of drainage structures. Dedicated fauna underpasses are expected to achieve dry passage as they are not located on drainage lines or basins and are not likely to be at risk from flooding. Fauna furniture in these locations would improve opportunities for movement of fauna.

4.4.2 Recommendations

A detailed assessment of flooding risk associated with combined culverts and bridges with fauna furniture would be undertaken during preparation of the Final Fauna Connectivity Strategy. The following options would be investigated:

- ensure combined culverts will be dry in a 20% AEP flood event to minimise risk of damage to fauna furniture
- oversizing of selected drainage structures from the hydrological requirements to accommodate fauna connectivity while not exacerbating flooding risks. Inclusion of fauna furniture is also recommended in these structures
- the placement of additional dedicated culverts away from drainage lines and basins to prevent flooding risk.

4.5 Maintenance

Fauna connectivity structures would need to be maintained for the life of the proposal. Regular monitoring of structural integrity and management of debris would need to be undertaken. Where necessary, structures would need to be replaced. Further discussion of maintenance is provided in section 6.6.

5. Fish passage

5.1 Key fish habitat

The proposal crosses three major waterways, the Macquarie River, Castlereagh River, and Narrabri Creek/Namoi River. In addition, the proposal crosses 12 non-perennial major creeks and 26 non-perennial minor creeks. The majority of watercourses are intermittent with the exception of the Macquarie River and Narrabri Creek/Namoi River, which are permanently flowing.

Table 7 lists the areas of key fish habitat within/around the proposal site. These are areas classified as class 3 (minimal key fish habitat) or above in accordance with *Policy and guidelines for fish habitat conservation and management* (DPI 2013). Watercourses have been ordered from north to south and categorised into catchments.

The Macquarie River and Narrabri Creek/Namoi River floodplain would be crossed by viaducts, ensuring fish passage in these areas. The majority of other key fish habitat would be crossed by bridges, ensuring continued fish passage in these areas. Small, ephemeral waterways would be crossed by culverts, often as multiple cells, allowing for flows during rain events. No monitoring of aquatic species is proposed. Maintenance of culverts would be undertaken as necessary (see section 6.6).

Table 7 Key fish habitat

Watercourse	Strahler stream order	Potential for threatened species (dpi, 2016)	Habitat sensitivity type (dpi, 2013)	Classification of watercourse for fish passage (dpi, 2013)	Crossing structure
Namoi River catchment					
Narrabri Creek	Ninth order	Yes	Type 1 - Highly	Class 1 - Major	Viaduct
Namoi River	Ninth order	Yes	Type 1 - Highly	Class 2 - Moderate	Viaduct
Bohena Creek	Sixth order	Yes	Type 1 - Highly	Class 2 - Moderate	Viaduct
Bundock Creek	Second order	No	Type 3 - Minimally	Class 3 - Minimal	Bridge
Goona Creek	Third order	Yes	Type 1 - Highly	Class 2 - Moderate	Bridge
Tributary of Black Creek	Second order	No	Type 3 - minimally	Class 3 - Minimal	Culvert
Black Creek	Third order	No	Type 3 - minimally	Class 3 - Minimal	Culvert
Mollieroi Creek	Fourth order	Yes	Type 1 - Highly	Class 2 - Moderate	Culvert
Coghill Creek	Fourth order	Yes	Type 1 - Highly	Class 2 - Moderate	Bridge
Talluba Creek	Third order	No	Type 3 - minimally	Class 3 - Minimal	Bridge
Tinegie Creek	First order	No	Type 3 - minimally	Class 3 - Minimal	Bridge
Rocky Creek/ Pine Creek	Fourth order	Yes	Type 1 - Highly	Class 2 - Moderate	Bridge
Stockyard Creek	Third order	No	Type 1 - Highly	Class 2 - Moderate	Bridge

Watercourse	Strahler stream order	Potential for threatened species (dpi, 2016)	Habitat sensitivity type (dpi, 2013)	Classification of watercourse for fish passage (dpi, 2013)	Crossing structure
Etoo Creek	Fifth order	Yes	Type 1 - Highly	Class 2 - Moderate	Bridge
Cumbil Forest Creek	First order	No	Type 3 - minimally	Class 3 - Minimal	Bridge
Coolangla Creek	Third order	No	Type 3 - minimally	Class 3 - Minimal	Bridge
Baradine Creek	Sixth order	Yes	Type 1 - Highly	Class 2 - Moderate	Viaduct
Tenandra Creek	Fourth order	No	Type 3 - minimally	Class 3 - Minimal	Bridge
Castlereagh River catchment					
Gulargambone Creek	Fifth order	Yes	Type 1 - Highly	Class 2 - Moderate	Bridge
Castlereagh River	Seventh order	Yes	Type 1 - Highly	Class 1 - Major	Bridge
Macquarie-Bogan catchment					
Kickabil Creek	Fourth order	No	Type 1 - Highly	Class 2 - Moderate	Bridge
Emogandy Creek	Fourth order	No	Type 1 - Highly	Class 2 - Moderate	Bridge
Ewenmar Creek	Fourth order	No	Type 2 - Moderately	Class 2 - Moderate	Bridge
Macquarie River	Ninth order	Yes	Type 1 - Highly	Class 1 - Major	Viaduct
Backwater Cowal	Wetland depression	Yes	Type 1 - Highly	Class 2 - Moderate	Culvert

6. Monitoring

6.1 Approach

The objective of the monitoring program is to assess the effectiveness of the various designs of fauna connectivity structures to facilitate movement of target species and thus help to maintain stable populations. The monitoring program should be **SMART**: Specific, Measurable, Achievable, Realistic, and Timely.

Monitoring impacts on threatened species is hampered by the following:

- Detectability: Cryptic or rare species are difficult to observe and therefore difficult to obtain enough information to gain meaningful results. Detection variability, including seasonal variation has the potential to bias estimates and make it more difficult to detect trends in the data. Therefore detectability must be considered and accounted for when analysing results of a monitoring program.
- Environmental responsiveness: species that have variable movement patterns or irruptive behaviour are difficult to monitor because it is difficult to predict where the animals are to obtain a count, and difficult to know if variability in counts is due to true changes in the population or simply a result of the movement of portions of the population.
- Environmental and climatic variability: high variation or noise in monitoring results will diminish the ability to detect and estimate trends.
- Bias: bias in monitoring methods used can cause monitoring programs to reach false conclusions regarding the trajectory of those population changes (Freegard and Williams 2009).

Appropriate monitoring is required for the proposal in order to measure the efficacy of the crossing structures and to collect useful information on impacts on wildlife populations to allow adaptive management responses to be developed.

Surveillance monitoring in conservation typically involves a two-step process: identification of population declines via statistical tests, followed by either implementation of active management actions or further studies. This approach to monitoring can be inefficient and ineffective due to the issues with statistical testing, time lags between the development occurring and the impact being detectable, costs and resource availability, and the ability to identify the cause of decline (Lindenmayer et al 2013).

Pilot surveys that estimate spatial and temporal variation in wildlife activity should occur before the monitoring is designed as these surveys can yield long-term benefits in efficiency by identifying appropriate sampling frequency and duration (Smith and van der Ree 2015). Sampling frequency and duration will be affected by the level of variation in the data. It is possible to reduce variability by estimating detectability, thus providing more accurate population estimates. Statistical power would be maximised by increasing sampling frequency and duration. The use of barrier poles or mesh is also recommended as a pilot study (see section 6.4.4).

It is recommended that threatened species management plans for key species or groups be prepared as the first step to develop the details of the monitoring program (see section 6.2). This will enable the most recent scientific research and modelling and monitoring techniques targeted to each key species or group to be drawn together with input from relevant technical experts. These threatened species management plans would then be used to directly inform the Final Fauna Connectivity Strategy.

Monitoring is likely to comprise a combination of remote cameras, occupancy modelling, eDNA surveys and other methods. A before-after-control-impact (BACI) survey design is recommended whenever possible, and monitoring is also recommended during construction. Adequate data needs to be collected in the 'before' phase at both control and impact sites, in order to ensure meaningful baseline data is obtained. Further details on proposed monitoring methods is provided in section 6.3 and monitoring phases in section 6.4. These will be developed further in the threatened species management plans and Final Fauna Connectivity Strategy.

6.2 Preparation of threatened species management plans

Threatened species management plans would be prepared for key threatened species or groups identified in Table 8. These management plans would include monitoring of the following:

- the use of the fauna connectivity structures
- impacts on occupancy or population size and structure
- train-strike
- habitat variables.

Potential monitoring techniques are included in Table 8 and their use investigated further during the development of the Final Fauna Connectivity Strategy. The management plans would outline the goals, frequency, performance thresholds and corrective actions for the above (as relevant to individual species). The threatened species management plans and monitoring approaches will be developed further in consultation with BCS and would be documented in the Final Fauna Connectivity Strategy delivered as a condition of consent.

Table 8 Key threatened species, crossing structures and monitoring methods

Species	Location	Use of crossing structures	Population/occupancy monitoring
Koala	Pilliga Newell Highway	Underpasses with Koala furniture Bridges (remote cameras)	eDNA sampling from fox and Koala scats Detector dogs or thermal drone surveys Distance sampling Occupancy modelling
Macropods (Black-striped Wallaby, Rufous Bettong)	Pilliga	Underpasses Bridges (remote cameras)	eDNA sampling Occupancy modelling
Pilliga Mouse and Eastern Pygmy-possum	Pilliga	Culverts, bridges (remote cameras, hair tubes)	eDNA sampling Occupancy modelling Nest boxes (Eastern Pygmy-possum)
Squirrel Glider	Pilliga	Glider poles Canopy bridges (remote cameras, hair tubes)	eDNA sampling Occupancy modelling Nest boxes
Owls	Pilliga	Barrier poles/mesh fencing (thermal video cameras)	Acoustic recordings (Songmeter/Anabat Chorus)

Species	Location	Use of crossing structures	Population/occupancy monitoring
Microbats	Pilliga	Barrier poles/mesh fencing, underpasses (remote cameras, thermal video cameras, Anabats)	Acoustic recordings (Songmeter/Anabat Chorus) Occupancy modelling
Woodland birds	Pilliga	Underpasses Bridges (remote cameras)	Acoustic recordings (Songmeter/Anabat Chorus) Transect surveys Occupancy modelling
Pale-headed Snake	Pilliga	Underpasses Bridges (remote cameras)	eDNA sampling Occupancy modelling

6.3 Monitoring methods

The following section provides an overview of likely monitoring methods that would be employed as part of the final strategy. The suitability and applicability of each monitoring method for each of the key species or groups would be confirmed in the threatened species management plans prepared for each species.

6.3.1 BACI design

BACI (Before/After and Control/Impact) sampling is widely used in investigations of environmental impacts on mean abundance of a population. The principle is that an anthropogenic disturbance in the “impact” location will cause a different pattern of change from before to after it starts compared with natural change in the control location (Underwood 1992). A BACI monitoring program remains one of the best models for environmental effects monitoring programs, however requires that adequate pre-impact data are collected, and that appropriate control sites are selected (Smokorowski and Randall 2017). Also, any location-specific temporal difference that occurs between the two locations may be interpreted as an impact even if it has nothing to do with the human disturbance. Alternatively, abundance in the single control location may independently change in the same direction, concealing the effects of an impact (Underwood 1992).

In BACI design, success can be defined as showing similar or better outcomes (eg trends) at impact sites compared to control sites. This avoids the need for absolute targets, which may not be feasible if landscape level factors exert a strong influence. Using a criterion such as no change in population numbers may not be realistic given populations naturally fluctuate in size, which is why the BACI design is useful. By testing and ranking various models (eg with and without experimental treatment as a factor), it can be possible to determine whether the proposal has had impacts on population size, survival, movement rates, and occupancy. The threshold criteria becomes observing similar trajectories for these variables by regression and/or ranking models without the experimental treatment higher than those that include it. This is essentially the same whether individual mark-recapture or occupancy models are used. Mark-recapture models for BACI study designs using a multi-state model (to account for the sampling of multiple control and impact sites) have previously been used for Squirrel Gliders on the Hume Freeway.

These issues are particularly pertinent to the proposal. Given that a number of the key fauna species are likely to occur in low densities, and that fauna species may go through changes in abundance and distribution in the Pilliga as a result of other factors, including climate change, logging, wildfire, and drought, accurate measurements of population abundance before and after construction of the rail line will be difficult. Adequate replication of impact and control sites is likely to overcome issues with independence.

6.3.2 Occupancy and population modelling

Monitoring long-term trends in occupancy, abundance, or demography provide some of the most useful data for the conservation planning process to prioritise and assess the vulnerability of wildlife species (Rosenberg et al, 2017). However, population trends without reference to monitoring objectives have limited utility for evaluating species responses to conservation and management (Nichols and Williams, 2007). Population density or abundance metrics are essential for wildlife conservation and important for estimating the effect of management actions on wildlife species (Nichols and Williams, 2007; Smith et al, 2013). Estimating detection function can also reduce variability in census data (because it controls for one source of variance), which increases statistical power.

The suitability of an area as habitat for a species is influenced by local- and landscape-level variables, and data from both spatial scales are usually required to evaluate the direct and indirect effects of linear infrastructure (Smith et al 2015). For species with low detection probabilities, it may be more feasible to do occupancy modelling (which would provide a detection estimate for a habitat patch). Occupancy models enable the estimation of the probability of occurrence of a species among sampled sites, while exploring hypotheses about factors that may influence the species' occurrence, such as microhabitats, environmental conditions, etc. Occupancy models estimate the probability that a species occurs in a grid cell, while accounting for variation in detectability. Habitat patches (ie. survey sites) can also be considered 'states', providing a way to incorporate multiple patches into the same model.

Survey effort will be an important consideration for the Pilliga, given the large area of habitat the proposal would cross. Use of nest boxes, remote cameras, eDNA and detection dogs may provide appropriate presence/absence data for input to occupancy modelling for some species. Increasing total sampling effort generally decreases error associated with the occupancy estimate but changing the number of sites or sampling duration can have very different results, depending on whether a species is spatially common or rare and easy or hard to detect when present (Shannon et al 2014). These factors will need to be considered when developing the survey design. If the goal of the study is to estimate the occupancy of a rare species that is difficult to detect, it may be necessary to employ multiple methods (Shannon et al 2014).

Various survey methods may be able to be used for species with a higher detectability. Individual capture data can be used with marked individuals in mark-recapture analysis.

Data from surveys may also be used for various other studies. For example, data could be used to estimate changes in survival, which may show something different to abundance, eg if there is high population turnover, a population may remain constant even though survival is low. Collecting age/sex data where possible is useful as changes in demographic structure can precede changes in population size (eg lack of juveniles indicating reproductive failure), thus providing an earlier signal of negative outcomes. Mark-recapture can also provide estimates of survival rates. This type of information is also required in population viability analysis (PVA), and using local data where possible is advantageous, particularly for sensitive parameters (eg survival).

Distance sampling is a widely used technique for estimating the density of a population and may be suitable for Koala surveys in some areas. Using distance sampling (eg spotlighting or thermal imagery) can also provide a detection function.

6.3.3 Crossing structures

The use of connectivity structures would be monitored by infra-red cameras. Most structures would require cameras on each side to enable confirmation of successful crossings. The use of genetic studies can evaluate the success of road crossing structures for wildlife, and also guide their placement within the landscape (Soanes et al 2017) (for example as part of adaptive management).

Monitoring the effectiveness of structures is described in section 6.4.2. Multiple potential goals should be considered when selecting where crossing structures should be installed and when evaluating their success. Reinstating or continuing gene flow is rarely the only goal of mitigation (Soanes et al 2017). In addition, high use of crossing structures may not always be an indicator of success. Crossing structures may be used for more regular, home-range use reasons (which may entail frequent crossing, at least during certain periods, by an individual), but may also be used for occasional dispersal (which would be uncommon). Despite these two scenarios entailing very different use rates, they can both be considered "successful" if they achieve the required outcomes (ie. feeding and survival, and dispersal and gene flow).

In addition to monitoring usage of structures, monitoring of structural integrity would also be required. This is discussed further in section 6.6.

6.3.4 Environmental DNA

Collection of environmental DNA (eDNA) can be used for wildlife detection and population monitoring. eDNA can either be used to target one species at a time (a single species approach) or to detect many species at once (eg DNA metabarcoding). eDNA can be extracted from water, soil and scats (Smart et al 2015, Bohmann et al 2014). Multi-scale and multi-species occupancy models for the analysis of data resulting from eDNA metabarcoding have been developed that account for imperfect detection and additional sources of environmental and experimental variation (McClenaghan et al 2020). Statistical packages have been developed specifically for eDNA occupancy modelling (Dorazio and Erickson 2017). Collection of eDNA samples is recommended to occur prior to construction, to allow for a before-after-control-impact (BACI) sampling design (see section 6.3.1).

Collection of eDNA from waterbodies has been used in marine and freshwater systems. A citizen science project with the Landcare program investigating farm dam biodiversity in Victoria identified up to 27 bird species (both terrestrial and aquatic), 13 mammal species (including only two aquatic species), as well as frogs and turtles (EnviroDNA 2019). eDNA is being used as a key conservation tool for detecting and protecting the Platypus (*Ornithorhynchus anatinus*) in a number of locations around Australia (Hawke et al 2020).

Scat DNA metabarcoding has been found to provide a sensitive method of prey detection in predator scats (Thuo et al 2019). A study of DNA in fox scats in Victoria identified two fish species, one frog species, 13 mammal species and four reptile species, as well as identifying individual foxes (EnviroDNA 2021). The analysis of scat DNA must also account for the systematic bias in results to control for degradation of scats, feeding day, meal size and prey species consumed (Thuo et al 2019). The collection of predator scats (eg fox, dog, dingo) in the Pilliga may provide a useful method for occupancy modelling of cryptic species, as well as potentially providing population information on foxes themselves.

The application of DNA testing may also be investigated for other studies, for example nest box use and fauna furniture.

6.3.5 Train strike

Mortality of fauna through train strike should be monitored to feed into assessments of the effectiveness of crossing structures, fencing and revegetation. Train-kill fauna can be surveyed for along the rail line, and include control and impact sites as well as different treatments (eg fencing versus no fencing). Collision risks can also be modelled across geographic space with a conceptual analytical framework using existing sources of data, which may reduce the need for expensive or time-consuming field data collection (Visintin et al 2016).

6.4 Monitoring phases

Examples of recommended monitoring in each phase of the proposal are provided below. The monitoring approach and program will be developed further with inputs from the threatened species management plans and documented in the Final Fauna Connectivity Strategy, in consultation with BCS.

6.4.1 Pre-construction monitoring

Adequate pre-construction surveys and/or monitoring is required to gain baseline information on key species. Examples of monitoring or surveys to be considered include:

- Use of Koala detection dogs or thermal imagery in areas of generational persistence to further study existing population. Potential to also incorporate radio tracking and genetic studies.
- Use of thermal imagery to undertake targeted surveys for the Rufous Bettong and Black-striped Wallaby. Potential to also incorporate radio tracking and genetic studies once populations identified.
- Targeted trapping, cameras and/or hair tube surveys for the Rufous Bettong, Black-striped Wallaby, Squirrel Glider, Pilliga Mouse and Eastern Pygmy-possum to gain pre-construction distribution and population information. Genetic sampling can also be conducted at this time to feed into later studies.
- Camera grid surveys to target macropods. Results from these surveys can feed into occupancy modelling.
- Songmeter and Anabat surveys to get detailed baseline information on the use of creeklines and other habitat as flyways.
- Harp netting and radio tracking to identify microbat roost trees.
- Collection of eDNA from fox scats and waterbodies.

6.4.2 Effectiveness of connectivity structures and mitigation measures

Monitoring of fauna use of connectivity structures post-construction should consider the following:

- Monitoring use of structures using infra-red cameras. The use of glider poles, canopy bridges culverts and ballast tunnels would require cameras on each side to enable confirmation of successful crossings.
- Monitoring the effectiveness of fauna mitigation such as barrier poles and fencing.
- Monitoring of sections of the rail corridor in the Pilliga without crossing structures to determine how often fauna cross over the rail line. This may include methods such as infra-red cameras and sandplots.
- Monitoring of fauna mortality. This would require comparison of areas with and without fauna connectivity and mitigation measures.
- Radio tracking of fauna near the rail corridor. This may be suitable for species such as the Black-striped Wallaby, Rufous Bettong, microbats, Squirrel Glider, Koala and others.

- Genetic studies to assess gene flow following the construction of the rail line to determine if genetic exchange has continued to occur.

The threatened species management plans will identify the suitable methods and duration of this monitoring.

6.4.3 Population impacts

The barrier effect of the rail line in the Pilliga should be monitored following construction. This may include a combination of the following:

- DNA surveys (scats and waterbodies) to identify the presence of cryptic fauna.
- Occupancy modelling, based on eDNA results, remote cameras, detector dogs etc.
- Genetic assessments to assess population structure. Genetic sampling would be required prior to construction, and on-going sampling would be required to determine if the rail line has altered the population structures of threatened species.
- Collection of life history data where possible, for inclusion in population viability analysis (PVA).
- Computer simulations, such as PVA.
- Monitoring the impact of the rail line on resident fauna, such as small woodland birds.
- Monitoring the use of landscaping treatments to encourage movement of woodland birds and terrestrial mammals.
- Monitoring of wildlife-train collisions as part of the adaptive monitoring of fauna connectivity, and additional fencing may be required if high concentrations of wildlife-train collisions are recorded, including as train volumes increase.

The threatened species management plans will identify the suitable methods and duration of this monitoring.

6.4.4 Pilot studies

Pilot studies should be conducted to determine the effectiveness of newer technologies and untested methods. These studies would then feed into adaptive management, with successful methods to be employed elsewhere along the alignment. These would include:

- Removal of ballast (mainly within the Pilliga). Sandplots, hair tubes and/or remote cameras may be used to monitor the efficacy of this treatment for movement of small fauna such as the Pilliga Mouse.
- Effectiveness of barrier poles or mesh on bridges. Remote cameras, thermal cameras and/or Anabats would be used to monitor these treatments given the limited scientific literature related to this measure.

The threatened species management plans will identify the suitable methods and duration of this monitoring.

6.5 Indicators of success and triggers for corrective actions

Potential indicators of success and thresholds for adaptive management for crossing structures and population impacts are outlined in Table 9 and Table 10. These would be developed and refined further during the preparation of the threatened species management plans and in consultation with BCS, and summarised in the Final Fauna Connectivity Strategy. Note that both success criteria and corrective actions may both require refinement as a result of adaptive management.

Table 9 Example indicators of success and thresholds for monitoring of connectivity measures

Structure	Indicators of success	Thresholds for adaptive management	Corrective actions
Bridges and viaducts Combined culverts	Evidence of regular usage by general fauna (non-threatened species) within 1 year	No evidence of usage in defined timeframe	Review fauna furniture, fencing, and landscaping treatments. Provide enhancements if necessary
	Evidence of usage by Koalas at key locations (eg Etoo Creek) within 2 years	No evidence of usage in defined timeframe	Undertake further surveys to determine local population density, determine if more time is required, or additional measures required (revegetation etc)
	Use of crossings without fauna furniture by Koalas within 5 years	No evidence of usage in defined timeframe	Install fauna furniture if height/drainage requirements allow
	Use by cover-dependent species and species with low mobility (eg threatened woodland birds and insectivorous bats) within 2 years	No evidence of usage in defined timeframe	Review fencing and landscaping treatments. Provide enhancements if necessary
	Use by Pale-headed Snake within 2 years	No evidence of usage in defined timeframe	Undertake further surveys to determine local population density, determine if more time is required, or additional measures required (revegetation etc)
	Use by Black-striped Wallaby and Rufous Bettong within 2 years	No evidence of usage in defined timeframe	Undertake further surveys to determine local population density, determine if more time is required, or additional measures required (revegetation etc)
	Low usage by feral predators (eg less than 10 percent of fauna crossings)	Evidence of regular usage by feral predators (eg more than 10 percent of fauna crossings)	Targeted predator control as required
Dedicated culverts	Use of dedicated culverts by the Pilliga Mouse within 2 years or during population growth phase	No evidence of usage in defined timeframe	Undertake further surveys/assessment to determine local population density, determine if more time is required, or additional measures required (revegetation etc)

Structure	Indicators of success	Thresholds for adaptive management	Corrective actions
Glider poles and canopy bridges	Uptake by Squirrel Gliders (successful crossings) within 2 years of installation	No evidence of usage in defined timeframe	Undertake further surveys to determine local population occupancy, determine if more time is required, or additional measures required (eg additional structures etc)
	Evidence of crossing by other fauna (Sugar Gliders) within 1 year of installation	No evidence of usage in defined timeframe	Determine if more time is required, or additional measures required (eg additional structures etc)
	Evidence of genetic exchange across the rail corridor within 5 years of impact	No evidence of genetic exchange in defined timeframe	Installation of additional crossing structures
Barrier poles or mesh fencing	Low incidence of evidence of train strike of owls at bridges with this treatment	Similar incidence of train strike at bridges with this treatment compared to control sites	Review pole gaps or mesh design
	Evidence of changes in flight path observed, or evidence of bat activity under bridges	Birds or bats not observed flying over or under barriers	Investigate whether this treatment should be applied elsewhere
Removal of ballast	Successful crossings of small fauna recorded within 2 years	No successful crossings recorded	Investigate whether this treatment should be expanded on or terminated
Landscaping	Successful crossings of woodland birds and terrestrial mammals recorded within 2 years of rehabilitation	No successful crossings recorded	Investigate whether this treatment should be expanded on
Fencing	Low evidence of mortality from train strike within 500 metre crossing structures	Regular evidence of mortality from train strike	Review fencing requirements where mortality from train-strike is high
	Low evidence of mortality from train strike in areas with fencing	Regular evidence of mortality from train strike	Review fencing requirements where mortality from train-strike is high

Note that indicators of success of crossing structures would be developed during the preparation of the threatened species management plans.

Table 10 Example indicators of success and thresholds for monitoring of population impacts

Species	Indicators of success	Thresholds for adaptive management	Corrective actions
Various species	Occupancy modelling shows stable occupancy of populations at sites close to or away from rail corridor over five years	Occupancy modelling shows reduction in occupancy of sites close to the rail line over five years	Review opportunities for revegetation and habitat enhancement. Investigate whether natural factors may contribute to occupancy changes (eg post-fire succession)
Various species	eDNA data shows stable rates of species detection at sites close to or away from rail corridor over five years	eDNA data shows reduction in species detection of sites close to the rail line over five years	Review opportunities for revegetation and habitat enhancement. Investigate undertaking different studies.
Various species	DNA analysis shows stable genetics of populations on either side of the rail corridor over ten years	DNA analysis shows changes in population genetics on either side of the rail line	Review connectivity structures. Investigate options for retrofitting additional structures or improving usage of existing structures
Woodland birds	Surveys show effect of rail line on species diversity and abundance not detectable over 70 metres from the rail corridor	Surveys show rail line has a measurable change in species diversity and abundance up to 100 metres from the rail corridor	Review opportunities for revegetation and habitat enhancement
Feral animals	No increase in incidence along the rail corridor as compared to adjacent areas within two years	Increased detection of predators using the rail corridor as compared to adjacent areas	Increased baiting and other management actions

Note that indicators of success for population studies and occupancy modelling etc would be further developed during the preparation of the threatened species management plans.

6.6 Structural integrity

ARTC would maintain the connectivity structures for the life of the proposal as part of regular rail line maintenance. Monitoring of connectivity structures would focus on presence of blockages (culverts and bridges) and structural integrity (particularly relevant to canopy bridges and glider poles). Integrity of fauna furniture in dedicated underpasses would also be monitored, and wooden structures may require occasional replacement.

Three levels of inspections are typically carried out for highway structures and are considered appropriate for railway structures. These include the following:

- Level 1 inspection: A visual inspection to check the overall serviceability of the structure
- Level 2 inspection: Detailed visual inspections with condition assessments
- Level 3 inspection: Special inspections and investigations.

All inspections are to be carried out in a uniform and consistent manner in accordance with the relevant ARTC guidelines and practice. Requirements for maintenance work would be determined from inspection reports and incorporated into the ARTC Asset Management System documentation.

Frequency of monitoring would depend on structure type and risk of damage or blockage. A visual inspection of all connectivity structures should be undertaken on an annual basis as part of the standard railway maintenance inspection program or following severe weather events.

Bridges would normally have routine Level 1 maintenance inspections annually to determine if there are any issues that need to be remedied to keep the public safe. Any issues relating to fauna connectivity could be assessed at this time (eg bank erosion in dry passage areas, large woody debris blocking passage etc.).

Culverts would normally be inspected on a less frequent (or as required) basis, however it is recommended that combined and dedicated culverts are inspected at least annually. Routine (level 1) inspections should be carried out on all structures (bridges, culverts, glider poles, pole barriers) following reports of impact damage, or following flood events or bush fires. Wooden structures, such as fauna furniture within dedicated structures and canopy bridge supports, would also be inspected on an annual basis.

ARTC would conduct periodic inspections and maintenance of fencing along with general rail corridor asset maintenance. The program would include ongoing inspections of the structures as part of the standard maintenance requirements for stability and damage and replacement where necessary. Clearing of vegetation from exclusion fencing during these inspections may also be necessary. Checks of fencing integrity would also be carried out should threatened fauna roadkill be observed during operation. Data collected will also be used to help assess effectiveness of fencing.

Level 2 inspections would be carried out on a 5 to 10 year cycle or if issues are found during the Level 1 inspection. Level 2 inspections comprise detailed visual inspections where all components are inspected closely (within 1.0 metre). These inspections would involve the collection of quantitative data on structures for use in engineering analyses. Any issues relating to fauna connectivity should also be assessed during these inspections.

Level 3 inspections are not scheduled but may be required due to concerns over a structure's safety, condition, load capacity or for structures subject to complex associated repair, strengthening or widening works. Any changes to rail design in the future would require re-evaluation of fauna crossing structures.

7. Reporting and next steps

7.1 Preparation of management plans

The preparation of species-specific management plans for threatened fauna are required for construction and operation of the proposal. These would detail the relevant connectivity structures and measures and monitoring required at each phase for the key species.

7.2 Preparation of the Final Fauna Connectivity Strategy

A Final Fauna Connectivity Strategy would be prepared that would take into account the measures identified in the threatened species management plans, and the detailed design for the proposal. Liaison with the designers during detailed design is required to ensure appropriate location and number and type of fauna connectivity measures, with a focus on including dedicated structures for a range of fauna species. These would be further refined and finalised in consultation with BCS.

7.3 Adaptive management

Reports would be prepared by the contractor(s) after each monitoring period or seasonal block as defined in the threatened species management plan. These would be distributed to ARTC, DPIE, BCS, and DAWE (as relevant). These reports would incorporate all the methods and results of the monitoring and recommend any additional measures (if deemed necessary) to facilitate the long-term survival of the key populations in the locality. Updated management plans would need to be prepared to account for any changes to the monitoring program that may be identified by the threatened species specialists or agencies.

If there is a lack of evidence of species using connectivity structures, the provision of additional structures or measures should be investigated.

7.4 Summary of next steps

As a summary, the following steps are proposed for the monitoring program:

- project approval, with the preparation of the Final Fauna Connectivity Strategy as a condition of approval
- development of threatened species management plans in parallel with detailed design
- conduct pre-construction baseline surveys as detailed in the threatened species management plans
- prepare Final Fauna Connectivity Strategy, drawing on information from the threatened species management plans, detailed design and results of baseline surveys
- monitoring surveys continue through construction and operation, as detailed in the threatened species management plans
- preparation of monitoring reports
- consultation with agencies regarding results of monitoring surveys as necessary
- update of threatened species management plans if required for adaptive management
- continue monitoring as detailed in the threatened species management plans
- monitoring concludes (timing to be outlined in detailed in the threatened species management plans)
- preparation of final reports
- publication of results in peer-reviewed journals.

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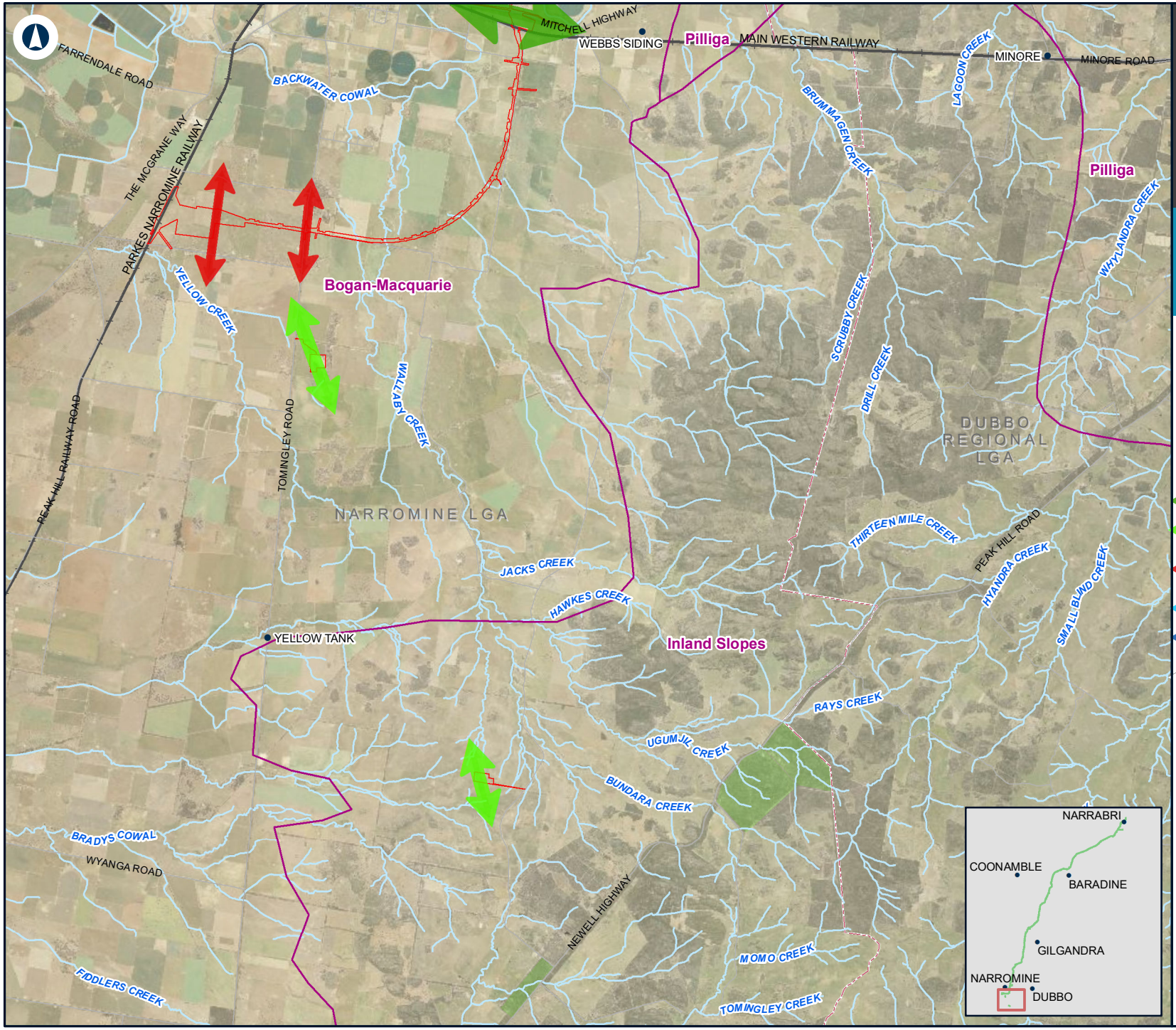
Appendices

Appendix A – Existing (pre-construction) connectivity in the study area



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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 1 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 2.5 5 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:150,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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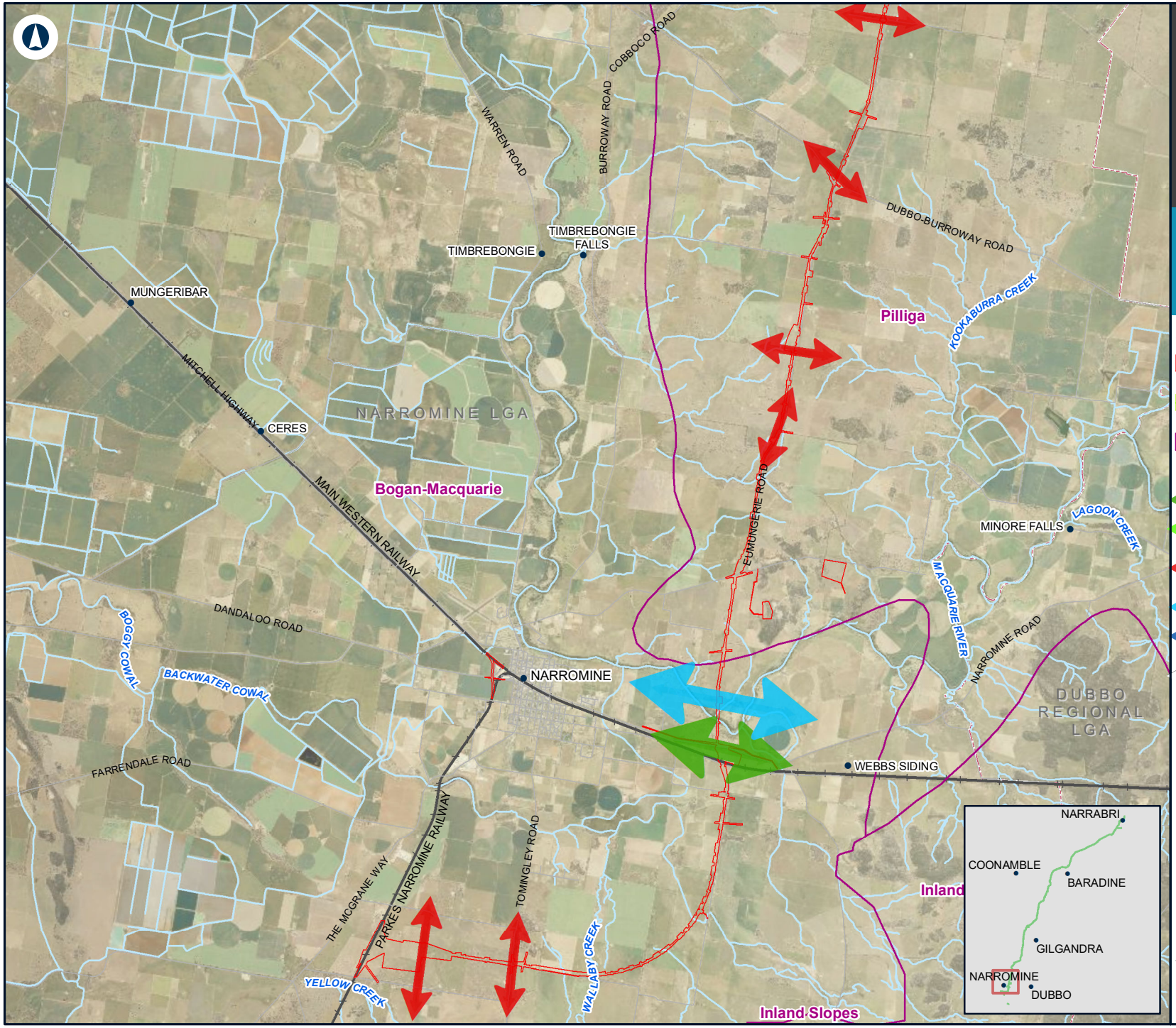

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 2 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 2.5 5 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:150,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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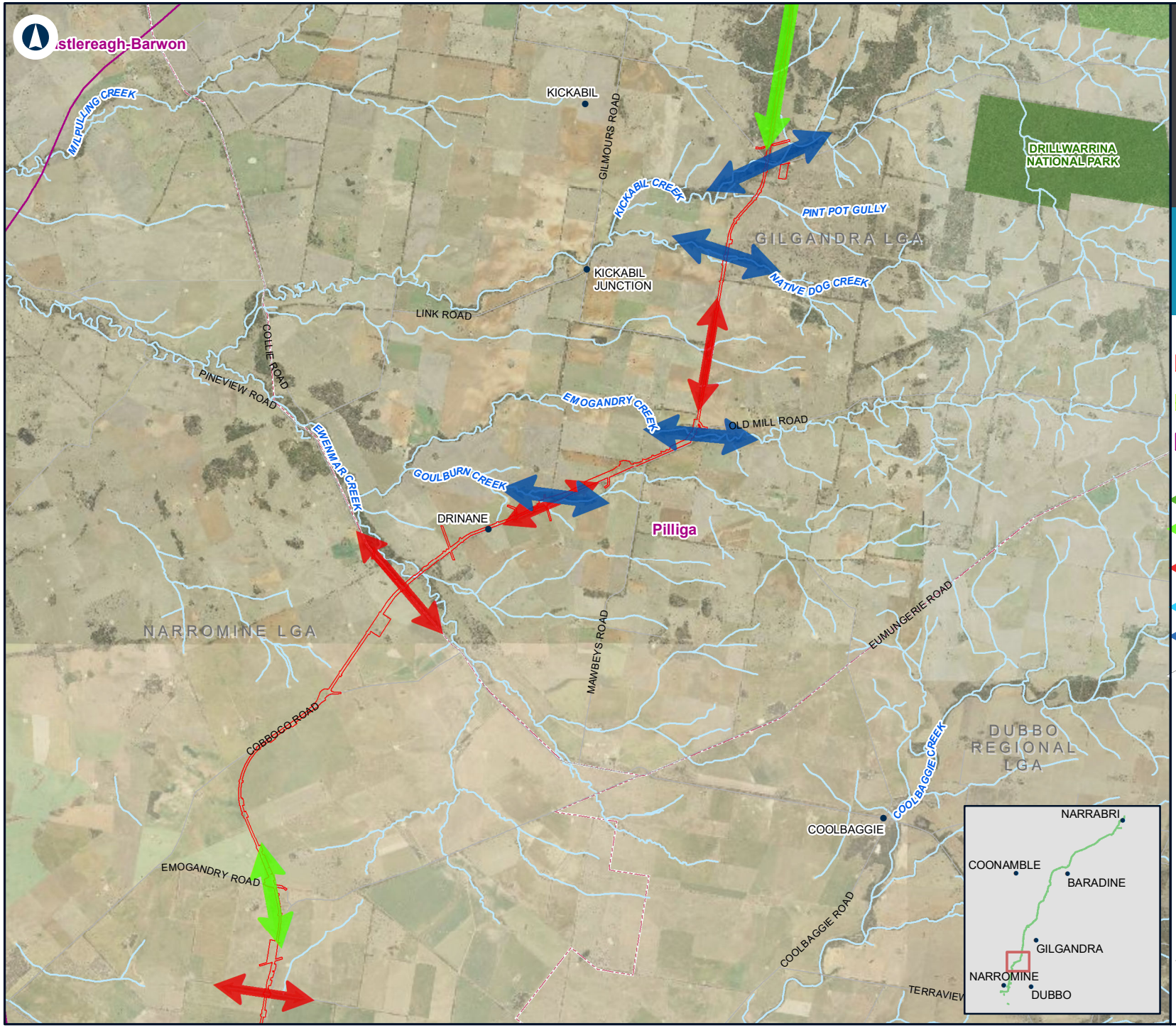

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 3 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 2 4 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:130,000

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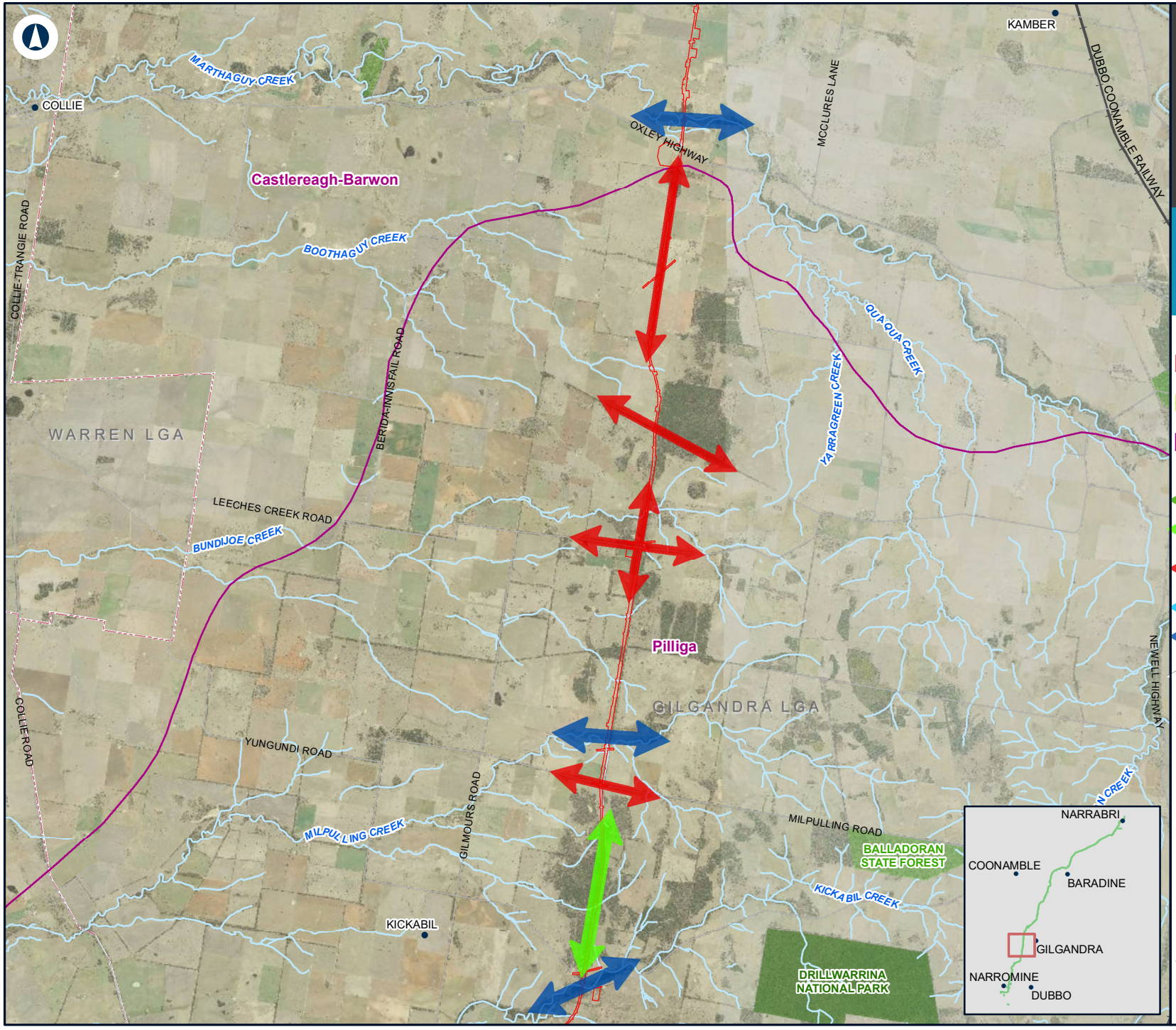

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 4 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 2.5 5 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:150,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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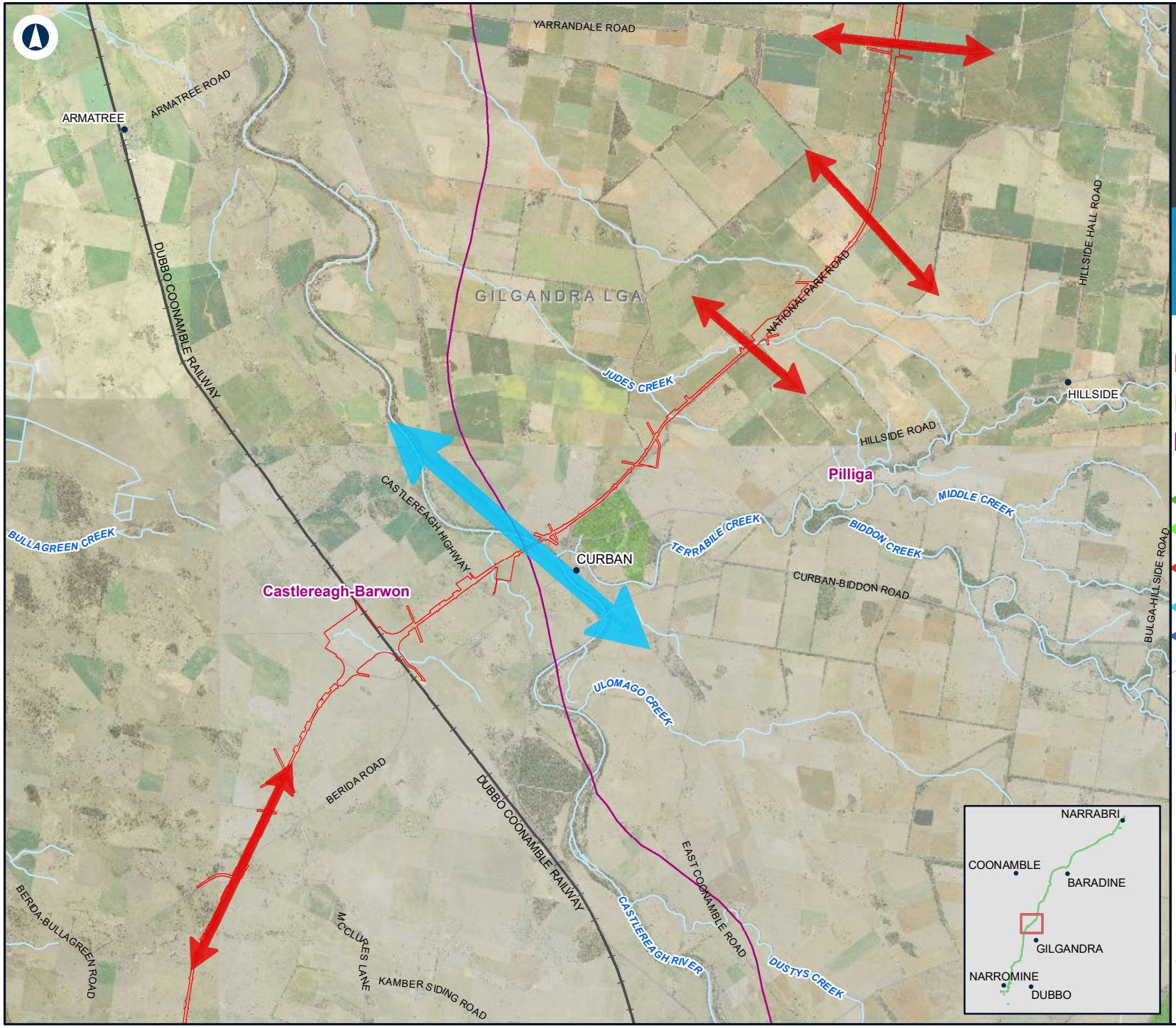

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 5 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 2 4 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:125,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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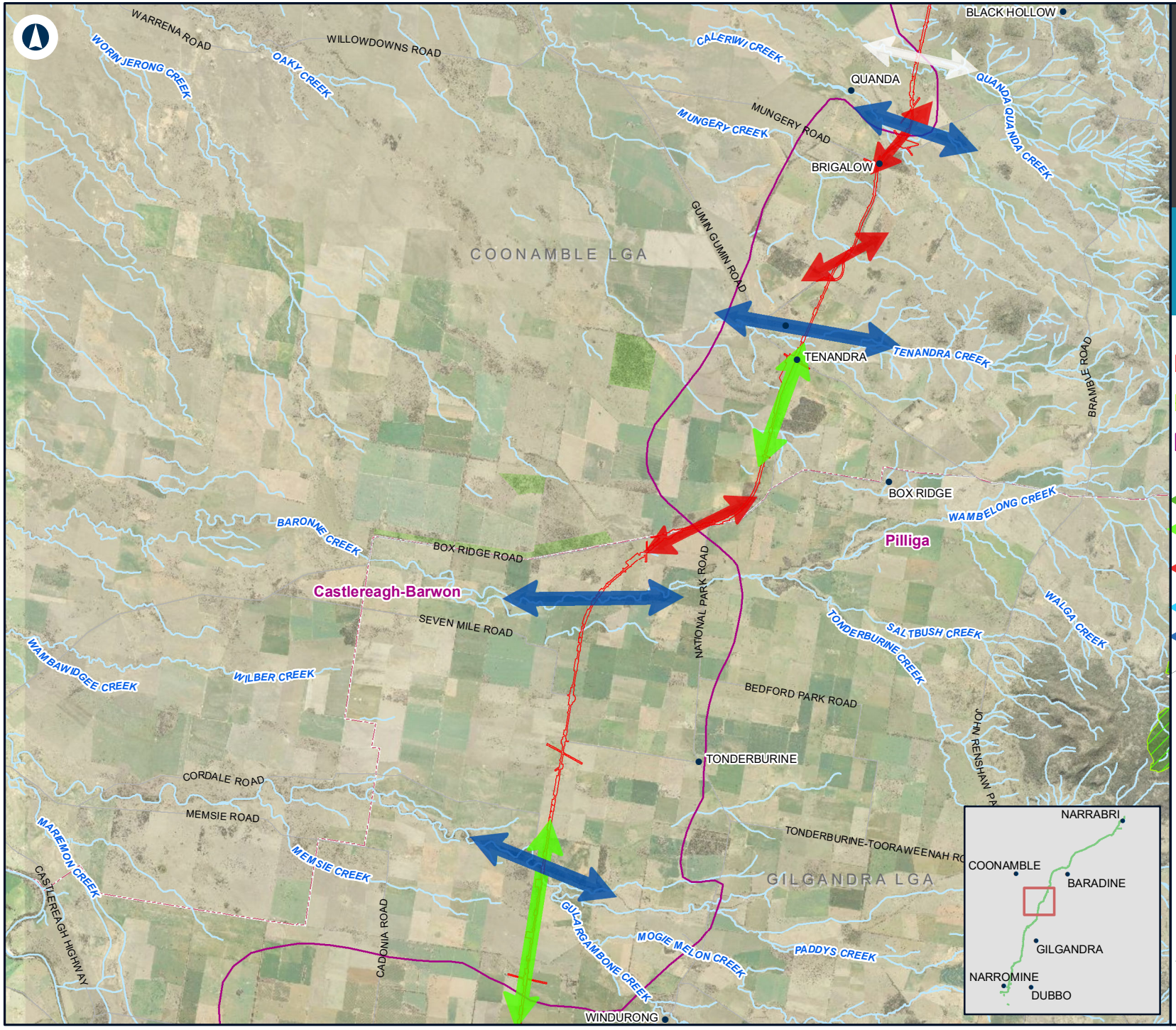

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 6 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 3 6 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

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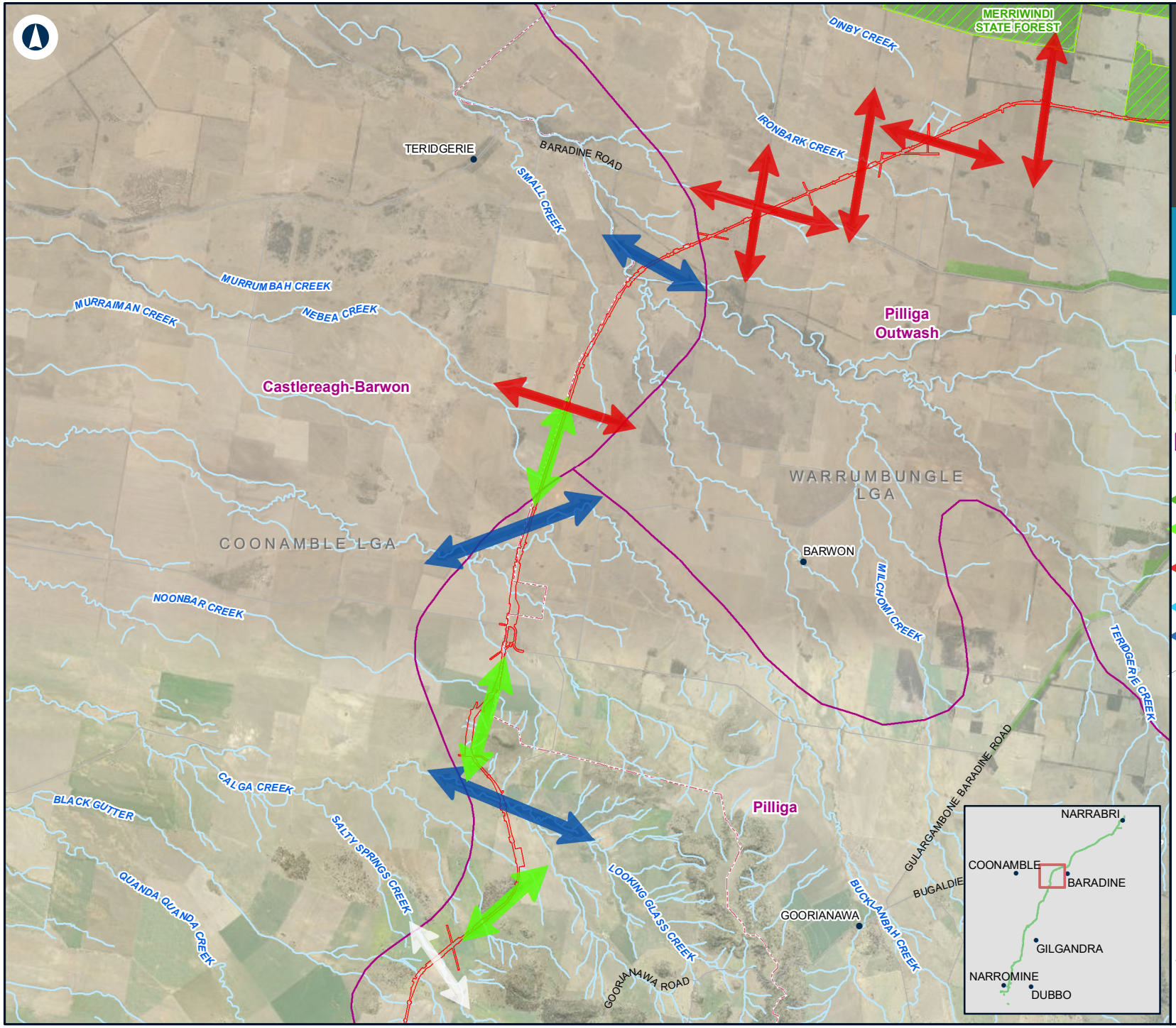

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 7 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 2.5 5 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:150,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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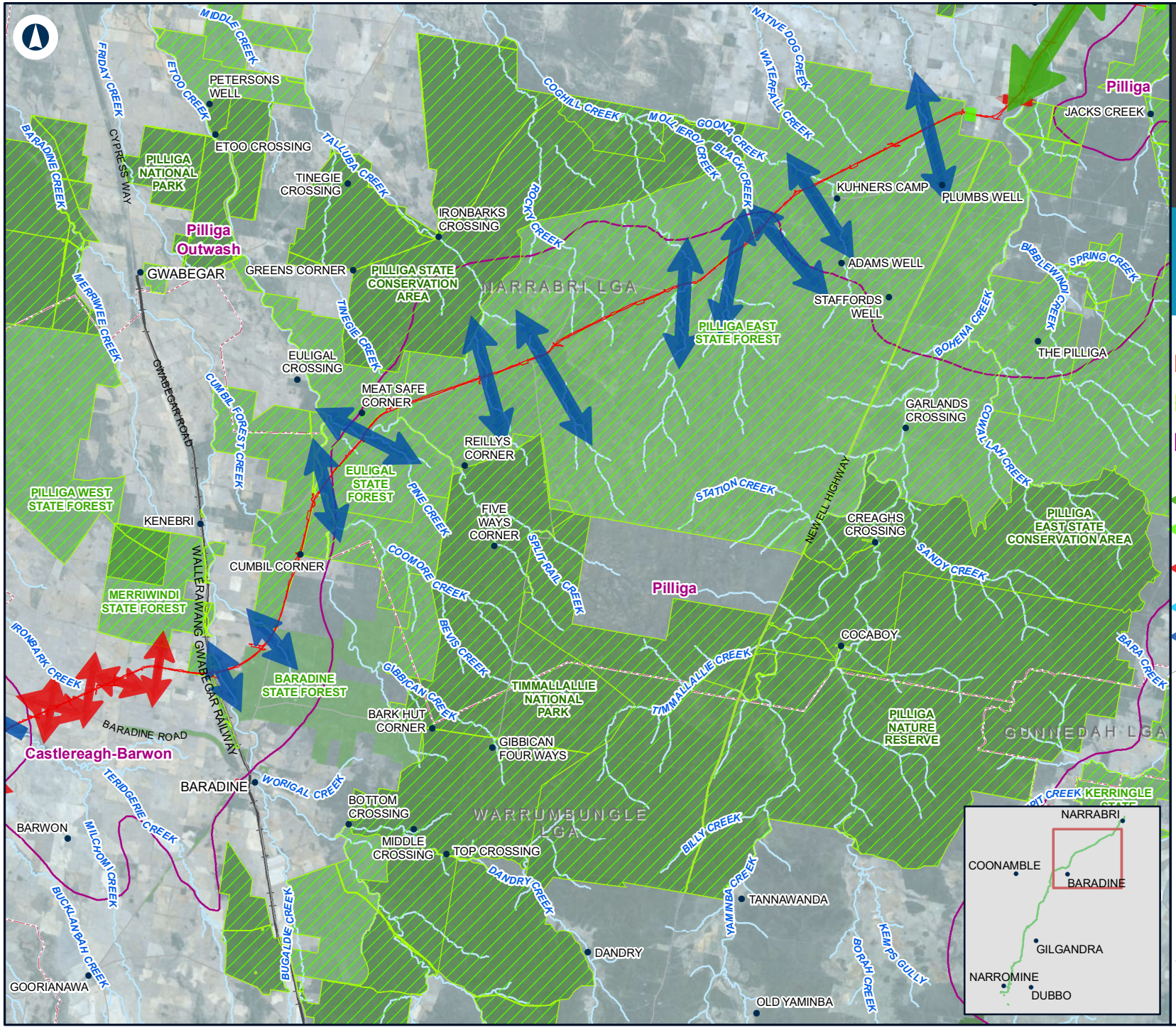

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 8 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 6.5 13 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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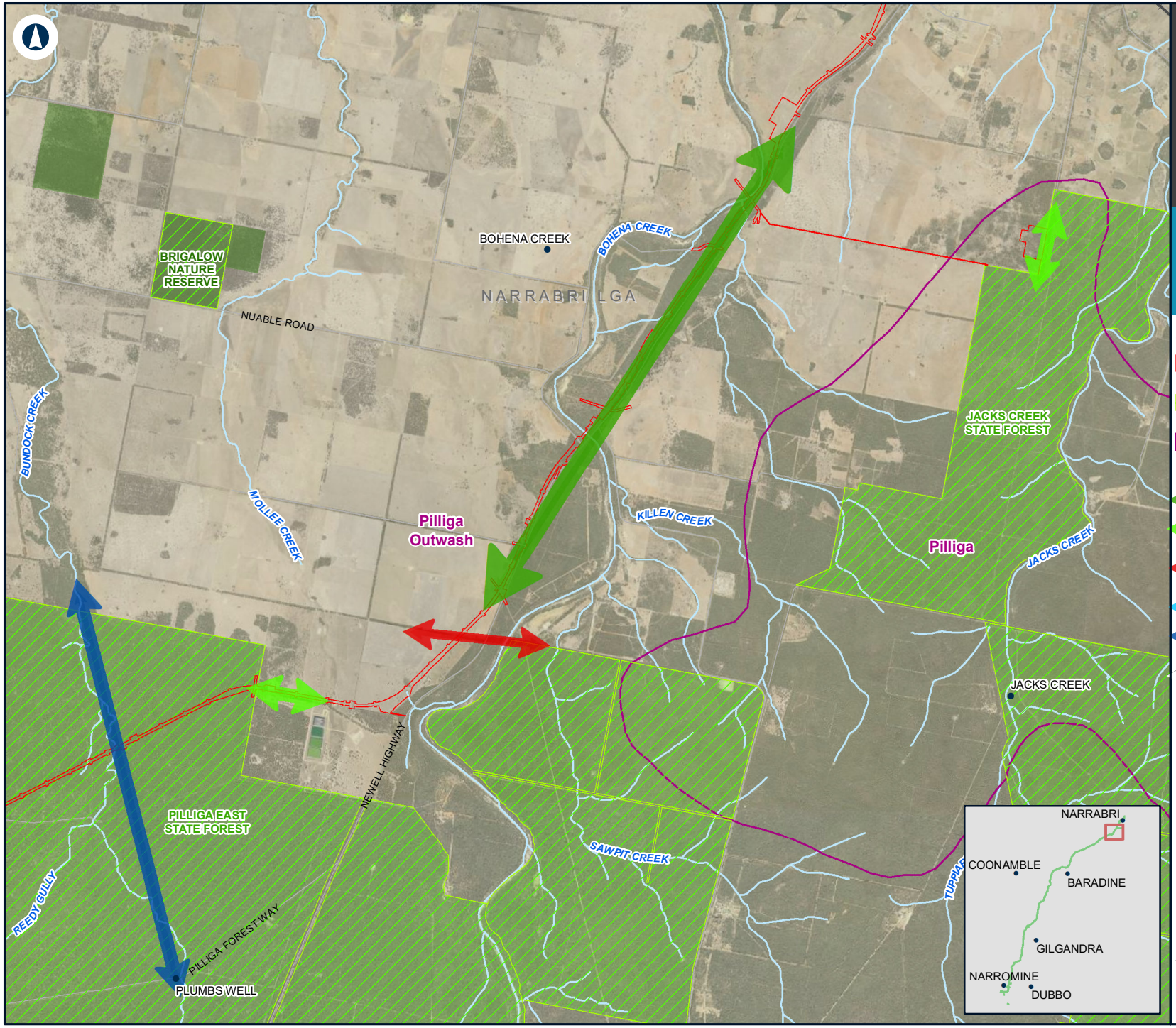

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 9 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 1.5 3 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:100,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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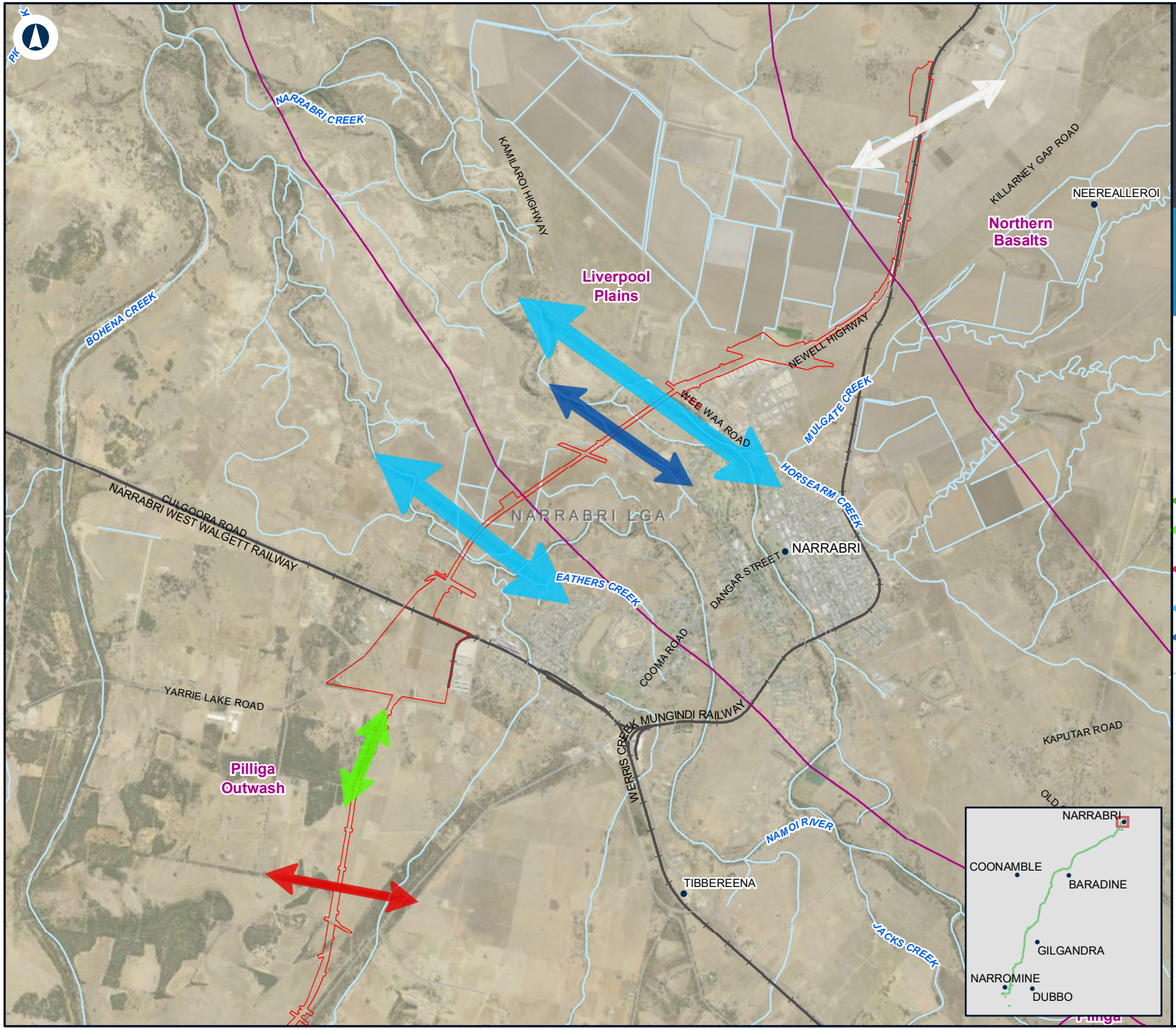

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NARROMINE TO NARRABRI

Appendix A: Existing (pre-construction) connectivity in the study area

MAP 10 OF 10

LEGEND

- Construction impact zone
- Pilliga IBA (important bird and biodiversity area)
- IBRA7 subregions

Connectivity

- Local connectivity - large patch
- Local connectivity - small patch
- Local connectivity - linear remnants
- Major riparian corridor
- Riparian corridor - vegetated
- Riparian corridor - minimal vegetation

0 1 2 Km

Coordinate System: GDA2020 MGA Zone 55

Date: 2021-12-01 Paper: A4

Author: JacobsGHD Scale: 1:65,000

Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

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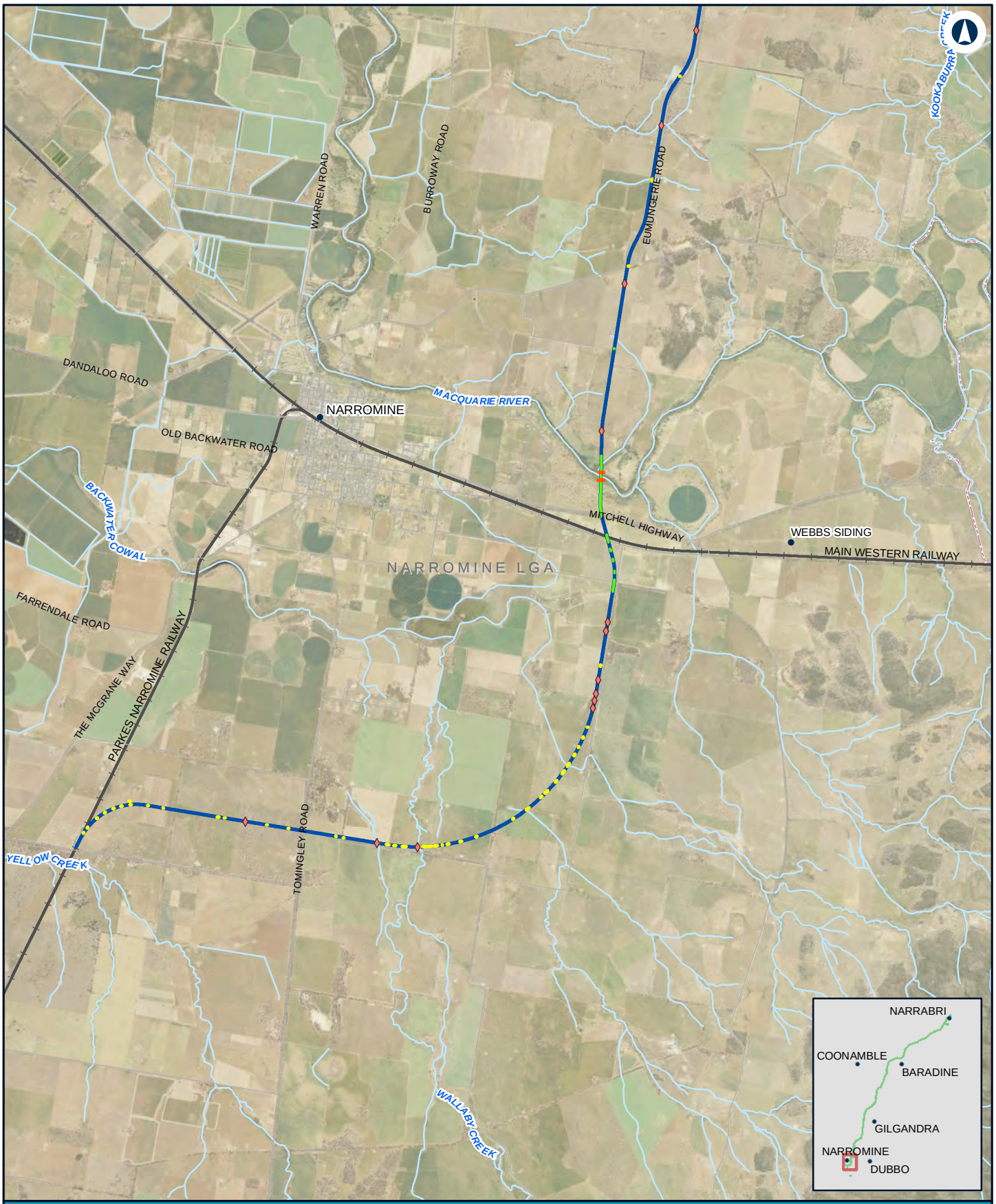
Appendix B – Proposed connectivity measures



NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 1 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

Poles & ropes

- Canopy bridge

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NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 2 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

Fauna furniture

- General arboreal

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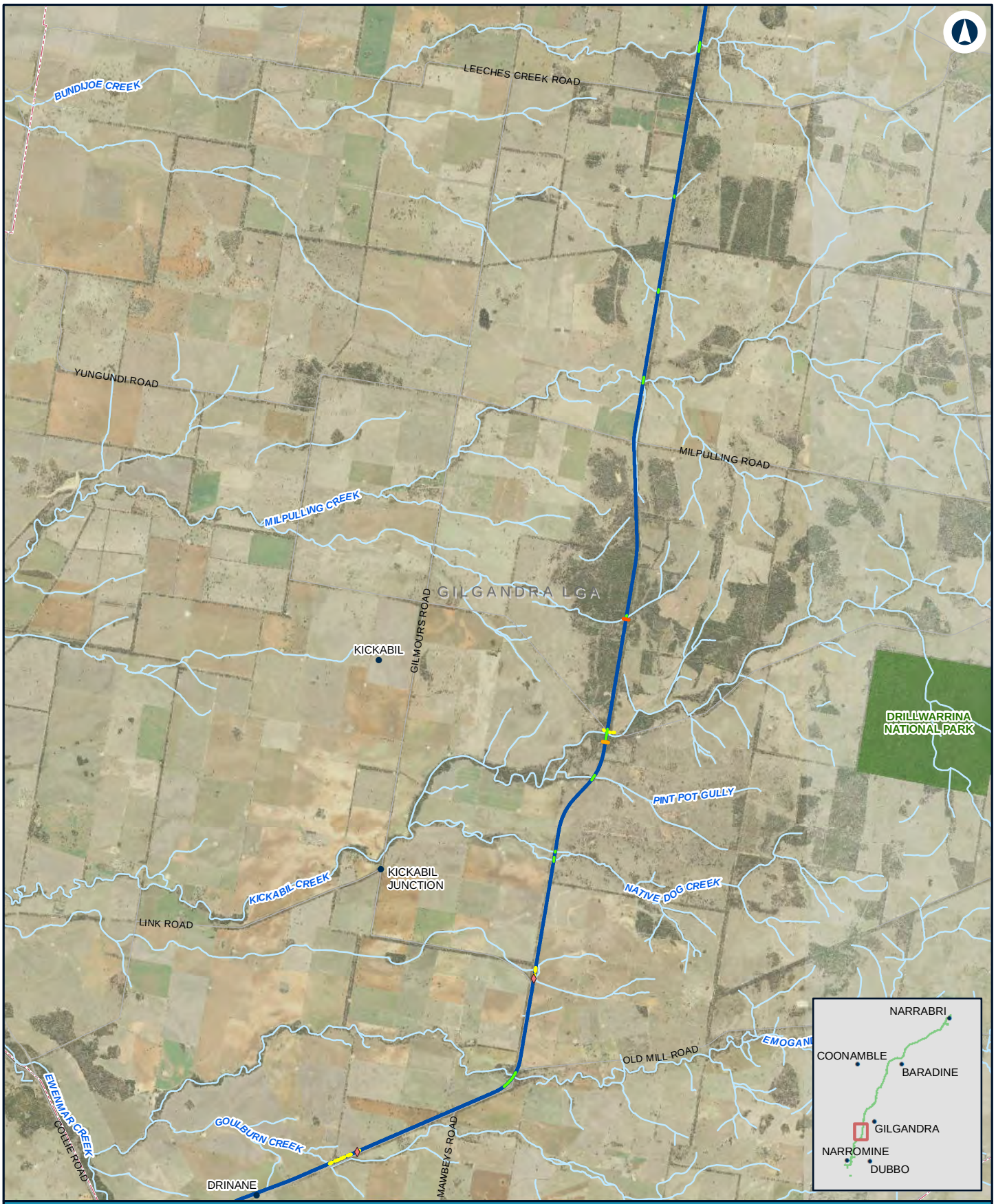

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 3 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

Poles & ropes

- Canopy bridge

Fauna furniture

- General arboreal

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NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 4 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

Fauna furniture

- Koala furniture

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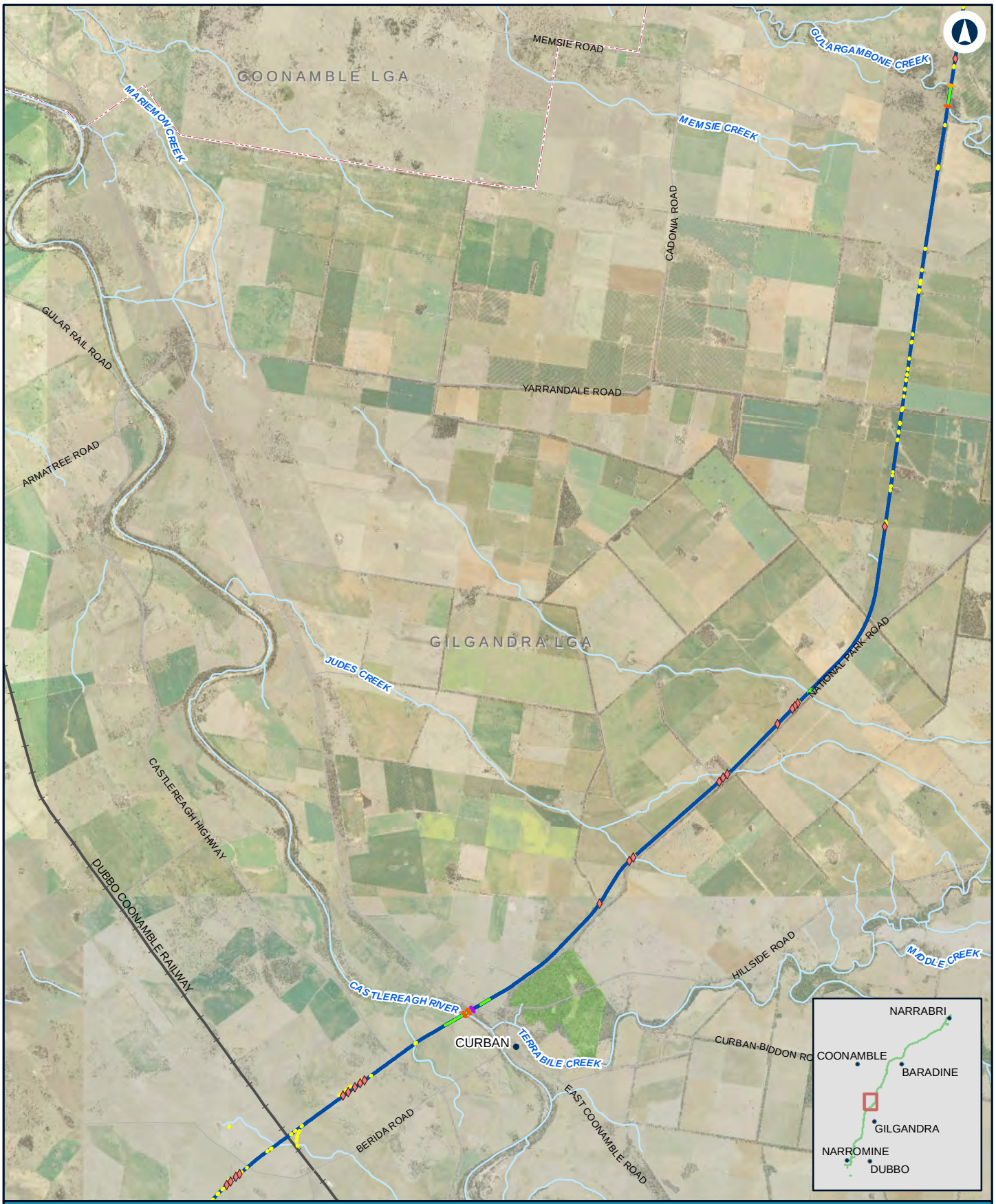

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 5 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

Poles & ropes

- Canopy bridge

Fauna furniture

- General arboreal
- Koala furniture

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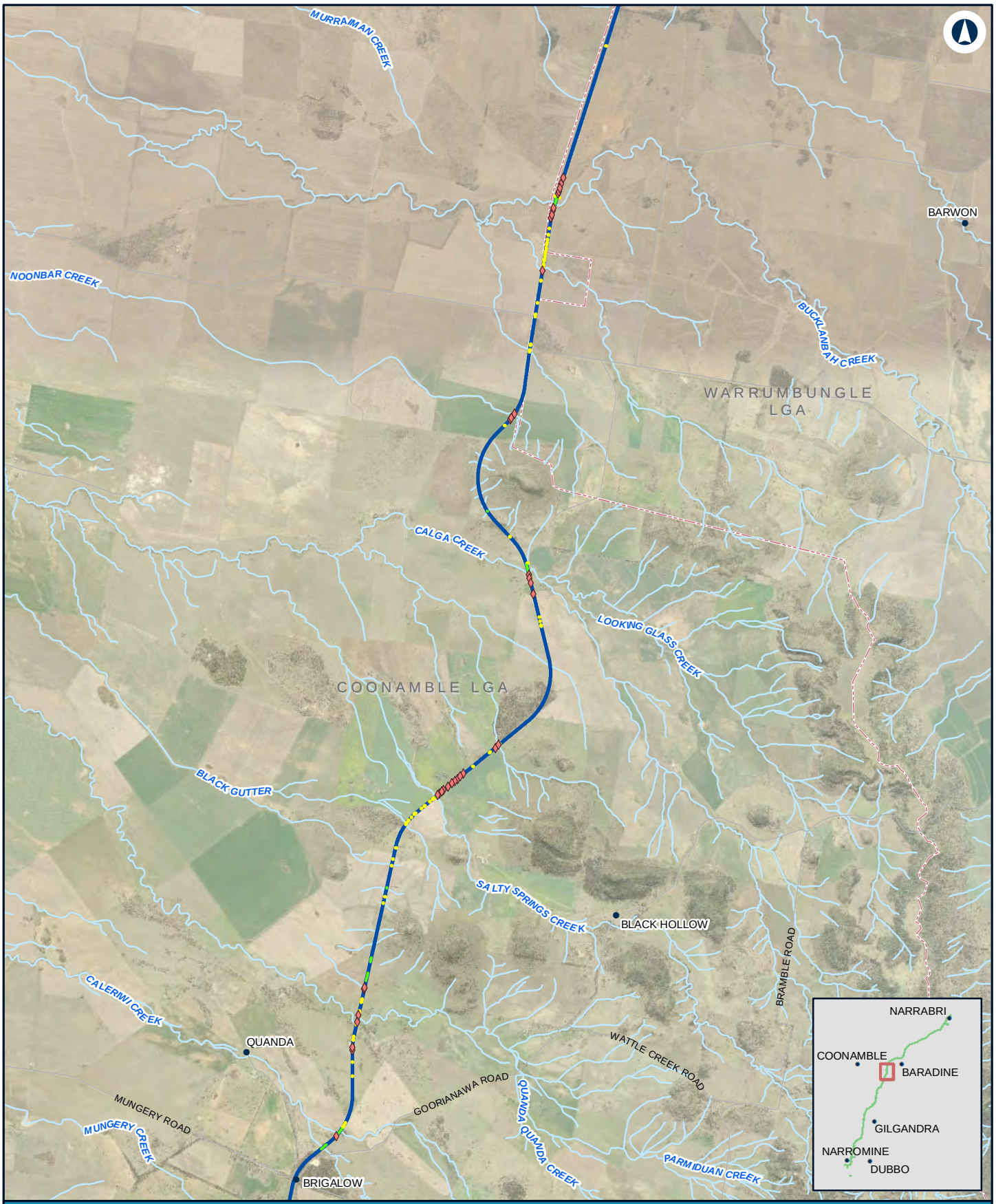

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 6 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

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NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 7 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Incidental

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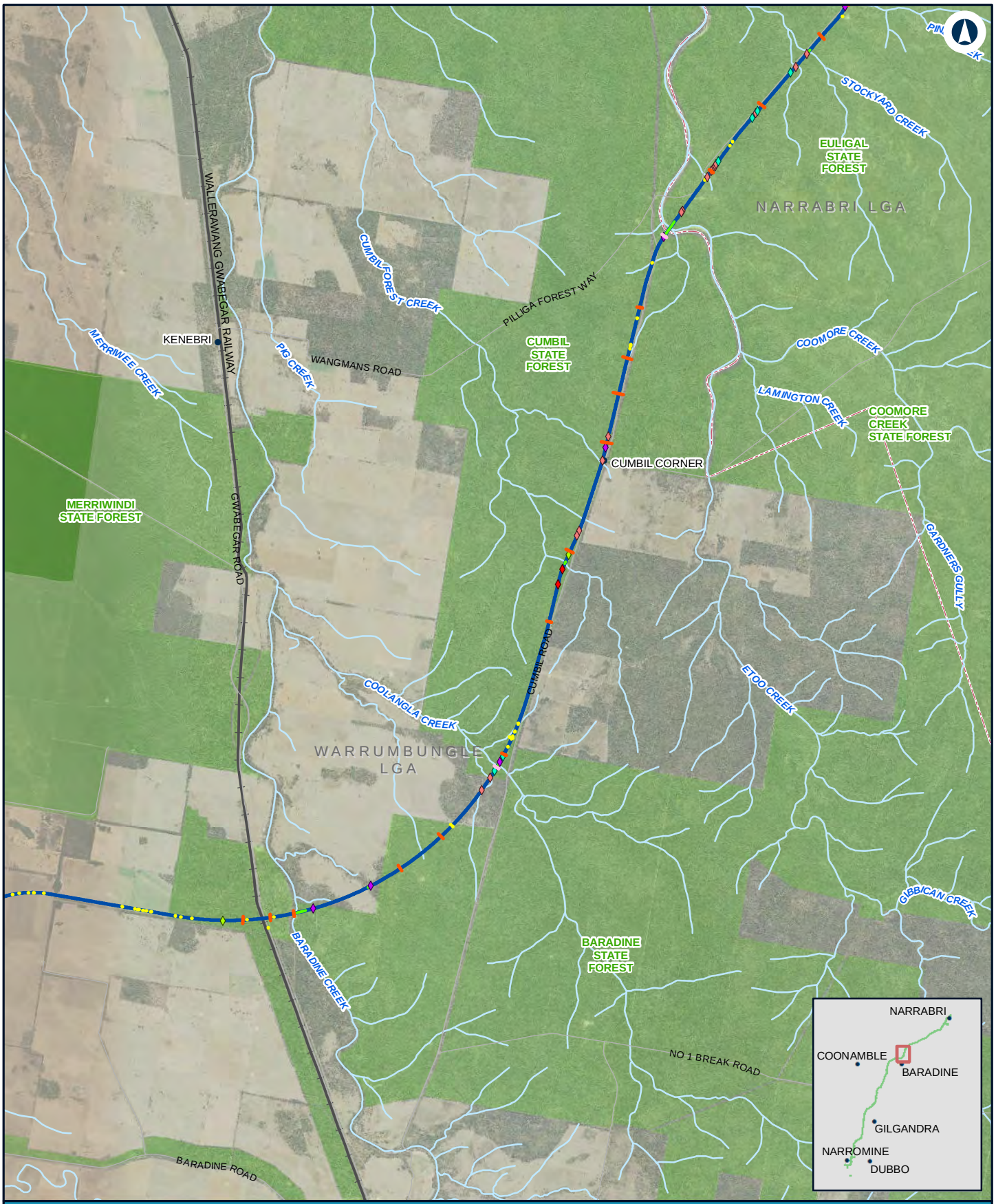

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 8 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges
- Dedicated (small-medium)
- Incidental

Culvert type

- Combined
- Dedicated (Koala)
- Dedicated (large)
- Dedicated (medium)

Poles & ropes

- Barrier poles
- Canopy bridge

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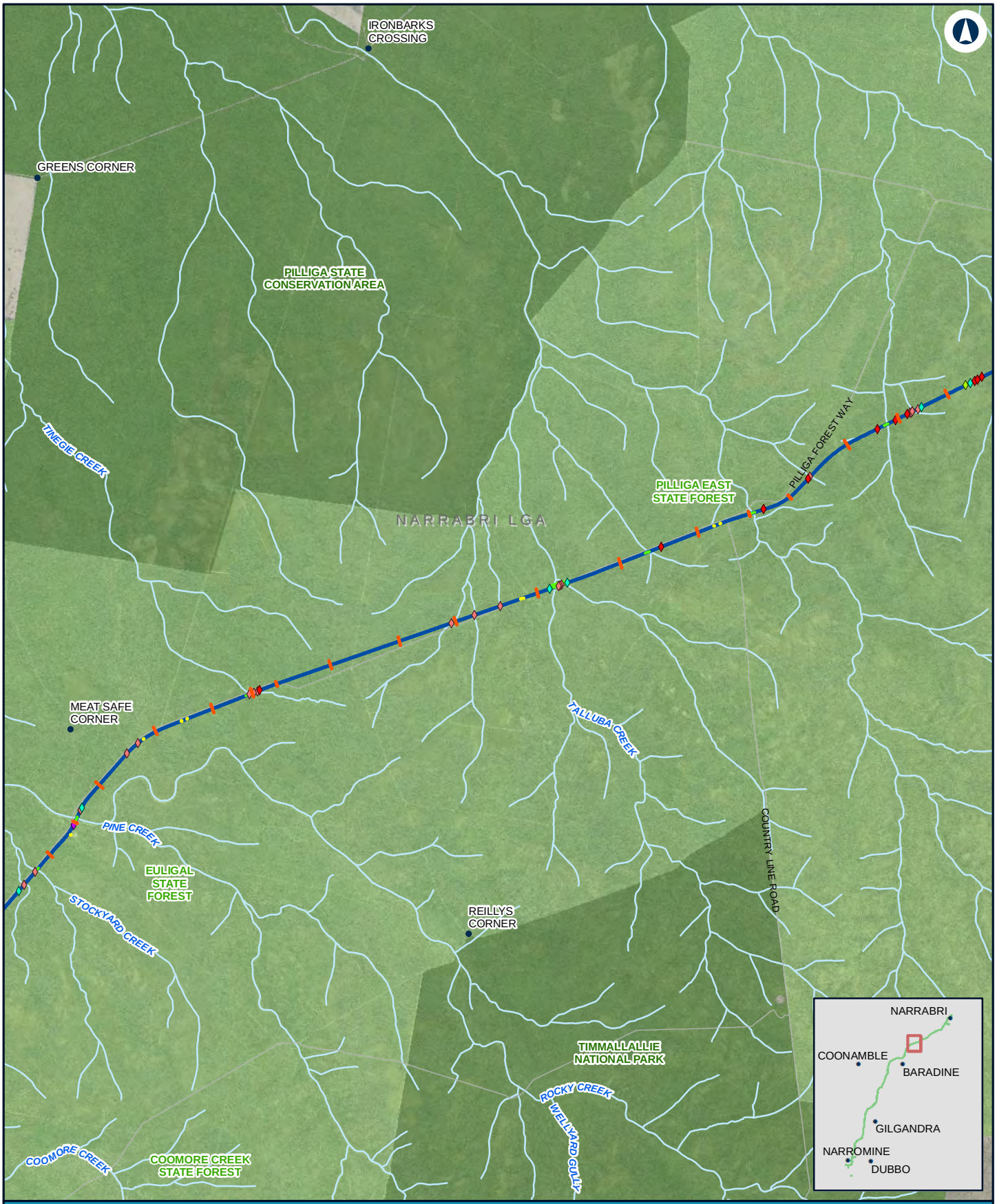

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 9 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Dedicated (Koala)
- Dedicated (large)
- Dedicated (medium)
- Dedicated (small-medium)
- Incidental

Poles & ropes

- Barrier poles
- Canopy bridge

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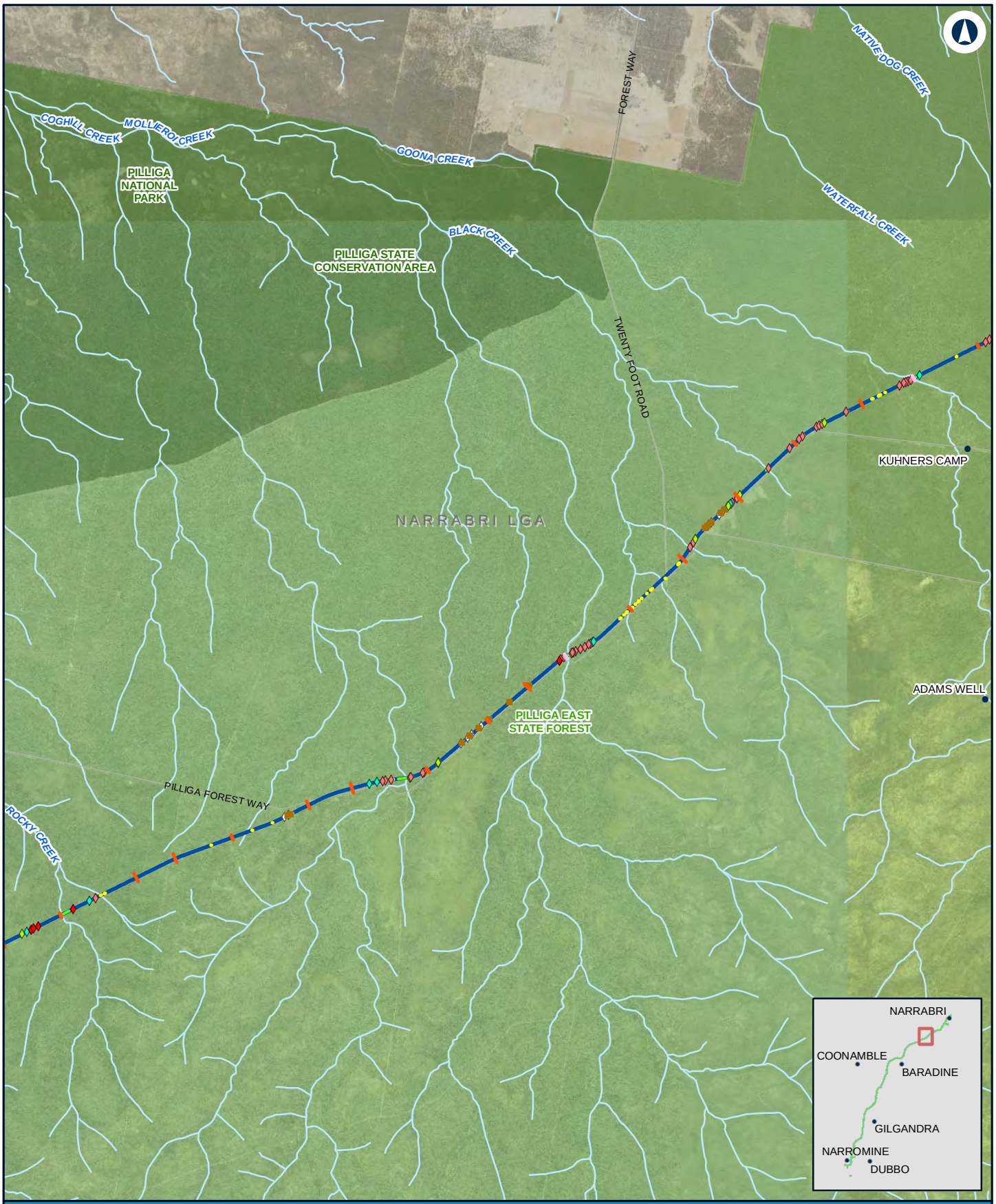

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 10 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Dedicated (large)
- Dedicated (medium)
- Dedicated (small-medium)
- Dedicated (Pilliga Mouse)
- Gravel removal
- Incidental

Poles & ropes

- Barrier poles
- Canopy bridge

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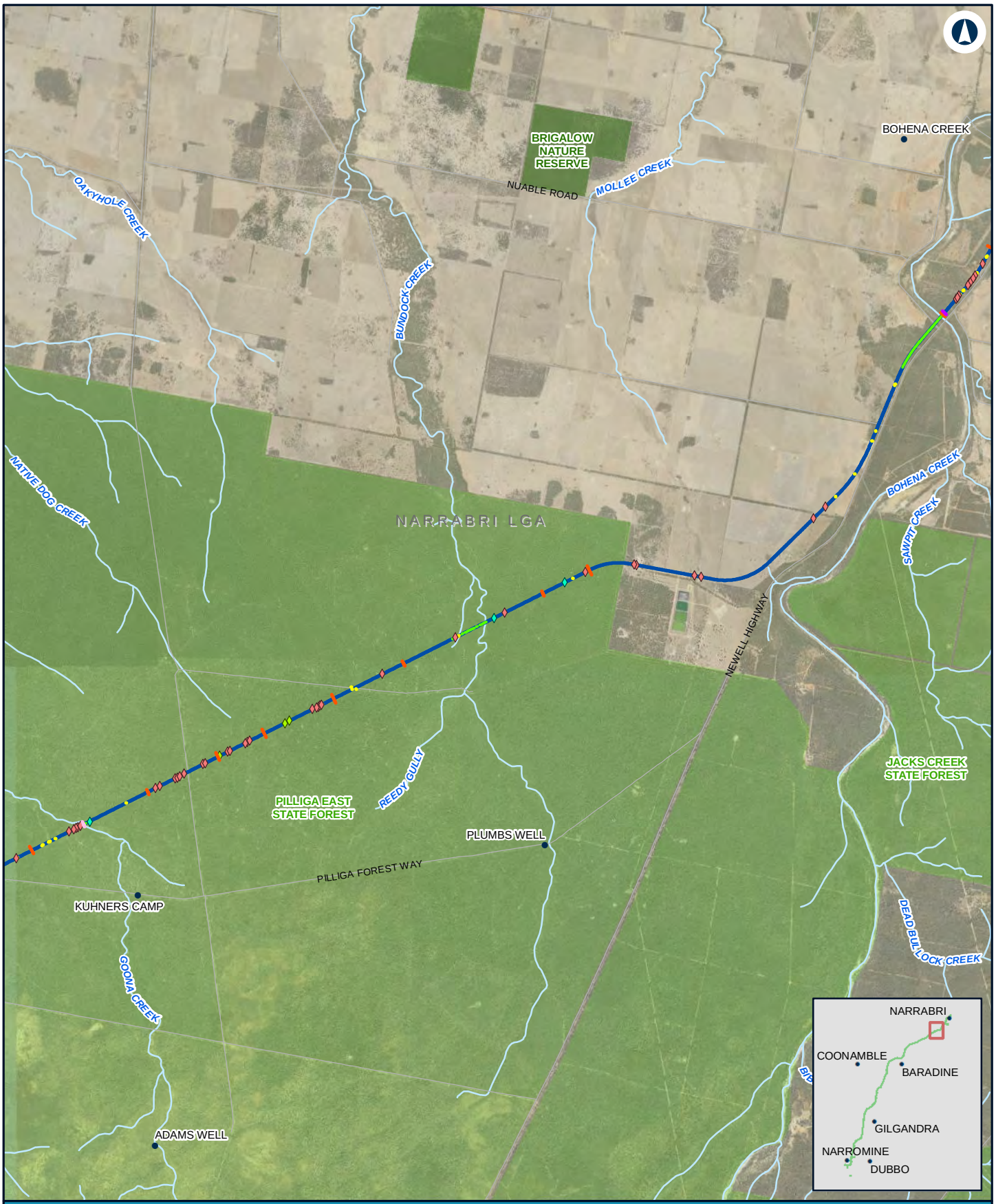

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 11 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Dedicated (medium)
- Dedicated (small-medium)
- Incidental

Poles & ropes

- Barrier poles
- Canopy bridge

Fauna furniture

- Koala furniture

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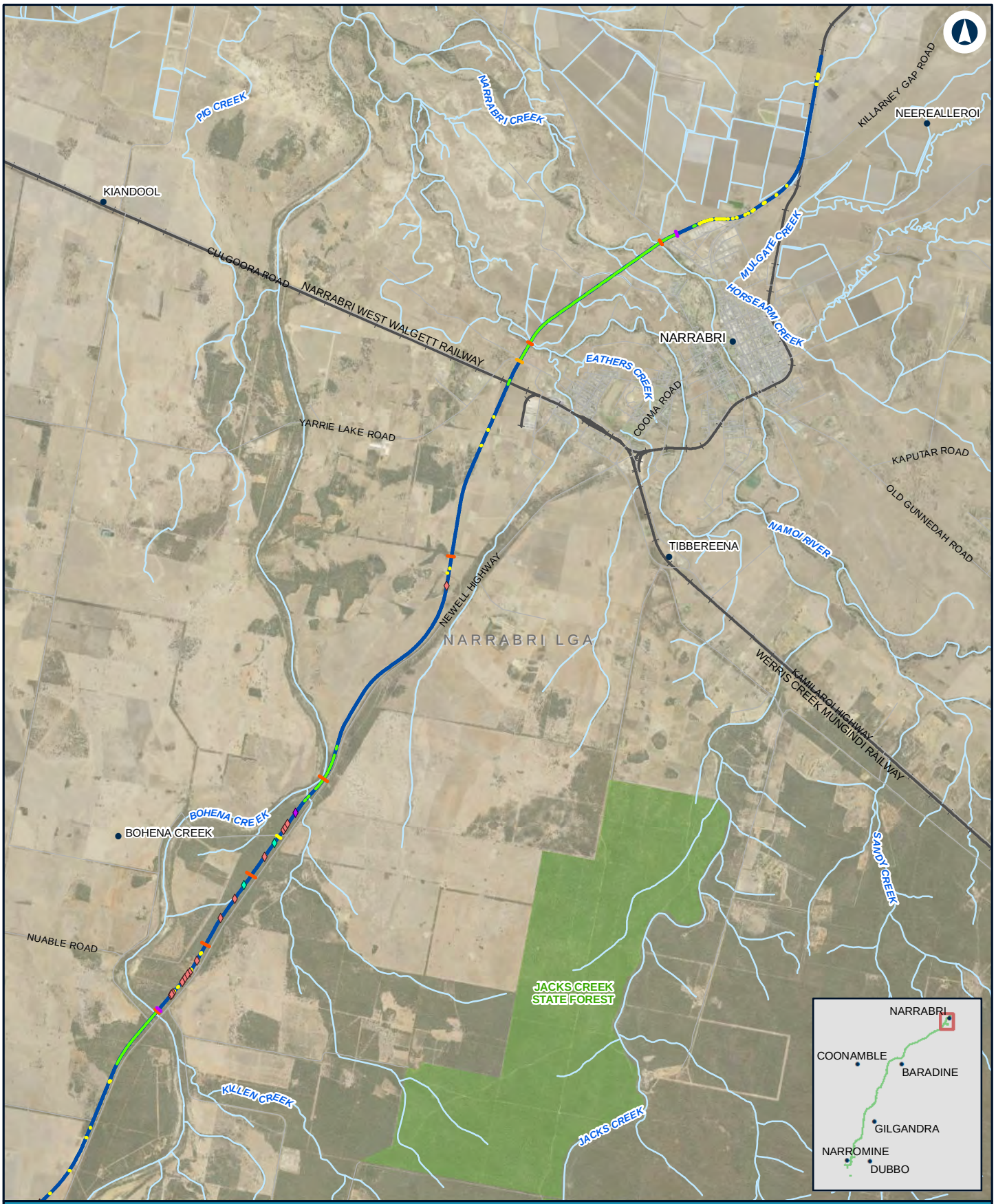

NARROMINE TO NARRABRI Appendix B: Proposed fauna connectivity measures MAP 12 OF 12

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 29/06/2022 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS; , Other layers: JacobsGHD

LEGEND

- Alignment
- Bridges

Culvert type

- Combined
- Dedicated (Koala)
- Dedicated (medium)
- Incidental

Poles & ropes

- Canopy bridge

Fauna furniture

- General arboreal
- Koala furniture

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Appendix C – Register of proposed connectivity structures and associated furniture

Table C.1 Bridges and associated furniture

Note that these structures and furniture will be developed and revised during detailed design and the preparation of the threatened species management plans, and will be updated in the Final Fauna Connectivity Strategy and in consultation with BCS.

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR560872	238	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR561237	43	Unnamed		Small terrestrial fauna (lizards etc)		
250-BR561466	42.9	Unnamed		Small terrestrial fauna (lizards etc)		
250-BR561665	42.9	Unnamed		Small terrestrial fauna (lizards etc)		
250-BR561838	148	Dubbo to Narromine Line		Small terrestrial fauna (lizards etc)		
250-BR562344	1170	Macquarie		Possums, general fauna		Canopy bridge to be slung under bridge on both sides of river between piers 29-31 and 36-38 if possible with regards to flooding risk
250-BR565592	14	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR595239	321.8	Ewenmar		Possums, general fauna	Horizontal timber poles to be fitted to one pier on one side of creek to provide substrate for arboreal fauna to use if height permits and do not interfere with drainage	
250-BR602663	332	Emogandry		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR607145	88	Native dog		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR607323	28.8	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR608929	112.8	Pint Pot		General fauna (macropods, echidnas, small birds, reptiles etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR609715	253	Kickabil		Possums, general fauna	Horizontal timber poles to be fitted to one pier on one side of creek to provide substrate for arboreal fauna to use if height permits and do not interfere with drainage	
250-BR612110	74.6	Unnamed		possums, general fauna		Canopy bridge to be slung under bridge on one side of creek if possible with regards to flooding risk
250-BR616680	120.5	Milpulling		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR618445	62.7	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR620300	34.7	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR623146	182	Bundijoe		Possums, general fauna		
250-BR633677	1150	Marthaguy	Koalas	Possums, general fauna	Horizontal timber poles to be fitted to one pier on one side of creek to provide substrate for Koala to use if height permits and do not interfere with drainage	
250-BR643000	42.2	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR651728	608	Castlereagh		Possums, general fauna	Horizontal timber poles to be fitted to one pier on one side of creek to provide substrate for Koala to use if height permits and do not interfere with drainage	Canopy bridge to be slung under bridge on both sides of river between piers 18-19 and 22-23 if possible with regards to flooding risk
250-BR652520	207	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR661275	84.7	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR673082	414	Gulargambone		Possums, general fauna	Horizontal timber poles to be fitted to one pier on one side of creek to provide substrate for arboreal fauna to use if height permits and do not interfere with drainage	Canopy bridge to be slung under bridge on one side of creek if height permits and with regards to flooding risk
250-BR681404	140.5	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR682242	112.1	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR682601	99.4	Baronne		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR700017	183.017	Mungery				
250-BR701890	56	Unnamed				
250-BR701981	41.6	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR702305	143.86	Caleriwi		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR704588	56.2	Quanda Quanda		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR705358	14.039	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR705407	14.038	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR705460	60	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR705735	82.2	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR707183	14.039	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR709266	25.8	Salty Springs		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR714593	158.4	Calga		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR716029	14.038	Unnamed		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR722288	138.1	Bucklanbah		General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR730462	183.655	Teridgerie		Possums, general fauna		
250-BR747768	241.9	Baradine	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Canopy bridge to be slung under bridge on east side of creek if height permits eg between piers 3 and 4 if possible with regards to flooding risk Barrier poles or mesh to be installed along each side of bridge at main gap in vegetation along creek
250-BR749279	43.7	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR752712	69	Coolangala	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Barrier poles or mesh to be installed along each side of bridge at main gap in vegetation along creek
250-BR756787	45.3	Curbo Creek	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR763460	344.3	Etoo	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Barrier poles or mesh to be installed along each side of bridge at main gap in vegetation along creek
250-BR767941	75.083	Stockyard	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR769143	113.8	Rocky	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Canopy bridge to be slung under bridge on one side of creek if height permits if possible with regards to flooding risk Barrier poles or mesh to be installed along each side of bridge at main gap in vegetation along creek
250-BR773373	55.4	Tinegie	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR779635	57	Talluba	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR779828	70.4	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR781523	84.2	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR783652	114.9	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Canopy bridge to be slung under bridge on one side of creek if possible with regards to flooding risk
250-BR786808	82.3	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR789380	188.4	Rocky 2	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Canopy bridge to be slung under bridge on one side of creek if possible with regards to flooding risk
250-BR796414	181.5	Coghill	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR800445	91	Mollieroi	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Barrier poles or mesh to be installed along each side of bridge at main gap in vegetation along creek

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR805743	41.4	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR809114	55.3	Goona	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		Barrier poles or mesh to be installed along each side of bridge at main gap in vegetation along creek
250-BR817058	27.7	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR817258	28.7	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR817325	204.5	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR817573	27.9	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR817650	137.1	Bundock	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR828222	1329.051	Bohena	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)	Horizontal timber poles to be fitted to piers to provide substrate for Koalas to use at pier 42 (south of Cains Crossing Road), pier 45 (south of Bohena Creek), pier 56 (north of Bohena Creek) if possible with regards to flooding risk	Canopy bridge to be slung under bridge (eg piers 55-56). It is also recommended that the canopy bridge extends across the Newell Highway to link to the TSR on the eastern side of the highway if possible with regards to flooding risk
250-BR834450	42.2	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR834541	41.4	Spring	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)	Horizontal timber poles to be fitted to one pier on one side of creek to provide substrate for Koalas to use if height permits and do not interfere with drainage	
250-BR834764	758	Bohena	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR835640	55.3	Unnamed	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	General fauna (macropods, echidnas, small birds, reptiles etc)		
250-BR843613	91.9	Walgett Line		Small terrestrial fauna (lizards etc)		

Bridge No.	Length (m)	Name	Key threatened species	Other fauna	Fauna furniture	Canopy bridge/Barrier poles
250-BR844116	3941	Narrabri	Koala, Pale-headed Snake, Five-clawed Worm-skink, general fauna	General fauna (macropods, echidnas, small birds, reptiles etc)	Horizontal timber poles to be fitted to pier 17 (Namoi River) and pier 153 (Narrabri Creek) to provide substrate for arboreal fauna and Koalas to use if possible with regards to flooding risk	Canopy bridge to be slung under bridge at piers 15-16 (Namoi River), 152-153 (Narrabri Creek) if possible with regards to flooding risk
250-BR848406	42.2	Unnamed		Small terrestrial fauna (lizards etc)		

Table C.2 Assessment of potential dedicated culverts and associated fauna furniture

Note that these structures and furniture will be developed and revised during detailed design and the preparation of the threatened species management plans, and will be updated in the Final Fauna Connectivity Strategy and in consultation with BCS, but should be taken to comprise the minimum requirements of the proposal.

Note that key target species are identified. It is assumed that a variety of species would use each culvert.

Proposed Culvert		Embankment Width						Culvert dimensions			Aperture ratio		Openness ratio												
Chainage	Track type	Culvert Height	Embankment Height	Capping width	Approx. Earthworks Width	Location	Flooding/ Issues?	Width 3 culv	Culvert Height	Length: width	Total Length: culv 3	Total length: height	Op 1 culv emb	Op 3 culv embank	Comment	Location	PCT	Structure	Recommended Furniture	Koala	Black-striped Wallaby	Rufous Bettong	Eastern Pygmy-possum	Pilliga Mouse	Justification - suitable habitat and culvert height
746.50	SINGLE	1.03	1.28	7.00	14.68	Best height at start of section Could move further up to get more height	Area not flooded in 20% AEP	7.2	0.9	6	2	16	0.15	0.44	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Mani Road	88	Dedicated (small-medium)	Ledge/timber	0	0	2	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
748.10	SINGLE	2.78	3.04	7.00	25.21	There is room to the north of bridge, need large culvert for embankment	Just outside of 20% AEP limits	7.2	2.7	11	4	9	0.26	0.77	Yes - just outside of 20% AEP limits, suitable openness ration for large mammals, single track	Baradine Creek	394, 589	Dedicated (Koala)	Koala furniture, ledge, timber	1	1	1	1	1	Koala polygon (known record), Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
749.35	SINGLE	3.80	4.05	7.00	31.31	There is room to the north of bridge, need large culvert for embankment	Just outside of 20% AEP limits	7.2	3.3	13	4	9	0.25	0.76	Yes - just outside of 20% AEP limits, suitable openness ration for large mammals, single track	Unnamed creek	399/398	Dedicated (Koala)	Koala furniture, ledge, timber	1	1	1	1	1	Koala, Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
752.00	SINGLE	1.76	2.02	7.00	19.10	LiDAR appears to spike in the middle - no road, likely a tree. Best to put at end of section - further North will give the most room	Whole area has surrounding 20% AEP flood	7.2	1.5	8	3	13	0.19	0.57	No - flooding										
752.60	SINGLE	1.69	1.94	7.00	18.66	Most room at end of section	Area not flooded in 20% AEP	7.2	1.5	8	3	12	0.19	0.58	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Coolangala Creek	398	Dedicated (medium)	Ledge/timber	0	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
752.80	SINGLE	2.25	2.51	7.00	22.05	Bridge at start of section - will need to be after to avoid flood	Portion after bridge not flooded in 20% AEP	7.2	2.2	9	3	10	0.24	0.72	Yes - location after bridge not flooded in 20% AEP, suitable openness ratio for medium-large mammals, single track	Coolangala Creek	398	Dedicated (Koala)	Koala furniture, ledge, timber	1	1	1	1	1	Koala polygon (known record), Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
753.00	SINGLE	1.41	1.67	7.00	17.02	Most room at start of section	Area not flooded in 20% AEP	7.2	1.2	7	2	14	0.17	0.51	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Coolangala Creek	398	Dedicated (medium)	Ledge/timber	0	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
756.40	SINGLE	4.19	4.44	7.00	33.66	Most room at end of section - tall culverts required	Area not flooded in 20% AEP	7.2	3.3	14	5	10	0.24	0.71	Yes - area not flooded in 20% AEP, suitable openness ratio for large mammals, single track	Cumbil Creek	88	Dedicated (large)	Koala furniture, ledge, timber	2	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
756.70	SINGLE	4.72	4.97	7.00	36.83	Section in curve, most room at end	Area not flooded in 20% AEP	7.2	3.3	15	5	11	0.22	0.65	Yes - area not flooded in 20% AEP, suitable openness ratio for medium-large mammals, single track	Cumbil Creek	88	Dedicated (large)	Koala furniture, ledge, timber	2	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
757.00	SINGLE	1.02	1.28	7.00	14.68	Most room at end of section	Area not flooded in 20% AEP	7.2	0.9	6	2	16	0.15	0.44	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Cumbil Creek	398	Dedicated (small-medium)	Ledge/timber	0	0	1	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
759.20	SINGLE	3.08	3.34	7.00	27.02	Most room at end of section	Area not flooded in 20% AEP	7.2	3.0	11	4	9	0.27	0.80	Yes - area not flooded in 20% AEP, suitable openness ratio for large mammals, single track	Sixteen Foot Road	394	Dedicated (Koala)	Koala furniture, ledge, timber	1	1	1	1	1	Koala polygon, Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
761.50	SINGLE	0.59	0.85	7.00	12.09	Relatively constant elevation difference	Whole area has surrounding 20% AEP flood	7.2							No - flooding, low height										
762.80	SINGLE	0.31	0.57	7.00	10.42	Not much room outside of drainage culvert - likely not a good option. Most elevation at end	Whole area flooded in 20% AEP	7.2							No - flooding, low height										
763.48	SINGLE	3.21	3.47	7.00	27.81	Bridge at location, only area is at start	Start section not flooded in 20% AEP	7.2	3.3	12	4	8	0.28	0.85	Yes - start section not flooded in 20% AEP, suitable aperture ratio for large mammals, single track	The Aloes/Etoo Creek	397	Dedicated (Koala)	Koala furniture, ledge, timber	1	1	2	1	1	Koala polygon (known record), Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
763.70	SINGLE					Entirely within bridge extent	Whole area flooded in 20% AEP	0.0							No - bridge										
764.50	SINGLE	0.64	0.89	7.00	12.36	Deepest at end	Area not flooded in 20% AEP	7.2	0.6	5	2	21	0.12	0.35	No - openness		399			0	0	0	0	0	
765.20	SINGLE	1.40	1.66	7.00	16.95	Best at end of section to avoid flooding	End section not flooded in 20% AEP	7.2	1.2	7	2	14	0.17	0.51	Yes - end section not flooded in 20% AEP, suitable aperture ratio for medium mammals, single track	The Aloes/Etoo Creek	394	Dedicated (medium)	Ledge/timber	0	1	2	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
766.30	SINGLE	1.88	2.13	7.00	19.80	Start section not flooded in 20% AEP - more elevation at end	Start section not flooded in 20% AEP	7.2	1.8	8	3	11	0.22	0.65	Yes - start section not flooded in 20% AEP, suitable aperture ratio for medium mammals, single track	Euligal	394	Dedicated (medium)	Ledge/timber	3	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat

Proposed Culvert		Embankment Width						Culvert dimensions			Aperture ratio		Openness ratio												
Chainage	Track type	Culvert Height	Embankment Height	Capping width	Approx. Earthworks Width	Location	Flooding/ Issues?	Width 3 culv	Culvert Height	Length: width	Total Length: culv 3	Total length: height	Op 1 culv emb	Op 3 culv embank	Comment	Location	PCT	Structure	Recommended Furniture	Koala	Black-striped Wallaby	Rufous Bettong	Eastern Pygmy-possum	Pilliga Mouse	Justification - suitable habitat and culvert height
766.50	SINGLE	2.12	2.37	7.00	21.23	Start deeper	Start/ end of section not flooded in 20% AEP	7.2	1.8	9	3	12	0.20	0.61	Yes - start and end of section not flooded in 20% AEP, suitable aperture ratio for medium mammals, single track	Euligal	88	Dedicated (medium)	Ledge/timber	3	1	2	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
767.40	SINGLE	1.76	2.01	7.00	19.09	End deeper	Area not flooded in 20% AEP	7.2	1.5	8	3	13	0.19	0.57	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Euligal	394	Dedicated (medium)	Ledge/timber	0	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
769.05	SINGLE	2.77	3.03	7.00	25.17	Near to Coxes Road Lxing Area in curve Deepest at end	Area not flooded in 20% AEP	7.2	2.7	10	3	9	0.26	0.77	Yes - area not flooded in 20% AEP, suitable openness ratio for large mammals, single track	Rocky Creek	399	Dedicated (Koala)	Koala furniture, ledge, timber	2	1	2	2	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
769.50	SINGLE	1.85	2.11	7.00	19.65	Deepest at start	Area not flooded in 20% AEP	7.2	1.8	8	3	11	0.22	0.66	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Rocky Creek	398	Dedicated (medium)	Ledge/timber	3	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
770.60	SINGLE	0.71	0.96	7.00	12.79	Deepest at end - but there is flooding, have at original location	Some 20% AEP flooding at end	7.2	0.6	5	2	21	0.11	0.34	No - openness, low height		398								
771.50	SINGLE	0.68	0.94	7.00	12.61	Deepest in middle	Whole area has surrounding 20% AEP flood	7.2	0.6	5	2	21	0.11	0.34	No - flooding, low height		398								
771.80	SINGLE	0.77	1.03	7.00	13.16	Deepest in middle	Whole area has surrounding 20% AEP flood	7.2	0.6	5	2	22	0.11	0.33	No - flooding, low height		414								
773.70	SINGLE	2.49	2.74	7.00	23.45	Deepest at start	Area not flooded in 20% AEP	7.2	2.2	10	3	11	0.23	0.68	Yes - area not flooded in 20% AEP, suitable openness ratio for medium-large mammals, single track	Tinegie Creek	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
777.50	SINGLE	1.82	2.07	7.00	19.44	Deepest at end	Area entirely flooded in 20% AEP - suggest moving	7.2	1.8	8	3	11	0.22	0.67	No - flooding										
778.10	SINGLE	2.23	2.49	7.00	21.91	Deepest at start	Area entirely flooded in 20% AEP - suggest moving	7.2	2.2	9	3	10	0.24	0.72	No - flooding										
779.60	SINGLE	1.41	1.67	7.00	17.00	Deepest at end but need to avoid bridge and flooding	Flooding not at start for 20% AEP	7.2	1.2	7	2	14	0.17	0.51	Yes - flooding not at start for 20% AEP, suitable openness ratio for medium mammals, single track	Talluba Creek	399	Dedicated (medium)	Ledge/timber	0	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
779.90	SINGLE	1.45	1.70	7.00	17.22	Deepest at start but need to avoid flooding	Flooding not at end for 20% AEP	7.2	1.2	7	2	14	0.17	0.50	Yes - flooding not at end for 20% AEP, suitable openness ratio for medium mammals, single track	Talluba Creek	398	Dedicated (medium)	Ledge/timber	0	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
781.40	SINGLE	3.18	3.43	7.00	27.61	Deepest at end - plenty of depth - at start to avoid flooding - still some 20% AEP flooding at location	Whole area has surrounding 20% AEP flood	7.2	3.3	12	4	8	0.29	0.86	No - flooding										0.00
781.80	SINGLE	3.41	3.66	7.00	28.96	Deepest at start - plenty of depth - at end to avoid flooding - still some 20% AEP flooding at location	Some 20% AEP flooding throughout section - along Pilliga Forrest Way	7.2	3.6	12	4	8	0.30	0.89	Yes - some 20% AEP flooding in section, suitable openness for large mammals, single track	Sixteen Foot Road	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
783.50	SINGLE	7.14	7.39	7.00	51.35	Deepest at end - plenty of depth - at start to avoid flooding - still some 20% AEP flooding at location	Whole area has surrounding 20% AEP flood	7.2	3.6	21	7	14	0.17	0.50	No - flooding										0.00
783.90	SINGLE	6.53	6.78	7.00	47.69	Very deep throughout - likely better at end where shallower	Area not flooded in 20% AEP	7.2	3.6	20	7	13	0.18	0.54	Yes - area not flooded in 20% AEP, suitable openness ration for medium-large mammals, single track	County Line Road	88	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
785.00	SINGLE	2.20	2.45	7.00	21.71	Deepest at end, but also flooded there. Likely best at current	Flooded at end in 20% AEP	7.2	2.2	9	3	10	0.24	0.73	Yes - flooded at end in 20% AEP, suitable openness ratio for medium-large mammals, single track	Denobollie Road	141	Dedicated (large)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
786.70	SINGLE	2.45	2.71	7.00	23.25	Very deep throughout - likely better at start where shallower	Area not flooded in 20% AEP	7.2	2.2	10	3	11	0.23	0.68	Yes - area not flooded in 20% AEP, suitable openness ration for medium-large mammals, single track	Unnamed creek	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
787.00	SINGLE	3.70	3.96	7.00	30.74	Flooded at start, deep throughout, likely best at end	Flooded at start for 20% AEP	7.2	3.6	13	4	9	0.28	0.84	Yes - flooded at start in 20% AEP, suitable openness ratio for medium-large mammals, single track	Unnamed creek	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat

Proposed Culvert		Embankment Width						Culvert dimensions			Aperture ratio		Openness ratio												
Chainage	Track type	Culvert Height	Embankment Height	Capping width	Approx. Earthworks Width	Location	Flooding/ Issues?	Width 3 culv	Culvert Height	Length: width	Total Length: culv 3	Total length: height	Op 1 culv emb	Op 3 culv embank	Comment	Location	PCT	Structure	Recommended Furniture	Koala	Black-striped Wallaby	Rufous Bettong	Eastern Pygmy-possum	Pilliga Mouse	Justification - suitable habitat and culvert height
787.30	SINGLE	3.40	3.65	7.00	28.91	Flooded at end, partially at start, deep throughout, likely best at current location	Flooded at end, partially at start for 20% AEP	7.2	3.6	12	4	8	0.30	0.90	Yes - flooded at end, partially at start in 20% AEP, suitable openness ratio for medium-large mammals, single track	Shrubland	141	Dedicated (large)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
787.60	SINGLE	2.19	2.44	7.00	21.65	Some flooding at start, deepest at start, current location likely best	Area not flooded in 20% AEP, some at start	7.2	1.8	9	3	12	0.20	0.60	Yes - area not flooded in 20% AEP, suitable openness ration for medium mammals, single track	near shrubland	398	Dedicated (medium)	Ledge/timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
788.50	SINGLE	1.19	1.44	7.00	15.65	Deepest at end	Area not flooded in 20% AEP	7.2	0.9	7	2	17	0.14	0.41	Yes - area not flooded in 20% AEP, suitable openness ration for medium mammals, single track	Shrubland	141	Dedicated (small-medium)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
788.60	SINGLE	1.79	2.05	7.00	19.27	Deepest at end	Area not flooded in 20% AEP	7.2	1.5	8	3	13	0.19	0.56	Yes - area not flooded in 20% AEP, suitable openness ration for medium mammals, single track	Shrubland	141	Dedicated (medium)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
788.70	SINGLE	2.96	3.22	7.00	26.30	Deepest at end	Area not flooded in 20% AEP	7.2	2.7	11	4	10	0.25	0.74	Yes - area not flooded in 20% AEP, suitable openness ration for large mammals, single track	near shrubland	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
788.80	SINGLE	3.52	3.77	7.00	29.62	Deep throughout, deepest at end - likely too deep. Current location likely best	Area not flooded in 20% AEP	7.2	3.6	12	4	8	0.29	0.87	Yes - area not flooded in 20% AEP, suitable openness ration for large mammals, single track	near shrubland	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
789.00	SINGLE	4.65	4.91	7.00	36.46	Deep throughout, deepest at end - likely too deep. Current location likely best	Area not flooded in 20% AEP	7.2	3.6	15	5	10	0.24	0.71	Yes - area not flooded in 20% AEP, suitable openness ration for medium-large mammals, single track	Rocky Creek 2	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
789.60	SINGLE	6.03	6.28	7.00	44.70	Deep throught, deepest at start - likely too deep. Likely best at end	20% AEP flooding through bridge, otherwise ok	7.2	3.6	19	6	12	0.19	0.58	Yes - 20% AEP flooding at bridge, otherwise OK, suitable openness ration for medium-large mammals, single track	Rocky Creek 2	398	Dedicated (large)	Koala furniture, ledge, timber	2	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
790.00	SINGLE	1.95	2.20	7.00	20.20	Deepest at end but flooding, likely best at current location	Flooded at end in 20% AEP	7.2	1.8	8	3	11	0.21	0.64	Yes - flooded at end in 20% AEP, suitable openness ratio for medium-large mammals, single track	Rocky Creek 2	404	Dedicated (medium)	Ledge/timber	3	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
792.40	LOOP	1.04	1.30	16.10	25.19	IN LOOP Bump in middle, deepest at start	Whole area has surrounding 20% AEP flood	7.2	0.9						No - passing loop, flooding and low height	Kings Road									
793.50	LOOP	0.87	1.13	16.10	24.00	IN LOOP Deepest at end but some flooding there, likely best slightly after original location	Some 20% AEP flooding at end	7.2	0.6						No - passing loop, flooding and low height									
794.00	SINGLE	0.61	0.87	7.00	12.21	Just after loop, deepest at end	Area not flooded in 20% AEP	7.2	0.6	5	2	20	0.12	0.35	No - openness, low height										
794.10	SINGLE	1.12	1.38	7.00	15.28	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	0.9	6	2	17	0.14	0.42	No - flooding, low height										
794.20	SINGLE	1.08	1.33	7.00	14.99	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	0.9	6	2	17	0.14	0.43	No - flooding, low height										
795.80	SINGLE	2.12	2.38	7.00	21.27	Deepest at end	Area not flooded in 20% AEP	7.2	1.8	9	3	12	0.20	0.61	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Coghill Creek	398	Dedicated (medium)	Ledge/timber	3	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
796.00	SINGLE	2.11	2.36	7.00	21.18	Deepest at location	Area not flooded in 20% AEP	7.2	1.8	9	3	12	0.20	0.61	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Coghill Creek	398	Dedicated (medium)	Ledge/timber	3	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
797.00	SINGLE	2.03	2.29	7.00	20.73	Deepest at start, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.8	9	3	12	0.21	0.63	No - flooding										0.00
797.20	SINGLE	0.95	1.20	7.00	14.23	Deepest at start, but flooding at start. Likely best at end	Some flooding at start for 20% AEP	7.2	0.9	6	2	16	0.15	0.46	Yes - some flooding at start in 20% AEP, suitable openness ratio for medium mammals, single track	near shrubland	398	Dedicated (small-medium)	Ledge/timber	0	0	1	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
797.30	SINGLE	0.95	1.20	7.00	14.23	Deepest at start. Shallow throughout	Area not flooded in 20% AEP	7.2	0.9	6	2	16	0.15	0.46	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Shrubland	141	Dedicated (small-medium)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
797.80	SINGLE	0.21	0.47	7.00	9.79	Deepest at end. Shallow throughout	Area not flooded in 20% AEP	7.2	0.0						No - too low	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
798.00	SINGLE	0.22	0.48	7.00	9.87	Deepest at end. Shallow throughout	Area not flooded in 20% AEP	7.2	0.0						No - too low	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
798.10	SINGLE	0.22	0.48	7.00	9.87	Deepest at start. Shallow throughout	Area not flooded in 20% AEP	7.2	0.0						No - too low	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat

Proposed Culvert		Embankment Width						Culvert dimensions			Aperture ratio		Openness ratio												
Chainage	Track type	Culvert Height	Embankment Height	Capping width	Approx. Earthworks Width	Location	Flooding/ Issues?	Width 3 culv	Culvert Height	Length: width	Total Length: culv 3	Total length: height	Op 1 culv emb	Op 3 culv embank	Comment	Location	PCT	Structure	Recommended Furniture	Koala	Black-striped Wallaby	Rufous Bettong	Eastern Pygmy-possum	Pilliga Mouse	Justification - suitable habitat and culvert height
798.30	SINGLE	0.31	0.56	7.00	10.37	Shallow throughout	Area not flooded in 20% AEP	7.2	0.0						No - too low	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
798.50	SINGLE	0.41	0.67	7.00	11.01	Shallow throughout	Area not flooded in 20% AEP	7.2	0.0						No - too low	near shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
799.00	SINGLE	0.38	0.63	7.00	10.80	Shallow throughout	Area not flooded in 20% AEP	7.2	0.0						No - too low	Lanes mill	1384								
799.50	SINGLE	0.82	1.07	7.00	13.43	Shallow throughout	Area not flooded in 20% AEP	7.2	0.6	6	2	22	0.11	0.32	No - low height	Lanes mill	1384								
800.00	SINGLE	1.10	1.35	7.00	15.11	Deepest at end	Whole area has surrounding 20% AEP flood	7.2	0.9	0	0	0	0.00	0.00	No - flooding, low height										
800.25	SINGLE	2.26	2.51	7.00	22.08	At Jack Scott Road, flooding at start, deepest at end	Start section flooded in 20% AEP	7.2	2.2	9	3	10	0.24	0.72	Yes - start section flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Simmonds Road/Mollieroi Creek	399	Dedicated (large)	Koala furniture, ledge, timber	2	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
801.10	SINGLE	1.46	1.71	7.00	17.27	Deepest at start	Area not flooded in 20% AEP	7.2	1.2	7	2	14	0.17	0.50	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Mollieroi Creek	398	Dedicated (medium)	Ledge/timber	0	1	2	1	1	Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
801.30	SINGLE	0.82	1.07	7.00	13.45	Deepest at end	Area not flooded in 20% AEP	7.2	0.6	6	2	22	0.11	0.32	No - openness	Mollieroi Creek	398								0.00
802.60	SINGLE	0.45	0.71	7.00	11.25	Deepest towards start, flooded throughout	Whole area has surrounding 20% AEP flood	7.2	0.0						No - flooding, low height										0.00
803.50	SINGLE	0.54	0.80	7.00	11.78	Hump in middle, deepest at end	Area not flooded in 20% AEP	7.2	0.0						No - too low	twenty Foot Road									0.00
803.90	SINGLE	1.02	1.28	7.00	14.68	Deepest at start	Area not flooded in 20% AEP	7.2	0.9	6	2	16	0.15	0.44	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Sparrow Road	398	Dedicated (small-medium)	Ledge/timber	0	0	2	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
804.10	SINGLE	0.76	1.01	7.00	13.06	Deepest towards end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	0.6						No - flooding, low height	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
804.20	SINGLE	0.74	1.00	7.00	13.00	Relatively constant elevation difference, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	0.6						No - flooding, low height	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
804.30	SINGLE	0.81	1.07	7.00	13.41	Relatively constant elevation difference, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	0.6						No - flooding, low height	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
804.50	SINGLE	0.62	0.88	7.00	12.25	Deepest at end	Area not flooded in 20% AEP	7.2	0.6	5	2	20	0.12	0.35	No - openness, low height	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
804.60	SINGLE	0.72	0.98	7.00	12.88	Deepest at end	Area not flooded in 20% AEP	7.2	0.6	5	2	21	0.11	0.34	No - openness, low height	Shrubland	141	Gravel removal							Pilliga Mouse preferred habitat
804.70	SINGLE	1.06	1.32	7.00	14.90	Deepest at end	Area not flooded in 20% AEP	7.2	0.9	6	2	17	0.14	0.43	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Shrubland	141	Dedicated (small-medium)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
804.80	SINGLE	1.50	1.75	7.00	17.52	Deepest at end, flooding at end, likely best at location	Area at end flooded in 20% AEP	7.2	1.5	7	2	12	0.21	0.62	Yes - area at end flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Shrubland	141	Dedicated (medium)	Ledge/timber	0	0	0	1	1	Eastern Pygmy-possum polygon and Pilliga Mouse habitat
805.10	SINGLE	1.00	1.26	7.00	14.56	Deepest at start, hump in middle, flooded at end, likely best at start	Area at end flooded in 20% AEP	7.2	0.9	6	2	16	0.15	0.45	Yes - area at end flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Lucky Flat	398	Dedicated (small-medium)	Ledge/timber	0	0	2	2	1	Pilliga Mouse habitat
805.60	SINGLE	1.59	1.85	7.00	18.08	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.2	8	3	15	0.16	0.48	No - flooding	Lucky Flat									
805.90	SINGLE	2.13	2.38	7.00	21.28	Deepest at start, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.8	9	3	12	0.20	0.61	No - flooding	Lucky Flat									
807.20	SINGLE	1.04	1.30	7.00	14.78	Deepest at start, but flooding at start. Likely best at location	20% AEP flooding at start	7.2	0.9	6	2	16	0.15	0.44	Yes - area at start flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Lucky Flat	398	Dedicated (small-medium)	Ledge/timber	0	0	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Pilliga Mouse habitat
809.20	SINGLE	2.00	2.26	7.00	20.54	Deepest at start, but flooding at start. Likely best at end	20% AEP flooding at start	7.2	1.8	9	3	11	0.21	0.63	Yes - area at start flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Goona Creek	399/398	Dedicated (medium)	Ledge/timber	3	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
810.30	SINGLE	0.78	1.04	7.00	13.24	Deepest at start	Area not flooded in 20% AEP	7.2	0.6	6	2	22	0.11	0.33	No - openness, low height	Goona Creek	398								
811.00	SINGLE	1.59	1.84	7.00	18.05	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.2	8	3	15	0.16	0.48	No - flooding	Shatz Road									
812.00	SINGLE	0.97	1.23	7.00	14.35	Deepest at start, but flooding at start, likely best at end	20% AEP flooding at start	7.2	0.9	6	2	16	0.15	0.45	Yes - area at start flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Shatz Road	398	Dedicated (small-medium)	Ledge/timber	0	0	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Pilliga Mouse habitat

Proposed Culvert		Embankment Width						Culvert dimensions			Aperture ratio		Openness ratio												
Chainage	Track type	Culvert Height	Embankment Height	Capping width	Approx. Earthworks Width	Location	Flooding/ Issues?	Width 3 culv	Culvert Height	Length: width	Total Length: culv 3	Total length: height	Op 1 culv emb	Op 3 culv embank	Comment	Location	PCT	Structure	Recommended Furniture	Koala	Black-striped Wallaby	Rufous Bettong	Eastern Pygmy-possum	Pilliga Mouse	Justification - suitable habitat and culvert height
813.40	SINGLE	0.92	1.17	7.00	14.03	Deepest at end	Area not flooded in 20% AEP	7.2	0.9	6	2	16	0.15	0.46	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Old road	398	Dedicated (small-medium)	Ledge/timber	0	0	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Pilliga Mouse habitat
813.50	SINGLE	1.08	1.33	7.00	15.00	Deepest at end	Area not flooded in 20% AEP	7.2	0.9	6	2	17	0.14	0.43	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Old Mill Road	398	Dedicated (small-medium)	Ledge/timber	0	0	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Pilliga Mouse habitat
814.50	SINGLE	1.24	1.49	7.00	15.95	Deepest at start, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.2	7	2	13	0.18	0.54	No - flooding										
815.50	SINGLE	1.04	1.29	7.00	14.76	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	0.9	6	2	16	0.15	0.44	No - flooding										
816.80	SINGLE	2.20	2.45	7.00	21.73	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.2	9	3	18	0.13	0.40	No - flooding										
818.00	SINGLE	1.34	1.59	7.00	16.55	Hump in middle, deepest at start	Area not flooded in 20% AEP	7.2	1.2	7	2	14	0.17	0.52	Yes - area not flooded in 20% AEP, suitable openness ratio for medium mammals, single track	Bundook Creek	398	Dedicated (medium)	Ledge/timber	0	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
819.50	SINGLE	1.40	1.66	7.00	16.96	Relatively same depth throughout, flooding at end, likely best at start	Some flooding at end for 20% AEP	7.2	1.2	7	2	14	0.17	0.51	Yes - some flooding in 20% AEP, suitable openness ratio for medium mammals, single track	Dog Fence Road	398	Dedicated (medium)	Ledge/timber	0	1	1	1	1	Rufous Bettong, Eastern Pygmy-possum polygon and Black-stiped Wallaby and Pilliga Mouse habitat
829.70	SIDING	1.36	1.62	16.80	28.13	IN LOOP - AT SIDING Deepest at end	Area not flooded in 20% AEP	7.2	1.2	12	4	23	0.10	0.31	No - openness, passing loop and siding	Bohena Creek	399			0	0	0	0	0	
831.40	LOOP	2.25	2.51	16.10	33.67	IN LOOP Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	2.2	14	5	15	0.16	0.47	No - flooding, passing loop	Bohena Creek	148			1	0	0	1	0	Koala and Eastern Pygmy-possum polygon
831.80	LOOP	2.86	3.12	16.10	37.93	IN LOOP Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	2.7	16	5	14	0.17	0.51	No - flooding, passing loop	Bohena Creek	148			1	0	0	1	0	Koala and Eastern Pygmy-possum polygon
832.50	SINGLE	2.01	2.26	7.00	20.56	Deepest at start, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.8	9	3	11	0.21	0.63	No - flooding	Bohena Creek	148	Dedicated (medium)	Ledge/timber	3	0	0	1	0	Eastern Pygmy-possum polygon
833.40	SINGLE	1.89	2.15	7.00	19.88	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	1.8	8	3	11	0.22	0.65	No - flooding	Bohena Creek	148	Dedicated (medium)	Ledge/timber	3	0	0	1	0	Eastern Pygmy-possum polygon
834.10	SINGLE	3.08	3.34	7.00	27.03	Deepest at end, flooding throughout	Whole area has surrounding 20% AEP flood	7.2	3.3	11	4	8	0.29	0.88	No - flooding, may be suitable for arboreal fauna	Bohena Creek	148	Dedicated (Koala)	Koala furniture, ledge, timber	1	0	0	1	0	Koala and Eastern Pygmy-possum polygon

Table C.3 Drainage culverts and associated fauna furniture

Note that these structures and furniture will be developed and revised during detailed design and the preparation of the threatened species management plans, and will be updated in the Final Fauna Connectivity Strategy and in consultation with BCS.

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	547.29		Small fauna (echidnas, reptiles etc)	
Incidental	547.41		General fauna (macropods, echidnas, reptiles etc)	
Incidental	547.68		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	547.86		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	548.04		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	548.20		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	548.36		Small fauna (echidnas, reptiles etc)	
Incidental	548.38		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	548.72		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	549.02		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	550.07		Small fauna (echidnas, reptiles etc)	
Incidental	550.21		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	550.63		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	551.03		Small fauna (echidnas, reptiles etc)	
Incidental	551.45		Small fauna (echidnas, reptiles etc)	
Incidental	552.38		Small fauna (echidnas, reptiles etc)	
Combined	553.18		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	553.36		Small fauna (echidnas, reptiles etc)	
Incidental	553.51		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	553.68		Small fauna (echidnas, reptiles etc)	
Combined	553.97		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	554.07		Small fauna (echidnas, reptiles etc)	
Incidental	554.17		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	554.28		Small fauna (echidnas, reptiles etc)	
Incidental	554.54		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	554.79		Small fauna (echidnas, reptiles etc)	
Incidental	555.11		Small fauna (echidnas, reptiles etc)	
Incidental	555.90		Small fauna (echidnas, reptiles etc)	
Incidental	556.22		Small fauna (echidnas, reptiles etc)	
Incidental	556.58		Small fauna (echidnas, reptiles etc)	
Incidental	556.70		Small fauna (echidnas, reptiles etc)	
Incidental	556.99		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	557.20		Small fauna (echidnas, reptiles etc)	
Incidental	557.37		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	557.61		Small fauna (echidnas, reptiles etc)	
Incidental	557.79		Small fauna (echidnas, reptiles etc)	
Incidental	557.99		Small fauna (echidnas, reptiles etc)	
Incidental	558.22		Small fauna (echidnas, reptiles etc)	
Combined	558.60		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	558.76		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	558.89		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	559.15		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	559.41		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	560.10		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	560.29		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	564.00		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	566.87		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	568.92		Small fauna (echidnas, reptiles etc)	
Combined	570.02		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	571.03		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	571.98		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	572.82		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	573.50		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	574.23		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	575.44		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	575.93		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	577.32		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	577.97		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	578.07		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	579.22		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	580.34		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	580.55		Small fauna (echidnas, reptiles etc)	
Incidental	580.74		Small fauna (echidnas, reptiles etc)	
Incidental	582.87		Small fauna (echidnas, reptiles etc)	
Incidental	583.33		Small fauna (echidnas, reptiles etc)	
Incidental	583.39		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	583.64		Small fauna (echidnas, reptiles etc)	
Incidental	583.84		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	584.01		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	586.22		Small fauna (echidnas, reptiles etc)	
Combined	586.39		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	586.55		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	586.71		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	586.97		General fauna (macropods, echidnas, reptiles etc)	
Incidental	587.89		Small fauna (echidnas, reptiles etc)	
Incidental	588.19		Small fauna (echidnas, reptiles etc)	
Incidental	590.02		Small fauna (echidnas, reptiles etc)	
Incidental	590.67		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	598.99		Small fauna (echidnas, reptiles etc)	
Incidental	599.11		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	599.23		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	599.37		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	599.57		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	604.86		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	605.00		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	626.14		Small fauna (echidnas, reptiles etc)	
Combined	627.32		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	628.04		Small fauna (echidnas, reptiles etc)	
Incidental	628.28		Small fauna (echidnas, reptiles etc)	
Combined	629.53		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	630.39		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	630.61		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	630.73		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	631.40		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	631.77		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	635.12		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	635.23		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	635.38		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	635.88		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	636.52		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	636.81		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	637.40		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	638.18		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	638.35		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	639.83		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	640.12		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	640.40		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	640.57		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	640.92		Medium fauna (wombats, echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	641.08		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	641.23		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	641.37		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	641.48		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	641.58		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	641.75		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	641.98		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	643.10		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	643.17		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	643.85		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	644.16		Small fauna (echidnas, reptiles etc)	
Incidental	644.74		Small fauna (echidnas, reptiles etc)	
Incidental	645.10		Small fauna (echidnas, reptiles etc)	
Incidental	645.35		Small fauna (echidnas, reptiles etc)	
Incidental	645.51		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	645.93		Small fauna (echidnas, reptiles etc)	
Incidental	646.11		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	646.27		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	646.40		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	646.51		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	646.62		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	646.76		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	646.85		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	646.88		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	647.03		Small fauna (echidnas, reptiles etc)	
Incidental	647.52		Small fauna (echidnas, reptiles etc)	
Incidental	647.62		Small fauna (echidnas, reptiles etc)	
Incidental	647.96		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	648.05		Small fauna (echidnas, reptiles etc)	
Incidental	648.09		Small fauna (echidnas, reptiles etc)	
Incidental	648.14		Small fauna (echidnas, reptiles etc)	
Incidental	648.19		Small fauna (echidnas, reptiles etc)	
Incidental	648.23		Small fauna (echidnas, reptiles etc)	
Incidental	648.35		Small fauna (echidnas, reptiles etc)	
Incidental	648.70		Small fauna (echidnas, reptiles etc)	
Combined	649.34		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	649.46		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	649.61		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	649.74		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	649.85		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	650.00		Small fauna (echidnas, reptiles etc)	
Incidental	651.08		Small fauna (echidnas, reptiles etc)	
Combined	655.53		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	656.55		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	656.65		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	658.85		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	658.96		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	659.06		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	660.42		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	660.83		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	660.90		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	660.98		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	664.91		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	665.00		Small fauna (echidnas, reptiles etc)	
Incidental	665.62		Small fauna (echidnas, reptiles etc)	
Incidental	665.69		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	665.91		Small fauna (echidnas, reptiles etc)	
Incidental	665.98		Small fauna (echidnas, reptiles etc)	
Incidental	666.59		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	666.74		Small fauna (echidnas, reptiles etc)	
Incidental	666.91		Small fauna (echidnas, reptiles etc)	
Incidental	667.18		Small fauna (echidnas, reptiles etc)	
Incidental	667.44		Small fauna (echidnas, reptiles etc)	
Incidental	667.58		Small fauna (echidnas, reptiles etc)	
Incidental	667.76		Small fauna (echidnas, reptiles etc)	
Incidental	667.86		Small fauna (echidnas, reptiles etc)	
Incidental	667.97		Small fauna (echidnas, reptiles etc)	
Incidental	668.17		Small fauna (echidnas, reptiles etc)	
Incidental	668.50		Small fauna (echidnas, reptiles etc)	
Incidental	668.65		Small fauna (echidnas, reptiles etc)	
Incidental	669.48		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	669.63		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	669.89		Small fauna (echidnas, reptiles etc)	
Incidental	670.31		Small fauna (echidnas, reptiles etc)	
Incidental	671.88		Small fauna (echidnas, reptiles etc)	
Incidental	672.72		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	673.85		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	674.01		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	674.42		Small fauna (echidnas, reptiles etc)	
Incidental	674.56		Small fauna (echidnas, reptiles etc)	
Incidental	674.76		Small fauna (echidnas, reptiles etc)	
Incidental	674.89		Small fauna (echidnas, reptiles etc)	
Incidental	675.01		Small fauna (echidnas, reptiles etc)	
Incidental	675.21		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	675.41		Small fauna (echidnas, reptiles etc)	
Combined	675.62		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	675.94		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	676.08		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	676.18		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	676.32		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	676.45		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	677.42		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	677.77		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	677.99		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	678.83		Small fauna (echidnas, reptiles etc)	
Incidental	679.00		Small fauna (echidnas, reptiles etc)	
Incidental	679.13		Small fauna (echidnas, reptiles etc)	
Incidental	679.27		Small fauna (echidnas, reptiles etc)	
Incidental	679.43		Small fauna (echidnas, reptiles etc)	
Incidental	679.73		Small fauna (echidnas, reptiles etc)	
Combined	680.12		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	680.26		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	680.39		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	680.83		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	681.11		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	681.29		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	681.74		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	681.94		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	682.06		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	682.46		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	682.90		Small fauna (echidnas, reptiles etc)	
Incidental	683.56		Medium fauna (wombats, echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	683.70		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	684.26		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	684.48		Small fauna (echidnas, reptiles etc)	
Incidental	684.66		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	684.89		Small fauna (echidnas, reptiles etc)	
Incidental	685.13		Small fauna (echidnas, reptiles etc)	
Incidental	685.34		Small fauna (echidnas, reptiles etc)	
Combined	685.52		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	686.02		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	686.24		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	687.13		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	691.35		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	693.97		Small fauna (echidnas, reptiles etc)	
Incidental	694.03		Small fauna (echidnas, reptiles etc)	
Combined	694.19		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	694.57		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	694.63		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	695.56		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	695.64		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	697.47		Small fauna (echidnas, reptiles etc)	
Combined	697.74		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	697.85		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	697.90		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	697.98		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	702.28		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	702.47		Small fauna (echidnas, reptiles etc)	
Incidental	702.52		Small fauna (echidnas, reptiles etc)	
Incidental	702.57		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	703.50		Small fauna (echidnas, reptiles etc)	
Incidental	703.77		Small fauna (echidnas, reptiles etc)	
Combined	703.99		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	704.05		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	704.19		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	704.26		Small fauna (echidnas, reptiles etc)	
Incidental	704.50		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	704.55		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	704.68		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	704.94		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	704.98		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	705.19		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	705.23		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	706.89		Small fauna (echidnas, reptiles etc)	
Combined	707.01		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	707.63		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	707.76		Small fauna (echidnas, reptiles etc)	
Incidental	707.98		Small fauna (echidnas, reptiles etc)	
Incidental	708.47		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	708.57		Small fauna (echidnas, reptiles etc)	
Incidental	708.65		Small fauna (echidnas, reptiles etc)	
Incidental	708.73		Small fauna (echidnas, reptiles etc)	
Incidental	708.90		Small fauna (echidnas, reptiles etc)	
Incidental	708.98		Small fauna (echidnas, reptiles etc)	
Incidental	709.11		Small fauna (echidnas, reptiles etc)	
Incidental	709.18		Small fauna (echidnas, reptiles etc)	
Incidental	709.23		Small fauna (echidnas, reptiles etc)	
Combined	709.32		Medium fauna (wombats, echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	709.36		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	709.42		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.46		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.57		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.66		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.74		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.81		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.87		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	709.95		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	710.18		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	710.60		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	710.75		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	710.83		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on one outside culvert (south)
Incidental	713.53		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	713.63		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	713.71		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	714.16		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	714.39		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	714.49		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	714.55		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	715.38		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	717.87		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	718.04		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	718.07		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	718.17		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	719.41		Small fauna (echidnas, reptiles etc)	
Incidental	719.53		Small fauna (echidnas, reptiles etc)	
Incidental	720.09		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	720.14		Small fauna (echidnas, reptiles etc)	
Incidental	720.36		Small fauna (echidnas, reptiles etc)	
Incidental	720.79		Small fauna (echidnas, reptiles etc)	
Combined	720.99		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	721.18		Small fauna (echidnas, reptiles etc)	
Incidental	721.27		Small fauna (echidnas, reptiles etc)	
Incidental	721.32		Small fauna (echidnas, reptiles etc)	
Incidental	721.42		Small fauna (echidnas, reptiles etc)	
Incidental	721.49		Small fauna (echidnas, reptiles etc)	
Incidental	721.54		Small fauna (echidnas, reptiles etc)	
Incidental	721.59		Small fauna (echidnas, reptiles etc)	
Incidental	721.69		Small fauna (echidnas, reptiles etc)	
Incidental	721.81		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	722.03		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.08		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.16		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.21		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	722.45		General fauna (macropods, echidnas, reptiles etc)	
Combined	722.50		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.56		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.62		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.70		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	722.83		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	725.49		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	728.11		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	728.24		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	728.28		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	728.83		Medium fauna (wombats, echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	729.88		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	730.83		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	731.16		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	731.95		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	732.26		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	732.33		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	732.88		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	733.38		General fauna (macropods, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	734.09		Small fauna (echidnas, reptiles etc)	
Incidental	734.61		Small fauna (echidnas, reptiles etc)	
Incidental	734.64		Small fauna (echidnas, reptiles etc)	
Incidental	734.70		Small fauna (echidnas, reptiles etc)	
Incidental	734.79		Small fauna (echidnas, reptiles etc)	
Incidental	735.30		Small fauna (echidnas, reptiles etc)	
Incidental	735.43		Small fauna (echidnas, reptiles etc)	
Incidental	735.59		Medium fauna (wombats, echidnas, reptiles etc)	
Combined	735.69		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	736.29		Small fauna (echidnas, reptiles etc)	
Combined	737.01		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	737.14		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	737.89		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	737.98		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on one outside culvert
Combined	738.15		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	738.90		Small fauna (echidnas, reptiles etc)	
Incidental	738.96		Small fauna (echidnas, reptiles etc)	
Incidental	739.53		Small fauna (echidnas, reptiles etc)	
Incidental	739.65		Small fauna (echidnas, reptiles etc)	
Incidental	739.94		Small fauna (echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	740.42		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	740.47		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	740.51		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	740.63		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	740.70		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	741.13		Small fauna (echidnas, reptiles etc)	
Incidental	741.26		Small fauna (echidnas, reptiles etc)	
Incidental	741.34		Small fauna (echidnas, reptiles etc)	
Incidental	741.46		Small fauna (echidnas, reptiles etc)	
Combined	741.92		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	741.96		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Combined	742.02		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge on outside culverts
Incidental	742.31		Small fauna (echidnas, reptiles etc)	
Incidental	742.44		Small fauna (echidnas, reptiles etc)	
Incidental	742.61		Small fauna (echidnas, reptiles etc)	
Incidental	742.71		Small fauna (echidnas, reptiles etc)	
Incidental	742.91		Small fauna (echidnas, reptiles etc)	
Incidental	744.44		Small fauna (echidnas, reptiles etc)	
Incidental	744.69		Small fauna (echidnas, reptiles etc)	
Incidental	744.74		Small fauna (echidnas, reptiles etc)	
Incidental	744.84		Small fauna (echidnas, reptiles etc)	
Incidental	744.90		Small fauna (echidnas, reptiles etc)	
Incidental	745.00		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	745.48	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	745.59	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	745.80	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	746.85	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	747.38	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	752.19	Black-striped Wallaby	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	752.48	Black-striped Wallaby	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	753.16	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	753.33	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	753.38	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	753.48	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	753.64	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	757.44	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	757.55	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	758.97	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	759.46	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	761.19	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	761.24	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	761.79	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	762.89	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	764.02	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	764.07	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	764.79	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	764.87	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	765.01	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	765.05	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	765.13	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	765.17	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	765.61	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	765.70	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	766.41	Koala, Black-striped Wallaby, Rufous Bettong, Eastern	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
		Pygmy-possum, Pilliga Mouse		
Combined	767.59	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	767.91	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	769.41	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	
Combined	770.81	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in culvert for small terrestrial mammals (as per RMS designs)
Combined	771.10	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	771.24	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	772.05	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	772.16	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	773.45	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	773.54	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	773.62	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	777.56	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	778.02	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	778.55	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	778.97	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	779.02	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	779.74	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	779.77	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	779.80	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	782.94	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	783.07	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	785.06	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	787.36	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	787.38	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	787.41	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	787.52	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Dedicated (Pilliga Mouse)	788.20	Pilliga Mouse, Eastern Pygmy-possum	Small fauna (echidnas, reptiles etc)	5 x 40m
Combined	790.13	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	790.24	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	790.33	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Dedicated (Pilliga Mouse)	790.50	Pilliga Mouse, Eastern Pygmy-possum	Small fauna (echidnas, reptiles etc)	1 x 40 m
Incidental	792.57	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	793.41	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	793.83	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	794.25	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	796.11	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	796.16	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	796.27	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	796.63	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	796.66	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	796.90	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	796.93	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Dedicated (Pilliga Mouse)	797.40	Pilliga Mouse, Eastern Pygmy-possum	Small fauna (echidnas, reptiles etc)	10x40m
Combined	800.33	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.40	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	800.57	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.59	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.62	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.66	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.77	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.86	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.94	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	800.98	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	801.03	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	801.73	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	801.84	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	801.89	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	802.05	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	802.13	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	802.20	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	802.30	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	802.43	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	802.53	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	803.26	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	803.65	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	803.77	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Dedicated (Pilliga Mouse)	804.10	Pilliga Mouse, Eastern Pygmy-possum	Small fauna (echidnas, reptiles etc)	7x40 m
Incidental	804.32	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	804.85	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	804.96	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	805.81	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	806.36	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	806.62	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	806.70	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	807.02	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	807.08	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	807.15	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	807.67	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	808.22	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	808.36	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	808.50	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	808.81	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	808.91	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	808.95	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	809.00	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	809.05	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	810.04	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	810.67	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	810.75	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	811.09	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	811.14	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	811.18	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	811.28	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	811.69	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	811.73	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	812.22	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	812.26	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in culvert for small terrestrial mammals (as per RMS designs)
Combined	812.60	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	812.65	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	812.69	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	814.04	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	814.13	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	814.17	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	814.20	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	814.24	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	814.90	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	815.55	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	817.12	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	818.18	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	819.65	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	819.91	Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	820.89		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	820.93		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	822.07	Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	822.20	Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	824.80		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	825.12		Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	825.40		Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	825.97		Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	826.69	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	826.90	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Incidental	827.85	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	827.87	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	829.90	Koala, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	829.93	Koala, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	829.97	Koala, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.11	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.24	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.29	Koala, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.33	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.41	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.48	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	830.74	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	830.89	Eastern Pygmy-possum, Pilliga Mouse	Small fauna (echidnas, reptiles etc)	Small ledge
Combined	831.67	Koala, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	832.14	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	833.13	Pilliga Mouse	Medium fauna (wombats, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	833.75	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	833.82	Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Combined	833.89	Koala, Eastern Pygmy-possum, Pilliga Mouse	General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Combined	839.54		General fauna (macropods, echidnas, reptiles etc)	Low ledge to be included in outside culverts for small terrestrial mammals (as per RMS designs)
Incidental	839.87		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	842.33		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	842.65		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	842.92		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	848.53		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.58		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.62		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.65		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.70		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.74		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.78		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.86		General fauna (macropods, echidnas, reptiles etc)	
Incidental	848.89		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	848.92		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	848.96		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.00		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.04		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.09		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.19		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.26		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.42		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.49		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.57		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.61		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	849.83		Medium fauna (wombats, echidnas, reptiles etc)	

Culvert type	Chainage	Key threatened species	Other fauna	Other furniture
Incidental	849.87		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	850.13		Medium fauna (wombats, echidnas, reptiles etc)	
Incidental	850.39		Medium fauna (wombats, echidnas, reptiles etc)	

Table C.4 Barrier poles/mesh and glider poles

Note that these structures and furniture will be developed and revised during detailed design and the preparation of the threatened species management plans, and will be updated in the final Fauna Connectivity Strategy and in consultation with BCS.

Chainage	Type	Notes
563.05	Canopy bridge	
563.2	Canopy bridge	
609.71	Canopy bridge	
612.11	Canopy bridge	
652.15	Canopy bridge	
652.25	Canopy bridge	
673.08	Canopy bridge	
746.8	Canopy bridge	
747.3	Canopy bridge	
747.76	Barrier poles	Baradine Creek. Tall poles set every 2 metres or so (or mesh) along each side of bridge at main gap in vegetation along creek.
747.76	Canopy bridge	Canopy bridge to be slung under Baradine Creek bridge if height permits
750	Canopy bridge	
751	Canopy bridge	
752.71	Barrier poles	Coolangala Creek. Tall poles set every 2 metres or so (or mesh) along each side of bridge at main gap in vegetation along creek.
753	Canopy bridge	
755.7	Canopy bridge	
757.1	Canopy bridge	
759.3	Canopy bridge	
760.3	Canopy bridge	
761	Canopy bridge	
762	Canopy bridge	
763.46	Barrier poles	Etoo Creek. Tall poles set every 2 metres or so (or mesh) along each side of bridge at main gap in vegetation along creek.
765	Canopy bridge	
766.6	Canopy bridge	
768.3	Canopy bridge	

Chainage	Type	Notes
769.14	Barrier poles	Rocky Creek. Tall poles set every 2 metres or so (or mesh) along each side of bridge at main gap in vegetation along creek.
769.14	Canopy bridge	Canopy bridge to be slung under Rocky Creek bridge if height permits
770	Canopy bridge	
771.5	Canopy bridge	
772.7	Canopy bridge	
773.5	Canopy bridge	
774	Canopy bridge	
775.1	Canopy bridge	
776.5	Canopy bridge	
777.7	Canopy bridge	
779.3	Canopy bridge	
781	Canopy bridge	
782.6	Canopy bridge	
783.65	Canopy bridge	
784.5	Canopy bridge	
786	Canopy bridge	
787.1	Canopy bridge	
788.2	Canopy bridge	
789.38	Canopy bridge	
791	Canopy bridge	
791.8	Canopy bridge	
793	Canopy bridge	
794.6	Canopy bridge	
795.5	Canopy bridge	
797	Canopy bridge	
798.5	Canopy bridge	
799.5	Canopy bridge	
800.44	Barrier poles	Mollieroi Creek. Tall poles set every 2 metres or so (or mesh) along each side of bridge at main gap in vegetation along creek.

Chainage	Type	Notes
802	Canopy bridge	
803.4	Canopy bridge	
805	Canopy bridge	
806.5	Canopy bridge	
808	Canopy bridge	
809.11	Barrier poles	Goona Creek. Tall poles set every 2 metres or so (or mesh) along each side of bridge at main gap in vegetation along creek.
810.5	Canopy bridge	
812	Canopy bridge	
813	Canopy bridge	
814.5	Canopy bridge	
816	Canopy bridge	
819	Canopy bridge	
820	Canopy bridge	Bohena Creek - extend canopy bridge across Newell Highway if possible
829.5	Canopy bridge	Extend under Newell Highway?
831.1	Canopy bridge	Extend canopy bridge across Newell Highway if possible
832.7	Canopy bridge	Extend canopy bridge across Newell Highway if possible
835	Canopy bridge	Linear remnant connecting Newell Highway to the west
840.15	Canopy bridge	Canopy bridge to be slung under Namoi River viaduct
844.5	Canopy bridge	Canopy bridge to be slung under Narrabri Creek viaduct
847.7	Canopy bridge	

Appendix D – Connectivity, train strike and mitigation assessment for prescribed impacts

Table D.1 Connectivity, train strike and mitigation assessment for prescribed impacts

Species	Species Polygon/ potential habitat	Species Polygon/ potential habitat (Pilliga)	% in the Pilliga	Occurrence	Patch size	Home range	Demography	Estimated number of individuals	Gap threshold	Abililty	Movement	Train strike	Mitigation
Koala	257.5	207.09	80.4	Three areas of occupancy mapped in the Pilliga: Baradine Creek to Coolangala Creek, Etoo Creek area, and north-east Pilliga (Phillips 2021)	<5 ha	In the Pilliga State Forest, the average home range is 10–15 ha. Similarly, other studies in north eastern NSW (Phillips 1994; Callaghan and Phillips 1998) have established home ranges for individual koalas of 13–15 ha.	Koalas live in breeding aggregations, generally comprising a dominant male, a small number of mature females, as well as juveniles of various ages (Phillips 1997).	Low. Phillips (2021) estimated that 33 Koalas may have home ranges intersected by the proposal.	High. Known to travel across cleared land (paddocks)	High. Likely to be able to cross over and under the rail line.	In northern NSW long-distance dispersal of up to 16.6 km was recorded in around 20% of the population, and the average dispersal distance was found to be 5.6 km (Norman et al 2019).	Koalas are at risk of train strike while moving between forage trees, particularly in vegetation associated with creeklines in the Pilliga.	Fauna monitoring for the Bonville Pacific Highway Upgrade identified the Koala utilising bridge underpasses (RTA 2009). A study at Brunswick Heads recorded a greater number of complete passages made through bridge underpasses than box culverts (AMBS 2002). Koalas have been shown to use structures as small as 2.4 metres by 1.2 metres near Brunswick Heads (Taylor and Goldingay 2003), and up to 100 metres long (SKM 2013). Dedicated culverts under the M1 (Sydney to Newcastle freeway) were found to be used by Koala and Eastern Pygmy-possum (RTA 2009). A study of box culvert usage by Koalas for the Bonville Koala study identified 20 records of Koalas using a dedicated underpass; comprising four complete passages (equates to eight records), two probable complete passages, seven unlikely passages and three non-passages (AMBS 2009).
Rufous Bettong	357.9	357.9	100.0	Previously thought to be extinct in the Pilliga, until occasional records from the 1990s. 4 records since 1990's in Bionet	<5 ha	Estimates of home-range size vary from about 20 ha in northern New South Wales to 44-107 ha at Black Rock in North Queensland (Frederick and Johnson, 1996)	Solitary or small groups (Frederick and Johnson, 1996)	Low. Few records. Previously considered extinct in the area.	Little information available	Moderate. May be able to cross over the rail line. Likely to cross under the rail line.	Little information available	Operation of the rail line would create a risk of injury and mortality from train strike.	Fauna monitoring for the Bonville Pacific Highway Upgrade identified many species utilising bridge underpasses including species of wallabies, possums, Koala, echidna, bandicoots, rats, antechinus, bats, foxes, cats, and a variety of birds, lizards and snakes (RTA 2009). A study at Brunswick Heads recorded a greater number of complete passages made through bridge underpasses than box culverts (AMBS 2002). Bettongs have been clearly identified using culverts during surveys for the Glenugie upgrade (RMS 2014).
Black-striped Wallaby	654	654	100.0	The main distribution for the Black-striped Wallaby in the study area occurs in the Pilliga forests. This species prefers dense cover, but is also known to graze in crops (Strahan 1995).	<5 ha	Home ranges of black-striped wallabies (91 ha) (Evans 1996)	Often occurs in groups of up to 20 (Strahan 1995)	Moderate. Restricted to the Pilliga area	White (2004) noted that the species can occur in grassland adjacent to forest. Likely to be able to move across gaps in the forest.	High. Likely to be able to cross over and under the rail line.	Little information available	Based on the habitat requirements of this species, train strike risk would be highest in areas where shrubby forest (shelter habitat) occurs near grassy areas (foraging habitat).	Fauna monitoring for the Bonville Pacific Highway Upgrade identified many species utilising bridge underpasses including species of wallabies, possums, Koala, echidna, bandicoots, rats, antechinus, bats, foxes, cats, and a variety of birds, lizards and snakes (RTA 2009). A study at Brunswick Heads recorded a greater number of complete passages made through bridge underpasses than box culverts (AMBS 2002).

Species	Species Polygon/ potential habitat	Species Polygon/ potential habitat (Pilliga)	% in the Pilliga	Occurrence	Patch size	Home range	Demography	Estimated number of individuals	Gap threshold	Abililty	Movement	Train strike	Mitigation
Eastern Pygmy-possum	835.5	596.2	71.4	Patchily distributed and its overall abundance is low (Bowen and Goldingay 2000)	<5 ha	Short-term home-range areas are small with males generally utilizing larger areas than females (Harris 2008). Ward (1990) reported home ranges of males as 0.24–1.68 ha and of females as 0.18–0.61 ha.	Appear to be mainly solitary, each individual using several nests (EES 2019b).	Unknown. Likely to occur in low densities or as scattered populations depending on habitat values.	Typically, individuals move at ground level when understorey cover was low or when litter cover was high, suggesting that they avoid moving along the ground where cover is minimal (Law et al 2018).	Low. Unlikely to cross over the rail corridor, may cross under at riparian corridors.	Maximum distance recorded for an overnight movement is 450 m (Bladon et al. 2002)	There is potential for the Eastern Pygmy-possum to attempt to cross the rail tracks. Given the low numbers of trains that would travel through the Pilliga at night and the large areas of available habitat the risk of train strike is considered to be relatively low.	Fauna monitoring for the Bonville Pacific Highway Upgrade identified many species utilising bridge underpasses including species of possums, rats, antechinus, and a variety of birds, lizards and snakes (RTA 2009). A study at Brunswick Heads recorded a greater number of complete passages made through bridge underpasses than box culverts (AMBS 2002). Dedicated culverts under the M1 (Sydney to Newcastle freeway) were found to be used by the Eastern Pygmy-possum (RTA 2009). Purpose-built tunnels were constructed under road within a ski resort at Mt Hotham for the Mountain Pygmy-possum and were filled with rocks that imitated the natural habitat of scree, reconnecting habitat (Mansergh and Scotts, 1989). Canopy bridges can be used by non-gliding arboreal fauna, such as the Brush-tailed Phascogale, Antechinus species, possums and small gliders, such as the Feathertail Glider (Sandpiper Ecological Surveys 2013). Quick uptake of a canopy bridge near Busselton was recorded for Western Ringtail Possums (Yokucki and Bencini 2015).
Pilliga Mouse	645.9	645.9	100.0	The Pilliga Mouse is restricted to the Pilliga region and is found in greatest abundance in recently burnt moist gullies, areas dominated by Broombush (*Melaleuca uncinata*) and areas containing an understorey of *Acacia burrowii* with a *Corymbia trachyphloia* overstorey (Paull et al 2014). The alignment appears to pass through gaps in important habitat, however the proposal would impact some areas mapped by Paull et al (2014).	<5 ha	Seasonal degree of overlap of home ranges of P. pilligaensis was relatively high in spring, suggesting more widespread ranges by mice in the breeding season. Population density ranged between 4.8 mice/ha and 6.4 mice/ha during an irruption (Tokushima and Jarman 2008)	The Pilliga Mouse typically occurs at low densities, although has large population fluctuations in response to seasonal conditions (EES 2019b).	High. Restricted to the Pilliga area	Gap crossing threshold not known	Moderate. This species is likely to be able to cross the rail line using culverts, although this depends on behaviour of the species (willingness to use culverts) and potentially treatment of culverts (eg revegetation near culverts).	Tokushima and Jarman (2008) measured average movement distances of 40 m (range 0–181 m) for recaptured individuals	There is potential for the Pilliga Mouse to attempt to cross the rail tracks, although its small size may make this difficult. Given the low numbers of trains that would travel through the Pilliga at night, the large areas of available habitat, and the small size of the Pilliga Mouse the risk of train strike is considered to be relatively low.	Fauna monitoring for the Bonville Pacific Highway Upgrade identified many species utilising bridge underpasses including species of rats and antechinuses (RTA 2009). Purpose-built tunnels were constructed under road within a ski resort at Mt Hotham for the Mountain Pygmy-possum and were filled with rocks that imitated the natural habitat of scree, reconnecting habitat (Mansergh and Scotts, 1989). No fauna underpasses have previously been created for this species, so while benefit may be high, it is given a moderate rating here.

Species	Species Polygon/ potential habitat	Species Polygon/ potential habitat (Pilliga)	% in the Pilliga	Occurrence	Patch size	Home range	Demography	Estimated number of individuals	Gap threshold	Abililty	Movement	Train strike	Mitigation
Squirrel Glider	651	419.3	64.4	The Squirrel Glider is thought to occur in low densities in the Pilliga forests. Stanton (2011) recorded Sugar Gliders in Barking Owl pellets in the Pilliga, but no Squirrel Gliders were confirmed. The species also occurs along linear remnants, and could occur elsewhere in the study area.	<5 ha	Mean home range is 3-9 ha in coastal habitats and 3-4 ha in productive inland habitat fragments. (NSW Scientific Committee 2008)	The Squirrel Glider lives in social groups of one or two adult males and females and their offspring (NSW Scientific Committee 2008). Family groups can have somewhat overlapping home ranges (Sharpe et al 2007)	Unknown. Likely to occur in low densities or as scattered populations depending on habitat values.	The Squirrel Glider has a mean glide distance in a horizontal plane of 21.5 +/- 0.9 metres (with a maximum of 47 metres) and a mean glide angle of 28.5 +/- 0.8°. In order to cross a 40 metre gap created by a road, trees would need to be around 25 metres tall (see Goldingay and Taylor 2009)	Where taller trees are present along the rail line gliders would be able to cross the gap, although the gap created may be at or near the limit of the species gliding distance.	Although capable and willing to cross open habitat on occasion (e.g. to reach heavily flowering trees), they more typically require sufficient connectivity of tree cover within their maximum gliding distance (70 m: van der Ree 2002; van der Ree et al. 2003)	The height of trains (for example those carrying double-stacked containers) further increases the risk of injury and mortality as this species may collide with a train if attempting to glide across the rail corridor.	Squirrel Gliders were frequently recorded utilising glider poles at Compton Road, Brisbane, within a year of construction. This species was recorded at sites at this location where they had not previously occurred, likely as a result of the glider poles providing connectivity (Robinson-Wolrath 2007, in TMR 2010). Squirrel Gliders were shown to use poles within a 70 metre clearing to traverse agricultural land between two forest patches (Ball and Goldingay 2008). Monitoring of wildlife road crossing structures by Soanes et al. (2013) found the rate of glider crossing increased over several years as animals habituated to the structure. Use of canopy bridges by several glider species has been confirmed in a highway setting (Goldingay et al. 2013). The corridor gap may be able to be crossed without mitigation in some areas, and the gap may be near or beyond the the maximum crossing distance in others.
Pale-headed Snake	286.4	168.973	59.0	Known to be associated with riparian areas (EES 2019b, Fitzgerald et al. 2010). Patchy and restricted distribution north of Baradine (EES 2019a).	<5 ha	Can spend weeks at a time hidden in tree hollows (EES 2019b). Radio-tracking of snakes on the Namoi River (Fitzgerald et al. 2010) found individuals were sedentary and moved only short distances (up to 134 metres in that study)	Likely to be solitary, only interacting with other individuals during the breeding season.	Unknown. Likely to occur in low densities.	This species would rely on riparian corridors for movement. It is recorded on forest trails, so has some ability to crossed cleared land.	Low. Unlikely to cross over the rail corridor, may cross under at riparian corridors.	Sedentary. Movements of short distances <200m (Fitzgerald et al. 2010). Can spend weeks at a time hidden in tree hollows (EES 2019b)	Low risk given patchy distribution and low movement potential.	Fauna monitoring for the Bonville Pacific Highway Upgrade identified many species utilising bridge underpasses including a variety of lizards and snakes (RTA 2009).
Bush Stone-curlew	519.98	337.2	64.8	There are few records of the species in the Pilliga, and only scattered records occur in the wider region (EES 2019a). In a survey of 510 sites in the north-western portion of the Pilliga forests, one Bush Stone-curlew was recorded (Milledge 2004). The species is known from forest edges (Birdlife International 2021).	<5 ha	Home range characteristics have not yet been studied in NSW. Home range sizes are likely to vary depending on the availability and proximity of roosting, foraging and breeding habitat (DEC 2006)	Bush Stone-curlews are most commonly observed singly or in pairs roosting (Johnson and Baker-Gabb 1994).	Low. Very few records known. The species is known from forest edges (Birdlife International 2021).	Bush Stone-curlews are a terrestrial predator adapted to stalking and running. They prefer landscapes that give them good visibility at ground level, so they usually inhabit areas with bare ground or low ground cover and widely spaced trees and shrubs, which may encourage them into the rail corridor.	Moderate. May fly across the rail corridor on occasion, or cross under at riparian corridors.	Bush Stone-curlews are sedentary. Some local movements occur when they are not breeding, however there is no evidence of large-scale seasonal movement (Sleigh et al 2010).	High potential for train strike given they may be attracted to the rail corridor and are generally terrestrial.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.

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Little Eagle	465.8	277	59.5	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW (EES 2021b)	<5 ha	Breeding density in eastern NSW has been estimated at 1 pair per 1600 hectares in the early 1980s (Debus 1984) and one pair per 2100-3000 hectares since 2000 (Debus 2017).	Pairs nest solitarily (Debus 2019), with nests between 2-5 km apart (Debus 1984).	It is estimated that up to 38 breeding pairs of Little Eagle may occur along the rail corridor. Fourteen of these are likely to occur within the 80 km long Pilliga forests section (Saunders and Debus, 2021).	Wide-ranging species able to cross large areas.	High. Generally flies above the canopy (Debus 2019).	Foraging journeys of 10-20 km are known for this species (Brawata and Gruber 2016), and an individual has been recorded travelling between the ACT and the Northern Territory (Debus 2019).	Some risk of injury and mortality from train strike during operation of the rail line, particularly if drawn to the trackside area to feed on wildlife killed by trainstrike. Given the low numbers of trains that would travel through the Pilliga per day, low population density of these species, and the large areas of available habitat, the risk of train strike is considered to be relatively low.	No mitigation proposed - likely to fly above the rail corridor.
Square-tailed Kite	407.3	235.57	57.8	The Square-tailed Kite is primarily found in open eucalypt forests, woodland, and mallee where passerine birds (prey species) are common (Garnett 1993). They are generally absent from south-eastern New South Wales during the non-breeding period (Debus 1993).	<5 ha	In eastern NSW, neighbouring nests of the Square-tailed Kite are about 13 km apart, with a density of one pair per 170 km2 , and home range of roughly 50 km2 (Lutter et al. 2004).	Square-tailed Kites are generally solitary during the non-breeding season (Debus 1993). They appear to be long term monogamous as breeding pairs, as they are intolerant of other adults of the same species within their breeding territory, and they occupy the same nest site for many years (Debus et al. 1993)	It is estimated that up to 32 breeding pairs of Square-tailed Kite may occur along the rail corridor, and between 9-12 pairs estimated to occur along the alignment (Saunders and Debus 2021).	Wide-ranging species able to cross large areas.	High. Generally flies above the canopy or within the canopy (Debus 2019).	High. Wide-ranging species	Some risk of injury and mortality from train strike during operation of the rail line, particularly if drawn to the trackside area to feed on wildlife killed by trainstrike. Given the low numbers of trains that would travel through the Pilliga per day, low population density of these species, and the large areas of available habitat, the risk of train strike is considered to be relatively low.	No mitigation proposed - likely to fly above the rail corridor.

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Barking Owl	258.4	218.8	84.7	The Pilliga forests supported the largest Barking Owl population in southern Australia (EES 2019b). The population was found to occur in the western and northern parts of the Pilliga foresst, and this distribution correlated with the distribution of the Pilliga outwash geology formation (Milledge 2004)	<5 ha	Barking Owl territories in the Pilliga were estimated by Milledge (2004) by fitting a polygon of about 6000 ha (based on Schedvin et al. 2001), which was consistent with current knowledge of Barking Owl home range size in similar forests and woodlands.	Occurs in low population densities. Breeding pairs maintain exclusive territories	21 breeding territories estimated to occur along the alignment.	Wide-ranging species able to cross large areas.	Aerial species able to cross large areas.	Moderate - travels within territories	Given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat, the risk of train strike is considered to be relatively low, however the use of creeklines as flyways for these species could increase the risk of mortality.	Bridges can be flanked by barrier poles to ensure safe passage for aerial species well above moving rail traffic (Zuberogoitia et al. 2015). These structures have been successful in reducing bird mortality in Florida (Bard et al 2002).
Masked Owl	185.8	146	78.6	Inland records for this species are sparse. Generally, the Masked Owl appears to be less common than the other two large owls in heavily-forested areas (DEC 2006). Debus (2001) recorded the Masked Owl at only one or possibly two survey points (1-2 percent) of 110 points surveyed on the NW slopes, with one additional opportunistic record. Milledge (2004) recorded no Masked Owls at 510 sites in the Pilliga surveyed for nocturnal species. Debus (2001) noted recording the species near Baradine Creek, on the edge of the Pilliga forests.	<5 ha	The Masked Owl has a home range of 800 to 1200 hectares (Kavanagh 2002).	Occurs in low population densities. Breeding pairs maintain exclusive territories	15 breeding territories estimated along the alignment, although this is likely to be an overestimation given the few records in the area.	Wide-ranging species able to cross large areas.	Aerial species able to cross large areas.	Moderate - travels within territories	Given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat, the risk of train strike is considered to be relatively low, however the use of creeklines as flyways for these species could increase the risk of mortality.	Bridges can be flanked by barrier poles to ensure safe passage for aerial species well above moving rail traffic (Zuberogoitia et al. 2015). These structures have been successful in reducing bird mortality in Florida (Bard et al 2002).

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Glossy Black-cockatoo	324.7	223.98	69.0	Populations are known from the Pilliga, Goonoo Forest and other larger forests in the wider region. Few records are known from predominantly cleared land (EES 2019a).	<5 ha	Glossy Black-Cockatoos breed semi-colonially and pairs defend only the immediate area of the nest hollow, ranging widely to forage (NSW Scientific Committee 2008)	They are usually seen in pairs or small groups feeding quietly in sheoaks. (EES 2019).	Large population known to occur in the Pilliga area	Wide-ranging species able to cross large areas.	Aerial species able to cross large areas.	The Glossy Black-Cockatoo is highly mobile and able to disperse widely (up to 60 km), but habitat fragmentation may mean that it is energetically inefficient to commute long distances between feeding patches (NSW Scientific Committee 2008)	Glossy Black-cockatoos tend to nest in the same areas as other nesting pairs. Because pairs prefer to nest close to one another, areas with a relatively high density of suitable nest hollows will be favoured for nesting (Cameron 2006).	No mitigation proposed - likely to fly above the rail corridor.
Corben' s Long-eared Bat	1,100.10	645.9	58.7	The Pilliga is considered a stronghold for this species (EES 2019b)	5 - <25 ha	The species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches (Turbill and Ellis 2006), suggesting its home range is probably large (Lumsden et al., 2008).	Roost solitarily (NSW Scientific Committee 2015). Maternity colonies, consisting of 10-20 individuals, roosting in dead trees including ironbarks, cypress and buloke (Schulz and Lumsden 2010).	Given this species' stronghold is in Pilliga area, many individuals are likely to forage in the proposal site.	Occurs in a range of habitat including shrubland and forest (Churchill 2008)	Given the mobility of the species. Linear nature of clearing, and large area of available habitat, the proposal is unlikely to fragment habitat to such a degree that these mobile species could not move across the landscape.	most roost sites are used just for a single day and large distances are travelled at night, with consecutive roost sites generally within four km (Lumsden et al., 2008).	This species has a relatively high risk of mortality from train strike given its preference for flying in the understory.	Bridges can be flanked by barrier poles to ensure safe passage for aerial species well above moving rail traffic (Zuberogoitia et al. 2015). These structures have been successful in reducing bird mortality in Florida (Bard et al 2002).

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Large-eared Pied Bat	1,100.10	645.9	58.7	It is widely distributed, but still uncommon and patchy within its distribution in the sandstone areas of the Sydney Basin and the western slopes and plains including Pilliga Nature Reserve (DERM 2011). A maternity roost has been observed in the Pilliga sandstone (M. Pennay 2010). Small groups of females and young bats have been observed in the Pilliga Scrub (DERM 2011).	<5 ha	Wide-ranging species (Churchill 2008)	The Large-eared Pied Bat has been recorded congregating in groups of up to 50 breeding females at maternity roosts (Dwyer 1966)	Unknown. Likely to be concentrated near roosting habitat away from the alignment. Occasional individuals may forage in the proposal site.	Occur in a range of forest habitats (Churchill 2008)	Given the mobility of the species. Linear nature of clearing, and large area of available habitat, the proposal is unlikely to fragment habitat to such a degree that these mobile species could not move across the landscape.	The distance bats move from the maternity roost to over wintering roosts has not been established, but is likely to be less than 100 km (Hoye 2006).	This species has a relatively high risk of mortality from train strike given its preference for flying below the canopy (low along creek beds, or 6-10m above the ground, Churchill 2008).	Bridges can be flanked by barrier poles to ensure safe passage for aerial species well above moving rail traffic (Zuberogoitia et al. 2015). These structures have been successful in reducing bird mortality in Florida (Bard et al 2002).
Little Pied Bat	1,100.10	645.9	58.7	Scattered records throughout much of inland NSW (Atlas of Living Australia 2021. Recorded during field surveys.	<5 ha	Wide-ranging species (Churchill 2008)	Roosts individually and in groups of up to 50 (Churchill 2008)	Given the species roosts in tree hollows, may individuals are likely to forage in the proposal site.	Occur in a range of woodland habitats (Churchill 2008)	Given the mobility of the species. Linear nature of clearing, and large area of available habitat, the proposal is unlikely to fragment habitat to such a degree that these mobile species could not move across the landscape.	Recorded regularly travelling 34 km in a night (Churchill 2008)	This species has a relatively high risk of mortality from train strike given its preference for flying along riparian corridors.	Bridges can be flanked by barrier poles to ensure safe passage for aerial species well above moving rail traffic (Zuberogoitia et al. 2015). These structures have been successful in reducing bird mortality in Florida (Bard et al 2002).

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Yellow-bellied Sheath-tail bat	1,100.10	645.9	58.7	Recorded during field surveys, A strong association with the flyway on large stream-beds in the Pilliga has been shown for this species (Law et al 2011).	<5 ha	Wide-ranging species (Churchill 2008)	Roost in tree hollows in groups of up to 30 (Churchill 2008)	Given the species roosts in tree hollows, may individuals are likely to forage in the proposal site.	Occur in a range of habitats, including desert, shrubland, and forest (Churchill 2008)	Given the mobility of the species. Linear nature of clearing, and large area of available habitat, the proposal is unlikely to fragment habitat to such a degree that these mobile species could not move across the landscape.	The species is thought to migrate to southern Australia in late summer and autumn (Churchill 2008)	This species has a relatively low risk of mortality from train strike in forested areas given its preference for flying above the canopy, but may be at a higher risk in more open country.	No mitigation proposed - likely to fly above the rail corridor.
Large Bentwing Bat	1,100.10	645.9	58.7	The Large Bentwing Bat predominantly occurs in eastern NSW, with few records west of Dubbo and Narrabri (Atlas of Living Australia 2021).	<5 ha	Wide-ranging species (Churchill 2008)	Roost in large congregations (maternity roosts >100,000, winter roosts >1000) (Churchill 2008)	Few individuals likely to occur as the proposal site is beyond the usual distribution of this species.	Forages over open grassland and forested areas (Churchill 2008)	Given the mobility of the species. Linear nature of clearing, and large area of available habitat, the proposal is unlikely to fragment habitat to such a degree that these mobile species could not move across the landscape.	Travel large distances between maternity caves and winter roosts. Individuals have been recorded travelling over 1000km (Churchill 2008)	This species has a relatively low risk of mortality from train strike given its preference for flying above the canopy.	No mitigation proposed - likely to fly above the rail corridor.
Brown Treecreeper	1,107.40	645.9	58.3	The Brown Treecreeper is a common resident of the Pilliga (Birdlife International 2021)	<5 ha	The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha (mean = 4.4 ha). (EES 2017)	Gregarious and usually observed in pairs or small groups of 8 to 12 birds (EES 2017)	Many individuals are likely to be present.	Robertson and Radford (2009) found that treecreepers appeared reluctant to cross gaps of more than ~60 metres between patches of vegetation.	Flies within the canopy and mid-story, and may be able to cross above the rail corridor.	Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. (EES 2017)	As it spends part of its time foraging on the ground, this species may be susceptible to mortality from train strike.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.

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Diamond Firetail	1,107.40	645.9	58.3	The whole Pilliga is important for woodland birds including the Diamond Firetail (Birdlife International 2021). Only one individual recorded in surveys by Cleland (2015).	<5 ha	Densities in Eucalypt woodland near Armidale, NSW, were as high as 1.18 birds/ha. This dropped considerably during drought conditions (Ford 1989). In revegetation areas at Monarto (SA) densities varied seasonally with a high of 0.58 birds/ha in March to a low of 0.01 birds/ha in August (Paton and Rogers 2004). These density data suggest populations can fluctuate substantially when conditions change	Usually encountered in flocks of between 5 to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. (EES 2017)	Many individuals are likely to be present.	Given this species can occur in open areas, it is likely to be able to cross the gap created by the rail corridor	Flies within the canopy and mid-story, and may be able to cross above the rail corridor.	Appears to be sedentary, though some populations move locally (EES 2017). Paton and Rogers (2004) found that this species almost completely disappeared from revegetation sites in winter and banded individuals have been located up to 2 km away from their original banding location	It's preference for foraging on native grass seeds make it susceptible to mortality from train strike in areas with a native ground-cover.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.
Flame Robin	1,107.40	645.9	58.3	Occasional sightings of the Flame Robin are recorded in the Pilliga (Birdlife International 2021).	<5 ha	In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains (EES 2021b). Limited other infomration available on home range.	Occur singly, in pairs, or in flocks of up to 40 birds or more; in the non-breeding season they will join up with other insectivorous birds in mixed feeding flocks. (EES 2017)	Low numbers likely to be present (see Birdlife International 2021)	Prefers clearings or areas with open understoreys (EES 2021)	Flies within the canopy and mid-story, and may be able to cross above the rail corridor.	In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains) (EES 2021)	It's ground-foraging habit may make it susceptible to mortality from train strike.	Limited mitigation proposed - likely to fly above the rail corridor. Targeted landscaping may encourage movements across the rail corridor for foraging individuals.
Grey-crowned Babbler	1,107.40	645.9	58.3	The Grey-crowned Babbler is a common resident of the Pilliga (Birdlife International 2021). This species was one of the ten most numerous species recorded in the Pilliga forests by Cleland (2015).	<5 ha	Family groups have territories between 1-50 (generally around 10) hectares.	Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds (EES 2017)	Many individuals are likely to be present.	Grey-crowned Babblers in and around Dubbo have been recorded occasionally crossing open areas of up to 200 metres between trees, including treeless sports grounds (Lambert and Ford 2016).	Poor fliers, tend to glide from the tops of one tree down to the next.	Sedentary	Grey-crowned Babbler would be subject to train-strike due to its ground-foraging nature and laborious and low flight.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.

Species	Species Polygon/ potential habitat	Species Polygon/ potential habitat (Pilliga)	% in the Pilliga	Occurrence	Patch size	Home range	Demography	Estimated number of individuals	Gap threshold	Abililty	Movement	Train strike	Mitigation
Hooded Robin	1,107.40	645.9	58.3	The Hooded Robin is a common resident of the Pilliga (Birdlife International 2021). None recorded by Cleland (2015).	<5 ha	Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season (EES 2017)	They are usually seen in pairs or small groups (Birdlife Australia)	Many individuals are likely to be present.	Given this species can occur in open areas, it is likely to be able to cross the gap created by the rail corridor, particularly where the corridor is narrow.	Flies within the canopy and mid-story, and may be able to cross above the rail corridor.	It is considered a sedentary species, but local seasonal movements are possible (EES 2017)	It's ground-foraging habit may make it susceptible to mortality from train strike.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.
Speckled Warbler	1,107.40	645.9	58.3	The Speckled Warbler is a common resident of the Pilliga (Birdlife International 2021). Recorded in moderate numbers by Cleland (2015).	<5 ha	Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding (EES 2017)	Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills (EES 2017)	Many individuals are likely to be present.	This species is likely to be affected by gaps of more than 100 metres between patches (as shown in Doerr et al. 2010)	Tends to forage in the shrub-layer and mid-story, with limited movement.	Pairs are sedentary (EES 2017)	This species may be subject to train-strike due to its ground-foraging nature.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.
Varied Sittella	1,107.40	645.9	58.3	The Varied Sittella was recorded in moderate numbers by Cleland (2015).	<5 ha	In north-eastern New South Wales, Varied Sittellas occur in sedentary groups or clans holding weakly defended territories of 13-20 ha (Noske 1998)	A study in Wollombombi NSW found group size of Varied Sittella varied from two to nine (Noske 1998)	Many individuals are likely to be present.	While there is little information on the gap distance this species is able to cross, it is known to be threatened by fragmentation. This species is likely to be able to cross the gap created, particularly as it moves through the canopy.	Flies within the canopy, and may be able to cross above the rail corridor.	The Varied Sittella is sedentary (EES 2017)	This species is unlikely to be at risk of mortality through train strike.	No mitigation proposed - likely to fly above the rail corridor.

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Superb Parrot	1,107.40	645.9	58.3	The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums (Eucalyptus camaldulensis) and box eucalypts. The species also seasonally occurs in box-pine (Callitris) and Boree (Acacia pendula) woodlands (DEE 2019a). Scattered records only in the Pilliga (EES 2021a).	<5 ha	Nest in small colonies, often with more than one nest in a single tree. May forage up to 10 km from nesting sites (EES 2021a).	Superb Parrots nest singly or in loose colonies of up to nine pairs. Before nesting, birds congregate in small flocks (Baker-Gabb 2011).	Many individuals are likely to be present.	Superb Parrots are highly mobile, but its movement ecology is poorly understood (Baker-Gabb 2011). Given their migratory/nomadic nature, this species is considered able to cross large gaps.	The Superb Parrot feeds mainly on the ground, on the seeds of grasses as well as cereal crops and spilt grain. They also eat the seed-pods of many understorey species of wattles, and flowers and fruits of eucalypts, berries of mistletoe and lerps (EES 2019a).	Birds breeding in the SW slopes are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers (DEE 2019a).	It's ground-foraging habit may make it susceptible to mortality from train strike.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.
Turquoise Parrot	1,107.40	645.9	58.3	The Turquoise Parrot is regularly recorded in the Pilliga (Date et al 2002).	<5 ha	Breeding pairs of Turquoise Parrots defend a nest site and a small feeding area around the nest against members of their own species. Breeding density can be four to seven pairs per hectare, with nests as little as 8 m apart (NSW Scientific Committee 2008)	Turquoise parrots occur in pairs or small groups, although they may congregate into larger flocks of up to 75 predominantly juvenile birds outside the breeding season. As the breeding season nears, pairs separate out from these flocks (Higgins 1999)	Many individuals are likely to be present.	The Turquoise Parrot prefers to feed within 100 m of the nest, but ranges up to 1.4 km away. Most movements are less than 10 km, often along treed corridors (NSW Scientific Committee 2008)	Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter	Predominantly sedentary, but may be locally nomadic (Higgins 1999)	It's ground-foraging habit may make it susceptible to mortality from train strike.	Targeted landscaping may encourage movements across the rail corridor for foraging individuals.

TECHNICAL REPORT

01

Biodiversity development assessment report

Appendix K BAM calculator reports

NARROMINE TO NARRABRI RESPONSE TO SUBMISSIONS

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029288	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
3	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

Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.												
3	55_Good	Not a TEC	65.5	65.5	0.2	PCT Cleared - 83%	High Sensitivity to Gain			2.00		7
											Subtotal	**7**
Derived Copperburr shrubland of the NSW northern inland alluvial floodplains												
1	168_Good	Not a TEC	88.9	88.9	7.1	PCT Cleared - 0%	High Sensitivity to Gain			1.50		237
											Subtotal	**237**
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion												
2	78_Good	Not a TEC	42	42.0	1.4	PCT Cleared - 60%	High Sensitivity to Gain			1.75		26
											Subtotal	**26**
											Total	**270**

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

Burhinus grallarius / Bush Stone-curlew (Fauna)									
78_Good	42.0	42.0	0.2			Endangered	Not Listed	False	4
								Subtotal	**4**
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
78_Good	42.0	42.0	0.2			Vulnerable	Not Listed	False	4
								Subtotal	**4**
Hieraaetus morphnoides / Little Eagle (Fauna)									
78_Good	42.0	42.0	0.2			Vulnerable	Not Listed	False	3
								Subtotal	**3**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
78_Good	42.0	42.0	0.5			Vulnerable	Not Listed	False	10
								Subtotal	**10**
Lophoictinia isura / Square-tailed Kite (Fauna)									
78_Good	42.0	42.0	0.2			Vulnerable	Not Listed	False	3
								Subtotal	**3**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
78_Good	42.0	42.0	0.2			Vulnerable	Not Listed	False	4
								Subtotal	**4**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00023995	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
12	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

Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.												
2	55_Good	Not a TEC	65.5	65.5	0.7	PCT Cleared - 83%	High Sensitivity to Gain			2.00		23
											Subtotal	**23**
Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
1	49_Good	Not a TEC	28.6	28.6	7.1	PCT Cleared - 50%	High Sensitivity to Gain			1.75		89
											Subtotal	**89**
											Total	**112**

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

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029285	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
4	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

Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.												
4	55_Good	Not a TEC	46.6	46.6	3.1	PCT Cleared - 83%	High Sensitivity to Gain			2.00		72
											Subtotal	**72**
Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion												
10	141_Good	Not a TEC	37.7	37.7	29	PCT Cleared - 11%	High Sensitivity to Gain			1.50		410
											Subtotal	**410**
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion												
28	746_Good	Not a TEC	45.6	45.6	2.1	PCT Cleared - 40%	High Sensitivity to Gain			1.50		36
											Subtotal	**36**
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion												
25	409_Good	Not a TEC	47.2	47.2	0.8	PCT Cleared - 17%	High Sensitivity to Gain			1.50		14
											Subtotal	**14**

Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
13	206_Good	Not a TEC	41.6	41.6	4.9	PCT Cleared - 50%	High Sensitivity to Gain			1.75		89
											Subtotal	**89**
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion												
12	202_Good	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	99.5	99.5	3.6	PCT Cleared - 75%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	179
											Subtotal	**179**
Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion												
16	256_Good	Not a TEC	41.5	41.5	0.3	PCT Cleared - 23%	High Sensitivity to Gain			1.50		5
											Subtotal	**5**

Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion												
15	255_Good	Not a TEC	36.8	36.8	7.9	PCT Cleared - 50%	High Sensitivity to Gain			1.75		127
											Subtotal	**127**
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion												
21	398_Good	Not a TEC	66.1	66.1	203	PCT Cleared - 27%	High Sensitivity to Gain			1.50		5029
											Subtotal	**5029**
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions												
17	394_Good_fire_affected	Not a TEC	24.6	24.6	11.1	PCT Cleared - 36%	High Sensitivity to Gain			1.50		102
18	394_Good	Not a TEC	44.7	44.7	35.6	PCT Cleared - 36%	High Sensitivity to Gain			1.50		596
19	394_DNG	Not a TEC	40.4	40.4	15.4	PCT Cleared - 36%	High Sensitivity to Gain			1.50		233
											Subtotal	**931**

Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
3	49_Good	Not a TEC	52.9	52.9	91.1	PCT Cleared - 50%	High Sensitivity to Gain			1.75		2110
											Subtotal	**2110**
Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion												
7	88_Good	Not a TEC	43.3	43.3	205.4	PCT Cleared - 38%	High Sensitivity to Gain			1.50		3336
8	88_Low	Not a TEC	45.1	45.1	1.7	PCT Cleared - 38%	High Sensitivity to Gain			1.50		29
9	88_DNG	Not a TEC	30.2	30.2	49.9	PCT Cleared - 38%	High Sensitivity to Gain			1.50		565
											Subtotal	**3930**
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW												
5	56_Good	Not a TEC	53.9	53.9	6.5	PCT Cleared - 78%	High Sensitivity to Gain			2.00		175
											Subtotal	**175**

Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion												
20	397_Good	Not a TEC	44.8	44.8	3.1	PCT Cleared - 45%	High Sensitivity to Gain			1.50		52
											Subtotal	**52**
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).												
14	244_Good	Not a TEC	35.5	35.5	24.2	PCT Cleared - 73%	High Sensitivity to Gain			2.00		430
											Subtotal	**430**
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion												
22	399_Good	Not a TEC	55.9	55.9	22.9	PCT Cleared - 10%	High Sensitivity to Gain			1.50		480
											Subtotal	**480**
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests												
23	404_Good	Not a TEC	51.1	51.1	25.1	PCT Cleared - 9%	High Sensitivity to Gain			1.50		481
											Subtotal	**481**

River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion												
6	78_Good	Not a TEC	46.6	46.6	8.5	PCT Cleared - 60%	High Sensitivity to Gain			1.75		173
											Subtotal	**173**
River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion												
2	36_Good	Not a TEC	52	52.0	3	PCT Cleared - 53%	High Sensitivity to Gain			1.75		68
											Subtotal	**68**
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
1	27_Good	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	44.8	44.8	1.9	PCT Cleared - 86%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		43
											Subtotal	**43**

Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion												
11	145_Good	Not a TEC	24.7	24.7	49.3	PCT Cleared - 75%	High Sensitivity to Gain			2.00		608
											Subtotal	**608**
White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests												
24	406_Good	Not a TEC	57	57.0	2.4	PCT Cleared - 6%	High Sensitivity to Gain			1.50		51
											Subtotal	**51**
White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion												
29	1384_Good	Not a TEC	80	80.0	8.8	PCT Cleared - 75%	High Sensitivity to Gain			2.00		352
											Subtotal	**352**
White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion												
27	469_Good	Not a TEC	38.6	38.6	1	PCT Cleared - 33%	High Sensitivity to Gain			1.50		14
											Subtotal	**14**

White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion												
26	414_Good_fire_affected	Not a TEC	28.8	28.8	7.3	PCT Cleared - 40%	High Sensitivity to Gain			1.50		79
											Subtotal	**79**
											Total	**15938**

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
Aepyprymnus rufescens / Rufous Bettong (Fauna)									
88_Good	43.3	43.3	3.1			Vulnerable	Not Listed	False	67
394_Good	44.7	44.7	22.7			Vulnerable	Not Listed	False	507
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	124.6			Vulnerable	Not Listed	False	4116
399_Good	55.9	55.9	1.3			Vulnerable	Not Listed	False	36
404_Good	51.1	51.1	22.7			Vulnerable	Not Listed	False	580
409_Good	47.2	47.2	0.8			Vulnerable	Not Listed	False	19
								Subtotal	**5395**
Burhinus grallarius / Bush Stone-curlew (Fauna)									
27_Good	44.8	44.8	1.6			Endangered	Not Listed	False	36
78_Good	46.6	46.6	7.9			Endangered	Not Listed	False	184

88_Good	43.3	43.3	141.6			Endangered	Not Listed	False	3067
88_Low	45.1	45.1	1.7			Endangered	Not Listed	False	38
244_Good	35.5	35.5	6			Endangered	Not Listed	False	107
394_Good	44.7	44.7	26.5			Endangered	Not Listed	False	592
397_Good	44.8	44.8	3.1			Endangered	Not Listed	False	70
398_Good	66.1	66.1	121.2			Endangered	Not Listed	False	4003
1384_Good	80.0	80.0	2.3			Endangered	Not Listed	False	92
								Subtotal	**8189**
Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)									
88_Good	43.3	43.3	65.9			Vulnerable	Not Listed	False	1427
202_Good	99.5	99.5	3.5			Vulnerable	Not Listed	False	174
394_Good_fire_affected	24.6	24.6	4.8			Vulnerable	Not Listed	False	59
394_Good	44.7	44.7	11.4			Vulnerable	Not Listed	False	255
397_Good	44.8	44.8	2			Vulnerable	Not Listed	False	45
398_Good	66.1	66.1	88.2			Vulnerable	Not Listed	False	2913
399_Good	55.9	55.9	8.3			Vulnerable	Not Listed	False	232
404_Good	51.1	51.1	8			Vulnerable	Not Listed	False	204
								Subtotal	**5309**
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
36_Good	52.0	52.0	0.6			Vulnerable	Not Listed	False	16
78_Good	46.6	46.6	1.1			Vulnerable	Not Listed	False	26
88_Good	43.3	43.3	156.3			Vulnerable	Not Listed	False	3385
141_Good	37.7	37.7	29			Vulnerable	Not Listed	False	547

202_Good	99.5	99.5	2.6			Vulnerable	Not Listed	False	129
244_Good	35.5	35.5	11.2			Vulnerable	Not Listed	False	199
255_Good	36.8	36.8	7.7			Vulnerable	Not Listed	False	142
394_Good_fire_affected	24.6	24.6	11.1			Vulnerable	Not Listed	False	136
394_Good	44.7	44.7	31.9			Vulnerable	Not Listed	False	712
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	198			Vulnerable	Not Listed	False	6540
399_Good	55.9	55.9	17.7			Vulnerable	Not Listed	False	495
404_Good	51.1	51.1	25.1			Vulnerable	Not Listed	False	641
406_Good	57.0	57.0	2.4			Vulnerable	Not Listed	False	68
414_Good_fire_affected	28.8	28.8	2.5			Vulnerable	Not Listed	False	36
746_Good	45.6	45.6	2.1			Vulnerable	Not Listed	False	48
1384_Good	80.0	80.0	8.8			Vulnerable	Not Listed	False	352
								Subtotal	**13542**
Commersonia procumbens / Commersonia procumbens (Flora)									
88_Good	43.3	43.3	21.7			Vulnerable	Vulnerable	False	470
141_Good	37.7	37.7	26.4			Vulnerable	Vulnerable	False	498
256_Good	41.5	41.5	0.3			Vulnerable	Vulnerable	False	6
397_Good	44.8	44.8	3.1			Vulnerable	Vulnerable	False	70
398_Good	66.1	66.1	202.3			Vulnerable	Vulnerable	False	6682
399_Good	55.9	55.9	22.9			Vulnerable	Vulnerable	False	641
404_Good	51.1	51.1	25.1			Vulnerable	Vulnerable	False	641
406_Good	57.0	57.0	2.4			Vulnerable	Vulnerable	False	68

409_Good	47.2	47.2	0.8			Vulnerable	Vulnerable	False	19
414_Good_fire_affected	28.8	28.8	7.3			Vulnerable	Vulnerable	False	105
1384_Good	80.0	80.0	8.8			Vulnerable	Vulnerable	False	352
								Subtotal	**9552**
Dichanthium setosum / Bluegrass (Flora)									
202_Good	99.5	99.5	3.5			Vulnerable	Vulnerable	False	174
								Subtotal	**174**
Diuris tricolor / Pine Donkey Orchid (Flora)									
88_Good	43.3	43.3	47			Vulnerable	Not Listed	False	763
88_DNG	30.2	30.2	11.9			Vulnerable	Not Listed	False	135
141_Good	37.7	37.7	7.9			Vulnerable	Not Listed	False	112
202_Good	99.5	99.5	3.5			Vulnerable	Not Listed	False	131
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	52
398_Good	66.1	66.1	54.8			Vulnerable	Not Listed	False	1358
399_Good	55.9	55.9	6.5			Vulnerable	Not Listed	False	136
404_Good	51.1	51.1	10.5			Vulnerable	Not Listed	False	201
								Subtotal	**2888**
Hieraaetus morphnoides / Little Eagle (Fauna)									
36_Good	52.0	52.0	3			Vulnerable	Not Listed	False	58
55_Good	46.6	46.6	2.8			Vulnerable	Not Listed	False	49
78_Good	46.6	46.6	0.6			Vulnerable	Not Listed	False	10
88_Good	43.3	43.3	87.5			Vulnerable	Not Listed	False	1421
145_Good	24.7	24.7	5.9			Vulnerable	Not Listed	False	55

206_Good	41.6	41.6	3.3			Vulnerable	Not Listed	False	51
244_Good	35.5	35.5	7.7			Vulnerable	Not Listed	False	103
394_Good_fire_affected	24.6	24.6	5.7			Vulnerable	Not Listed	False	52
394_Good	44.7	44.7	3.3			Vulnerable	Not Listed	False	55
398_Good	66.1	66.1	97.1			Vulnerable	Not Listed	False	2405
399_Good	55.9	55.9	11.4			Vulnerable	Not Listed	False	239
404_Good	51.1	51.1	14.6			Vulnerable	Not Listed	False	280
406_Good	57.0	57.0	2.4			Vulnerable	Not Listed	False	51
409_Good	47.2	47.2	0.8			Vulnerable	Not Listed	False	14
1384_Good	80.0	80.0	0.6			Vulnerable	Not Listed	False	18
								Subtotal	**4861**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
36_Good	52.0	52.0	0.6			Vulnerable	Not Listed	False	16
56_Good	53.9	53.9	1.2			Vulnerable	Not Listed	False	32
78_Good	46.6	46.6	7.4			Vulnerable	Not Listed	False	173
88_Good	43.3	43.3	45.9			Vulnerable	Not Listed	False	994
141_Good	37.7	37.7	1.6			Vulnerable	Not Listed	False	30
202_Good	99.5	99.5	3.3			Vulnerable	Not Listed	False	164
394_Good_fire_affected	24.6	24.6	3.5			Vulnerable	Not Listed	False	43
394_Good	44.7	44.7	11.4			Vulnerable	Not Listed	False	255
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	53.8			Vulnerable	Not Listed	False	1777
399_Good	55.9	55.9	17.7			Vulnerable	Not Listed	False	495

404_Good	51.1	51.1	1.7			Vulnerable	Not Listed	False	43
1384_Good	80.0	80.0	2.8			Vulnerable	Not Listed	False	112
								Subtotal	**4204**
Lepidium aschersonii / Spiny Peppercress (Flora)									
88_Good	43.3	43.3	48.4			Vulnerable	Vulnerable	False	1048
88_DNG	30.2	30.2	11.9			Vulnerable	Vulnerable	False	180
202_Good	99.5	99.5	0.1			Vulnerable	Vulnerable	False	5
398_Good	66.1	66.1	50.5			Vulnerable	Vulnerable	False	1668
404_Good	51.1	51.1	10.5			Vulnerable	Vulnerable	False	268
								Subtotal	**3169**
Lophoictinia isura / Square-tailed Kite (Fauna)									
36_Good	52.0	52.0	0.9			Vulnerable	Not Listed	False	18
55_Good	46.6	46.6	0.8			Vulnerable	Not Listed	False	14
56_Good	53.9	53.9	1.2			Vulnerable	Not Listed	False	24
78_Good	46.6	46.6	1.1			Vulnerable	Not Listed	False	19
88_Good	43.3	43.3	84.2			Vulnerable	Not Listed	False	1368
145_Good	24.7	24.7	5.9			Vulnerable	Not Listed	False	55
206_Good	41.6	41.6	4.9			Vulnerable	Not Listed	False	76
244_Good	35.5	35.5	6.6			Vulnerable	Not Listed	False	88
394_Good	44.7	44.7	7			Vulnerable	Not Listed	False	117
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	52
398_Good	66.1	66.1	95.7			Vulnerable	Not Listed	False	2371
399_Good	55.9	55.9	11.3			Vulnerable	Not Listed	False	237
404_Good	51.1	51.1	7.2			Vulnerable	Not Listed	False	138

406_Good	57.0	57.0	2.4			Vulnerable	Not Listed	False	51
746_Good	45.6	45.6	2.1			Vulnerable	Not Listed	False	36
								Subtotal	**4664**
Ninox connivens / Barking Owl (Fauna)									
56_Good	53.9	53.9	1.2			Vulnerable	Not Listed	False	32
78_Good	46.6	46.6	0.5			Vulnerable	Not Listed	False	12
88_Good	43.3	43.3	36.8			Vulnerable	Not Listed	False	797
202_Good	99.5	99.5	3.6			Vulnerable	Not Listed	False	179
394_Good	44.7	44.7	4.4			Vulnerable	Not Listed	False	98
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	56			Vulnerable	Not Listed	False	1850
399_Good	55.9	55.9	7.9			Vulnerable	Not Listed	False	221
404_Good	51.1	51.1	7.3			Vulnerable	Not Listed	False	187
1384_Good	80.0	80.0	2.8			Vulnerable	Not Listed	False	112
								Subtotal	**3558**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
36_Good	52.0	52.0	0.6			Vulnerable	Not Listed	False	16
78_Good	46.6	46.6	1.1			Vulnerable	Not Listed	False	26
88_Good	43.3	43.3	157.4			Vulnerable	Not Listed	False	3409
88_Low	45.1	45.1	1.7			Vulnerable	Not Listed	False	38
141_Good	37.7	37.7	17.6			Vulnerable	Not Listed	False	332
202_Good	99.5	99.5	3.2			Vulnerable	Not Listed	False	159
244_Good	35.5	35.5	3.4			Vulnerable	Not Listed	False	60
255_Good	36.8	36.8	7.8			Vulnerable	Not Listed	False	144

394_Good	44.7	44.7	26.9			Vulnerable	Not Listed	False	601
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	125.4			Vulnerable	Not Listed	False	4142
399_Good	55.9	55.9	1.3			Vulnerable	Not Listed	False	36
404_Good	51.1	51.1	22.7			Vulnerable	Not Listed	False	580
406_Good	57.0	57.0	2.4			Vulnerable	Not Listed	False	68
746_Good	45.6	45.6	2.1			Vulnerable	Not Listed	False	48
1384_Good	80.0	80.0	2.3			Vulnerable	Not Listed	False	92
								Subtotal	**9821**
Phascolarctos cinereus / Koala (Fauna)									
88_Good	43.3	43.3	2.7			Endangered	Endangered	False	58
394_Good	44.7	44.7	9.3			Endangered	Endangered	False	208
								Subtotal	**266**
Polygala linariifolia / Native Milkwort (Flora)									
88_Good	43.3	43.3	46.4			Endangered	Not Listed	False	1005
88_DNG	30.2	30.2	3.2			Endangered	Not Listed	False	48
								Subtotal	**1053**
Pterostylis cobarensis / Greenhood Orchid (Flora)									
88_Good	43.3	43.3	62.5			Vulnerable	Not Listed	False	1354
88_DNG	30.2	30.2	3.2			Vulnerable	Not Listed	False	48
141_Good	37.7	37.7	29			Vulnerable	Not Listed	False	547
202_Good	99.5	99.5	3.4			Vulnerable	Not Listed	False	169
244_Good	35.5	35.5	3.4			Vulnerable	Not Listed	False	60
256_Good	41.5	41.5	0.3			Vulnerable	Not Listed	False	6

394_Good_fire_affected	24.6	24.6	11.1			Vulnerable	Not Listed	False	136
394_Good	44.7	44.7	31.4			Vulnerable	Not Listed	False	701
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	53.2			Vulnerable	Not Listed	False	1757
399_Good	55.9	55.9	22.9			Vulnerable	Not Listed	False	641
404_Good	51.1	51.1	25.1			Vulnerable	Not Listed	False	641
406_Good	57.0	57.0	2.4			Vulnerable	Not Listed	False	68
409_Good	47.2	47.2	0.8			Vulnerable	Not Listed	False	19
414_Good_fire_affected	28.8	28.8	7.3			Vulnerable	Not Listed	False	105
1384_Good	80.0	80.0	8.8			Vulnerable	Not Listed	False	352
								Subtotal	**6674**
Swainsona murrayana / Slender Darling Pea (Flora)									
202_Good	99.5	99.5	3.5			Vulnerable	Vulnerable	False	174
244_Good	35.5	35.5	4.3			Vulnerable	Vulnerable	False	76
								Subtotal	**250**
Swainsona sericea / Silky Swainson-pea (Flora)									
49_Good	52.9	52.9	19.3			Vulnerable	Not Listed	False	511
202_Good	99.5	99.5	3.5			Vulnerable	Not Listed	False	174
244_Good	35.5	35.5	4.3			Vulnerable	Not Listed	False	76
398_Good	66.1	66.1	51.8			Vulnerable	Not Listed	False	1711
								Subtotal	**2472**
Tylophora linearis / Tylophora linearis (Flora)									
141_Good	37.7	37.7	5.1			Vulnerable	Endangered	False	96

202_Good	99.5	99.5	3.5			Vulnerable	Endangered	False	174
398_Good	66.1	66.1	19.9			Vulnerable	Endangered	False	657
1384_Good	80.0	80.0	3.6			Vulnerable	Endangered	False	144
								Subtotal	**1071**
Tyto novaehollandiae / Masked Owl (Fauna)									
56_Good	53.9	53.9	1.2			Vulnerable	Not Listed	False	32
78_Good	46.6	46.6	0.5			Vulnerable	Not Listed	False	12
88_Good	43.3	43.3	26			Vulnerable	Not Listed	False	563
202_Good	99.5	99.5	3.6			Vulnerable	Not Listed	False	179
394_Good	44.7	44.7	4.4			Vulnerable	Not Listed	False	98
397_Good	44.8	44.8	3.1			Vulnerable	Not Listed	False	70
398_Good	66.1	66.1	58.3			Vulnerable	Not Listed	False	1926
399_Good	55.9	55.9	2.1			Vulnerable	Not Listed	False	59
404_Good	51.1	51.1	7.3			Vulnerable	Not Listed	False	187
1384_Good	80.0	80.0	2.8			Vulnerable	Not Listed	False	112
								Subtotal	**3238**
Zieria ingramii / Keith's Zieria (Flora)									
398_Good	66.1	66.1	48.6			Endangered	Endangered	False	1605
								Subtotal	**1605**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029287	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
3	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

Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion												
1	35_Good	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	62.6	62.6	1.4	PCT Cleared - 90%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00	True	44
2	35_DNG	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	37.7	37.7	5.9	PCT Cleared - 90%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00	True	111
											Subtotal	**155**
Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion												
8	141_Good	Not a TEC	30.9	30.9	1.9	PCT Cleared - 11%	High Sensitivity to Gain			1.50		22
											Subtotal	**22**
Derived Copperburr shrubland of the NSW northern inland alluvial floodplains												
12	168_Good	Not a TEC	88.1	88.1	0.2	PCT Cleared - 0%	High Sensitivity to Gain			1.50		7
											Subtotal	**7**

Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion												
10	148_Good	Not a TEC	58.6	58.6	46.2	PCT Cleared - 50%	High Sensitivity to Gain			1.75		1185
11	148_DNG	Not a TEC	35.8	35.8	95.4	PCT Cleared - 50%	High Sensitivity to Gain			1.75		1493
											Subtotal	**2678**
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion												
15	398_Good	Not a TEC	59.5	59.5	170.9	PCT Cleared - 27%	High Sensitivity to Gain			1.50		3815
16	398_Mod_shrubs_removed	Not a TEC	49.6	49.6	8.4	PCT Cleared - 27%	High Sensitivity to Gain			1.50		156
											Subtotal	**3971**
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions												
13	394_Good	Not a TEC	56.1	56.1	19	PCT Cleared - 36%	High Sensitivity to Gain			1.50		399
											Subtotal	**399**

Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
3	49_Good	Not a TEC	51	51.0	98	PCT Cleared - 50%	High Sensitivity to Gain			1.75		2186
											Subtotal	**2186**
Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion												
6	88_Good	Not a TEC	52.5	52.5	72.6	PCT Cleared - 38%	High Sensitivity to Gain			1.50		1430
7	88_DNG	Not a TEC	40.6	40.6	36.3	PCT Cleared - 38%	High Sensitivity to Gain			1.50		552
											Subtotal	**1982**
Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion												
14	397_Good	Not a TEC	52.6	52.6	14.7	PCT Cleared - 45%	High Sensitivity to Gain			1.50		290
											Subtotal	**290**

Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion												
20	473_Good	Not a TEC	55.5	55.5	19.2	PCT Cleared - 30%	High Sensitivity to Gain			1.50		400
21	473_DNG	Not a TEC	8.2	8.2	0.9	PCT Cleared - 30%	High Sensitivity to Gain			1.50		0
											Subtotal	**400**
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion												
17	399_Good	Not a TEC	56.9	56.9	31.9	PCT Cleared - 10%	High Sensitivity to Gain			1.50		681
											Subtotal	**681**
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion												
4	78_Good	Not a TEC	86.2	86.2	10.7	PCT Cleared - 60%	High Sensitivity to Gain			1.75		404
5	78_DNG	Not a TEC	40.8	40.8	1.3	PCT Cleared - 60%	High Sensitivity to Gain			1.75		23
											Subtotal	**427**

Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion												
9	145_DNG	Not a TEC	31.9	31.9	5.8	PCT Cleared - 75%	High Sensitivity to Gain			2.00		92
											Subtotal	**92**
White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion												
22	589_Mod_logged	Not a TEC	44	44.0	1	PCT Cleared - 83%	High Sensitivity to Gain			2.00		22
											Subtotal	**22**

White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion												
18	435_Good	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	100	100.0	0.3	PCT Cleared - 58%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	19

19	435_DNG	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	40.4	40.4	5.1	PCT Cleared - 58%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	129
											Subtotal	**148**
											Total	**13460**

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
Aepyprymnus rufescens / Rufous Bettong (Fauna)									
35_Good	62.6	62.6	0.1			Vulnerable	Not Listed	False	3
88_Good	52.5	52.5	11			Vulnerable	Not Listed	False	289

394_Good	56.1	56.1	8.9			Vulnerable	Not Listed	False	249
397_Good	52.6	52.6	7.3			Vulnerable	Not Listed	False	192
398_Good	59.5	59.5	129.7			Vulnerable	Not Listed	False	3860
398_Mod_shrubs_removed	49.6	49.6	8.4			Vulnerable	Not Listed	False	208
399_Good	56.9	56.9	14.2			Vulnerable	Not Listed	False	404
								Subtotal	**5205**
Burhinus grallarius / Bush Stone-curlew (Fauna)									
35_Good	62.6	62.6	0.3			Endangered	Not Listed	False	9
78_Good	86.2	86.2	4.2			Endangered	Not Listed	False	181
88_Good	52.5	52.5	55.2			Endangered	Not Listed	False	1449
394_Good	56.1	56.1	8.9			Endangered	Not Listed	False	249
397_Good	52.6	52.6	4.8			Endangered	Not Listed	False	126
398_Good	59.5	59.5	114.7			Endangered	Not Listed	False	3414
398_Mod_shrubs_removed	49.6	49.6	8.4			Endangered	Not Listed	False	208
399_Good	56.9	56.9	7			Endangered	Not Listed	False	199
473_Good	55.5	55.5	2.7			Endangered	Not Listed	False	75
								Subtotal	**5910**
Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)									
35_Good	62.6	62.6	0.3			Vulnerable	Not Listed	False	9
78_Good	86.2	86.2	10.3			Vulnerable	Not Listed	False	444
88_Good	52.5	52.5	9.8			Vulnerable	Not Listed	False	257
148_Good	58.6	58.6	20.8			Vulnerable	Not Listed	False	610
394_Good	56.1	56.1	3.1			Vulnerable	Not Listed	False	87

397_Good	52.6	52.6	1.2			Vulnerable	Not Listed	False	32
398_Good	59.5	59.5	61.3			Vulnerable	Not Listed	False	1824
398_Mod_shrubs_removed	49.6	49.6	7.1			Vulnerable	Not Listed	False	176
399_Good	56.9	56.9	14.6			Vulnerable	Not Listed	False	416
473_Good	55.5	55.5	2.8			Vulnerable	Not Listed	False	78
								Subtotal	**3933**
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
78_Good	86.2	86.2	4.5			Vulnerable	Not Listed	False	194
88_Good	52.5	52.5	69.5			Vulnerable	Not Listed	False	1825
141_Good	30.9	30.9	1.9			Vulnerable	Not Listed	False	29
148_Good	58.6	58.6	19.4			Vulnerable	Not Listed	False	569
394_Good	56.1	56.1	9.9			Vulnerable	Not Listed	False	277
397_Good	52.6	52.6	14.4			Vulnerable	Not Listed	False	378
398_Good	59.5	59.5	160.3			Vulnerable	Not Listed	False	4771
398_Mod_shrubs_removed	49.6	49.6	8.4			Vulnerable	Not Listed	False	208
399_Good	56.9	56.9	17.2			Vulnerable	Not Listed	False	490
473_Good	55.5	55.5	18.2			Vulnerable	Not Listed	False	505
589_Mod_logged	44.0	44.0	0.4			Vulnerable	Not Listed	False	9
								Subtotal	**9255**
Commersonia procumbens / Commersonia procumbens (Flora)									
88_Good	52.5	52.5	47.6			Vulnerable	Vulnerable	False	1250
141_Good	30.9	30.9	1.9			Vulnerable	Vulnerable	False	29

397_Good	52.6	52.6	11.8			Vulnerable	Vulnerable	False	310
398_Good	59.5	59.5	158.8			Vulnerable	Vulnerable	False	4726
398_Mod_shrubs_removed	49.6	49.6	8.4			Vulnerable	Vulnerable	False	208
399_Good	56.9	56.9	23.3			Vulnerable	Vulnerable	False	663
								Subtotal	**7186**
Cyperus conicus / Cyperus conicus (Flora)									
88_Good	52.5	52.5	8.6			Endangered	Not Listed	False	226
88_DNG	40.6	40.6	33.1			Endangered	Not Listed	False	671
148_Good	58.6	58.6	9.1			Endangered	Not Listed	False	267
								Subtotal	**1164**
Diuris tricolor / Pine Donkey Orchid (Flora)									
88_Good	52.5	52.5	23.3			Vulnerable	Not Listed	False	459
88_DNG	40.6	40.6	36.3			Vulnerable	Not Listed	False	552
148_Good	58.6	58.6	10			Vulnerable	Not Listed	False	220
148_DNG	35.8	35.8	86.9			Vulnerable	Not Listed	False	1166
397_Good	52.6	52.6	11.9			Vulnerable	Not Listed	False	235
398_Good	59.5	59.5	66.5			Vulnerable	Not Listed	False	1484
399_Good	56.9	56.9	5.9			Vulnerable	Not Listed	False	126
473_Good	55.5	55.5	2.2			Vulnerable	Not Listed	False	46
								Subtotal	**4288**
Hieraaetus morphnoides / Little Eagle (Fauna)									
78_Good	86.2	86.2	9.3			Vulnerable	Not Listed	False	301
88_Good	52.5	52.5	36.9			Vulnerable	Not Listed	False	727

148_Good	58.6	58.6	7.7			Vulnerable	Not Listed	False	169
397_Good	52.6	52.6	4.4			Vulnerable	Not Listed	False	87
398_Good	59.5	59.5	84.1			Vulnerable	Not Listed	False	1877
398_Mod_shrubs_removed	49.6	49.6	7.1			Vulnerable	Not Listed	False	132
399_Good	56.9	56.9	20.1			Vulnerable	Not Listed	False	429
435_Good	100.0	100.0	0.3			Vulnerable	Not Listed	False	11
473_Good	55.5	55.5	10.4			Vulnerable	Not Listed	False	217
								Subtotal	**3950**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
35_Good	62.6	62.6	0.4			Vulnerable	Not Listed	False	13
78_Good	86.2	86.2	10.5			Vulnerable	Not Listed	False	453
88_Good	52.5	52.5	5.6			Vulnerable	Not Listed	False	147
148_Good	58.6	58.6	16.2			Vulnerable	Not Listed	False	475
394_Good	56.1	56.1	4.8			Vulnerable	Not Listed	False	135
397_Good	52.6	52.6	6.6			Vulnerable	Not Listed	False	173
398_Good	59.5	59.5	31.7			Vulnerable	Not Listed	False	943
398_Mod_shrubs_removed	49.6	49.6	1			Vulnerable	Not Listed	False	25
399_Good	56.9	56.9	21.9			Vulnerable	Not Listed	False	623
473_Good	55.5	55.5	3.4			Vulnerable	Not Listed	False	94
								Subtotal	**3081**
Lepidium aschersonii / Spiny Peppercress (Flora)									
88_Good	52.5	52.5	12.9			Vulnerable	Vulnerable	False	339
88_DNG	40.6	40.6	33.1			Vulnerable	Vulnerable	False	671

148_Good	58.6	58.6	10			Vulnerable	Vulnerable	False	293
148_DNG	35.8	35.8	86.9			Vulnerable	Vulnerable	False	1555
398_Good	59.5	59.5	66.5			Vulnerable	Vulnerable	False	1979
399_Good	56.9	56.9	5.8			Vulnerable	Vulnerable	False	165
473_Good	55.5	55.5	2.2			Vulnerable	Vulnerable	False	61
								Subtotal	**5063**
Lepidium monoplocoides / Winged Peppercress (Flora)									
78_Good	86.2	86.2	0.3			Endangered	Endangered	False	13
88_Good	52.5	52.5	12.9			Endangered	Endangered	False	339
88_DNG	40.6	40.6	33.1			Endangered	Endangered	False	671
148_Good	58.6	58.6	6.4			Endangered	Endangered	False	188
148_DNG	35.8	35.8	86.9			Endangered	Endangered	False	1555
								Subtotal	**2766**
Lophoictinia isura / Square-tailed Kite (Fauna)									
78_Good	86.2	86.2	9.3			Vulnerable	Not Listed	False	301
88_Good	52.5	52.5	37.8			Vulnerable	Not Listed	False	744
148_Good	58.6	58.6	7.7			Vulnerable	Not Listed	False	169
394_Good	56.1	56.1	4			Vulnerable	Not Listed	False	84
397_Good	52.6	52.6	2.3			Vulnerable	Not Listed	False	45
398_Good	59.5	59.5	53.4			Vulnerable	Not Listed	False	1192
399_Good	56.9	56.9	16.6			Vulnerable	Not Listed	False	354
435_Good	100.0	100.0	0.3			Vulnerable	Not Listed	False	11
473_Good	55.5	55.5	4.6			Vulnerable	Not Listed	False	96
								Subtotal	**2996**

Ninox connivens / Barking Owl (Fauna)									
35_Good	62.6	62.6	0.3			Vulnerable	Not Listed	False	9
78_Good	86.2	86.2	3.6			Vulnerable	Not Listed	False	155
88_Good	52.5	52.5	41.9			Vulnerable	Not Listed	False	1100
394_Good	56.1	56.1	2.7			Vulnerable	Not Listed	False	76
397_Good	52.6	52.6	4.6			Vulnerable	Not Listed	False	121
398_Good	59.5	59.5	53.6			Vulnerable	Not Listed	False	1595
398_Mod_shrubs_removed	49.6	49.6	1			Vulnerable	Not Listed	False	25
399_Good	56.9	56.9	19.6			Vulnerable	Not Listed	False	558
								Subtotal	**3639**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
78_Good	86.2	86.2	5			Vulnerable	Not Listed	False	216
88_Good	52.5	52.5	66.7			Vulnerable	Not Listed	False	1751
148_Good	58.6	58.6	25			Vulnerable	Not Listed	False	733
394_Good	56.1	56.1	8.9			Vulnerable	Not Listed	False	249
397_Good	52.6	52.6	9			Vulnerable	Not Listed	False	237
398_Good	59.5	59.5	131.2			Vulnerable	Not Listed	False	3905
398_Mod_shrubs_removed	49.6	49.6	8.4			Vulnerable	Not Listed	False	208
399_Good	56.9	56.9	14.2			Vulnerable	Not Listed	False	404
473_Good	55.5	55.5	3.4			Vulnerable	Not Listed	False	94
								Subtotal	**7797**
Phascolarctos cinereus / Koala (Fauna)									
88_Good	52.5	52.5	49.3			Endangered	Endangered	False	1294

148_Good	58.6	58.6	15.5			Endangered	Endangered	False	454
394_Good	56.1	56.1	17.9			Endangered	Endangered	False	502
397_Good	52.6	52.6	14.5			Endangered	Endangered	False	381
398_Good	59.5	59.5	94.4			Endangered	Endangered	False	2809
398_Mod_shrubs_removed	49.6	49.6	8.4			Endangered	Endangered	False	208
399_Good	56.9	56.9	24.7			Endangered	Endangered	False	703
435_Good	100.0	100.0	0.3			Endangered	Endangered	False	15
473_Good	55.5	55.5	19.2			Endangered	Endangered	False	533
589_Mod_logged	44.0	44.0	1			Endangered	Endangered	False	22
								Subtotal	**6921**
Polygala linariifolia / Native Milkwort (Flora)									
88_Good	52.5	52.5	12.9			Endangered	Not Listed	False	339
88_DNG	40.6	40.6	31.5			Endangered	Not Listed	False	639
148_Good	58.6	58.6	10			Endangered	Not Listed	False	293
148_DNG	35.8	35.8	86.9			Endangered	Not Listed	False	1555
398_Good	59.5	59.5	66.5			Endangered	Not Listed	False	1979
399_Good	56.9	56.9	5.8			Endangered	Not Listed	False	165
								Subtotal	**4970**
Pomaderris queenslandica / Scant Pomaderris (Flora)									
148_Good	58.6	58.6	9.1			Endangered	Not Listed	False	267
								Subtotal	**267**
Pterostylis cobarensis / Greenhood Orchid (Flora)									
88_Good	52.5	52.5	62.7			Vulnerable	Not Listed	False	1646

88_DNG	40.6	40.6	28.4			Vulnerable	Not Listed	False	576
141_Good	30.9	30.9	1.9			Vulnerable	Not Listed	False	29
394_Good	56.1	56.1	18			Vulnerable	Not Listed	False	505
397_Good	52.6	52.6	11.8			Vulnerable	Not Listed	False	310
398_Good	59.5	59.5	29.8			Vulnerable	Not Listed	False	887
399_Good	56.9	56.9	22.1			Vulnerable	Not Listed	False	629
								Subtotal	**4582**
Tylophora linearis / Tylophora linearis (Flora)									
399_Good	56.9	56.9	5.8			Vulnerable	Endangered	False	165
								Subtotal	**165**
Tyto novaehollandiae / Masked Owl (Fauna)									
35_Good	62.6	62.6	0.3			Vulnerable	Not Listed	False	9
78_Good	86.2	86.2	3.6			Vulnerable	Not Listed	False	155
88_Good	52.5	52.5	4.4			Vulnerable	Not Listed	False	116
394_Good	56.1	56.1	2.7			Vulnerable	Not Listed	False	76
397_Good	52.6	52.6	4.6			Vulnerable	Not Listed	False	121
398_Good	59.5	59.5	36.8			Vulnerable	Not Listed	False	1095
398_Mod_shrubs_removed	49.6	49.6	1			Vulnerable	Not Listed	False	25
399_Good	56.9	56.9	14.7			Vulnerable	Not Listed	False	418
								Subtotal	**2015**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029284	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
4	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

Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion												
9	599_Good	Not a TEC	78	78.0	3	PCT Cleared - 80%	High Sensitivity to Gain			2.00		117
											Subtotal	**117**
Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW												
7	248_Good	Not a TEC	59.1	59.1	16.3	PCT Cleared - 80%	High Sensitivity to Gain			2.00		482
											Subtotal	**482**
Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion												
8	255_Good	Not a TEC	53.1	53.1	4.3	PCT Cleared - 50%	High Sensitivity to Gain			1.75		100
											Subtotal	**100**
Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
2	49_Good	Not a TEC	85.3	85.3	11.7	PCT Cleared - 50%	High Sensitivity to Gain			1.75		437
											Subtotal	**437**

Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion												
5	88_Good	Not a TEC	48.8	48.8	19	PCT Cleared - 38%	High Sensitivity to Gain			1.50		348
6	88_DNG	Not a TEC	38.5	38.5	0.5	PCT Cleared - 38%	High Sensitivity to Gain			1.50		7
											Subtotal	**355**
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW												
3	56_Good	Not a TEC	99.7	99.7	0.6	PCT Cleared - 78%	High Sensitivity to Gain			2.00		30
											Subtotal	**30**
River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion												
1	36_Good	Not a TEC	53	53.0	2.8	PCT Cleared - 53%	High Sensitivity to Gain			1.75		65
											Subtotal	**65**

Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion												
4	81_Good	Not a TEC	80.1	80.1	0.9	PCT Cleared - 78%	High Sensitivity to Gain			2.00		36
											Subtotal	**36**
											Total	**1622**

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
Burhinus grallarius / Bush Stone-curlew (Fauna)									
88_Good	48.8	48.8	2.2			Endangered	Not Listed	False	54
248_Good	59.1	59.1	5.8			Endangered	Not Listed	False	172
								Subtotal	**226**
Hieraaetus morphnoides / Little Eagle (Fauna)									
36_Good	53.0	53.0	2.1			Vulnerable	Not Listed	False	42
56_Good	99.7	99.7	0.4			Vulnerable	Not Listed	False	15
248_Good	59.1	59.1	7.5			Vulnerable	Not Listed	False	166
255_Good	53.1	53.1	3.3			Vulnerable	Not Listed	False	66
								Subtotal	**289**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
36_Good	53.0	53.0	1.1			Vulnerable	Not Listed	False	29

81_Good	80.1	80.1	0.9			Vulnerable	Not Listed	False	36
248_Good	59.1	59.1	6.8			Vulnerable	Not Listed	False	201
599_Good	78.0	78.0	2.6			Vulnerable	Not Listed	False	101
								Subtotal	**367**
Lophoictinia isura / Square-tailed Kite (Fauna)									
36_Good	53.0	53.0	2.1			Vulnerable	Not Listed	False	42
56_Good	99.7	99.7	0.4			Vulnerable	Not Listed	False	15
248_Good	59.1	59.1	7.5			Vulnerable	Not Listed	False	166
255_Good	53.1	53.1	3.3			Vulnerable	Not Listed	False	66
								Subtotal	**289**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029286	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
3	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

Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
9	206_Good	Not a TEC	79.1	79.1	5.2	PCT Cleared - 50%	High Sensitivity to Gain			1.75		180
											Subtotal	**180**
Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
2	49_Good	Not a TEC	93.8	93.8	122.2	PCT Cleared - 50%	High Sensitivity to Gain			1.75		5015
											Subtotal	**5015**
Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion												
6	88_Good	Not a TEC	63	63.0	13.6	PCT Cleared - 38%	High Sensitivity to Gain			1.50		321
7	88_DNG	Not a TEC	38.5	38.5	3.1	PCT Cleared - 38%	High Sensitivity to Gain			1.50		45
											Subtotal	**366**

Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW												
3	56_Good	Not a TEC	73.3	73.3	12.8	PCT Cleared - 78%	High Sensitivity to Gain			2.00		469
4	56_DNG	Not a TEC	40.1	40.1	18.4	PCT Cleared - 78%	High Sensitivity to Gain			2.00		369
											Subtotal	**838**
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).												
10	244_Good	Not a TEC	87.2	87.2	19.7	PCT Cleared - 73%	High Sensitivity to Gain			2.00		859
											Subtotal	**859**
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion												
5	78_Good	Not a TEC	58.1	58.1	8.7	PCT Cleared - 60%	High Sensitivity to Gain			1.75		221
											Subtotal	**221**
Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion												
11	444_Good	Not a TEC	85.1	85.1	1.7	PCT Cleared - 83%	High Sensitivity to Gain			2.00		72
											Subtotal	**72**

Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion												
1	27_Good	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	57.2	57.2	4.6	PCT Cleared - 86%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		132
											Subtotal	**132**
Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion												
8	145_Good	Not a TEC	36.8	36.8	15.8	PCT Cleared - 75%	High Sensitivity to Gain			2.00		291
											Subtotal	**291**
											Total	**7974**

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

Burhinus grallarius / Bush Stone-curlew (Fauna)									
27_Good	57.2	57.2	1.7			Endangered	Not Listed	False	49
78_Good	58.1	58.1	1.7			Endangered	Not Listed	False	49
88_Good	63.0	63.0	10.4			Endangered	Not Listed	False	328
244_Good	87.2	87.2	9.4			Endangered	Not Listed	False	410
								Subtotal	**836**
Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)									
88_Good	63.0	63.0	0.2			Vulnerable	Not Listed	False	6
244_Good	87.2	87.2	1.1			Vulnerable	Not Listed	False	48
								Subtotal	**54**
Hieraaetus morphnoides / Little Eagle (Fauna)									
56_Good	73.3	73.3	4.9			Vulnerable	Not Listed	False	135
78_Good	58.1	58.1	8.5			Vulnerable	Not Listed	False	185
88_Good	63.0	63.0	2			Vulnerable	Not Listed	False	47
145_Good	36.8	36.8	1.4			Vulnerable	Not Listed	False	19
244_Good	87.2	87.2	6.8			Vulnerable	Not Listed	False	222
444_Good	85.1	85.1	1.7			Vulnerable	Not Listed	False	54
								Subtotal	**662**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
27_Good	57.2	57.2	0.6			Vulnerable	Not Listed	False	17
56_Good	73.3	73.3	0.1			Vulnerable	Not Listed	False	4
78_Good	58.1	58.1	8.7			Vulnerable	Not Listed	False	253
88_Good	63.0	63.0	4.2			Vulnerable	Not Listed	False	132
244_Good	87.2	87.2	4.8			Vulnerable	Not Listed	False	209

								Subtotal	**615**
Lepidium monoplocoides / Winged Peppercress (Flora)									
56_Good	73.3	73.3	8.4			Endangered	Endangered	False	308
56_DNG	40.1	40.1	17.7			Endangered	Endangered	False	355
88_Good	63.0	63.0	7			Endangered	Endangered	False	221
88_DNG	38.5	38.5	3.1			Endangered	Endangered	False	60
								Subtotal	**944**
Lophoictinia isura / Square-tailed Kite (Fauna)									
56_Good	73.3	73.3	4.9			Vulnerable	Not Listed	False	135
78_Good	58.1	58.1	5.2			Vulnerable	Not Listed	False	113
88_Good	63.0	63.0	1.7			Vulnerable	Not Listed	False	40
145_Good	36.8	36.8	1.4			Vulnerable	Not Listed	False	19
206_Good	79.1	79.1	1.9			Vulnerable	Not Listed	False	56
244_Good	87.2	87.2	7.4			Vulnerable	Not Listed	False	242
444_Good	85.1	85.1	0.9			Vulnerable	Not Listed	False	29
								Subtotal	**634**
Ninox connivens / Barking Owl (Fauna)									
78_Good	58.1	58.1	1.7			Vulnerable	Not Listed	False	49
88_Good	63.0	63.0	4.2			Vulnerable	Not Listed	False	132
244_Good	87.2	87.2	1.6			Vulnerable	Not Listed	False	70
								Subtotal	**251**
Phascolarctos cinereus / Koala (Fauna)									
56_Good	73.3	73.3	2.9			Endangered	Endangered	False	106
								Subtotal	**106**

Swainsona murrayana / Slender Darling Pea (Flora)									
27_Good	57.2	57.2	3.2			Vulnerable	Vulnerable	False	92
49_Good	93.8	93.8	30			Vulnerable	Vulnerable	False	1407
56_Good	73.3	73.3	5.4			Vulnerable	Vulnerable	False	198
56_DNG	40.1	40.1	3.7			Vulnerable	Vulnerable	False	74
								Subtotal	**1771**
Tyto novaehollandiae / Masked Owl (Fauna)									
78_Good	58.1	58.1	1.7			Vulnerable	Not Listed	False	49
88_Good	63.0	63.0	4.2			Vulnerable	Not Listed	False	132
244_Good	87.2	87.2	2.5			Vulnerable	Not Listed	False	109
								Subtotal	**290**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029283	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**BAM Case Status**	**Date Finalised**
BAAS17011	Finalised	17/08/2022
Assessment Revision	**Assessment Type**	
5	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
Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion												
1	185_DNG	Not a TEC	9.6	9.6	12.1	PCT Cleared - 20%	High Sensitivity to Gain			1.50		0

2	185_Good	Not a TEC	97.8	97.8	1.4	PCT Cleared - 20%	High Sensitivity to Gain			1.50		51
											Subtotal	**51**
											Total	**51**

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

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00029288	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 3	Assessment Type Major Projects	Date Finalised 17/08/2022

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Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Not a TEC	7.1	0	237	237
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	1.4	0	26	26
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	0.2	7	0	7

55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	55_Good	Yes	7	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	No	26	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	168_Good	No	237	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. 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
Burhinus grallarius / Bush Stone-curlew	**78_Good**	0.2	4.00
Cercartetus nanus / Eastern Pygmy-possum	**78_Good**	0.2	4.00
Hieraaetus morphnoides / Little Eagle	**78_Good**	0.2	3.00

Hoplocephalus bitorquatus / Pale-headed Snake	**78_Good**	0.5	10.00
Lophoictinia isura / Square-tailed Kite	**78_Good**	0.2	3.00
Petaurus norfolcensis / Squirrel Glider	**78_Good**	0.2	4.00

Credit Retirement Options

Like-for-like credit retirement options

Burhinus grallarius / Bush Stone-curlew	Spp	IBRA subregion
	Burhinus grallarius / Bush Stone-curlew	Any in NSW
Cercartetus nanus / Eastern Pygmy-possum	Spp	IBRA subregion
	Cercartetus nanus / Eastern Pygmy-possum	Any in NSW
Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion
	Hieraaetus morphnoides / Little Eagle	Any in NSW
Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Lophoictinia isura / Square-tailed Kite	Spp	IBRA subregion
	Lophoictinia isura / Square-tailed Kite	Any in NSW

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00023995	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 12	Assessment Type Major Projects	Date Finalised 17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	7.1	0	89	89
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	0.7	23	0	23

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	89	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	55_Good	Yes	23	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00029285	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 4	Assessment Type Major Projects	Date Finalised 17/08/2022

* 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
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Species
Nil

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
27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	1.9	0	43	43
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Not a TEC	3.0	68	0	68

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	91.1	0	2110	2110
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	3.1	72	0	72
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	6.5	175	0	175
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	8.5	173	0	173
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	257.0	3365	565	3930
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Not a TEC	29.0	0	410	410
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	49.3	608	0	608
202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	3.6	179	0	179
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	4.9	89	0	89

244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Not a TEC	24.2	430	0	430
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Not a TEC	7.9	127	0	127
256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Not a TEC	0.3	0	5	5
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Not a TEC	62.1	596	335	931
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Not a TEC	3.1	0	52	52
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Not a TEC	203.0	5029	0	5029
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Not a TEC	22.9	480	0	480
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Not a TEC	25.1	481	0	481

406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Not a TEC	2.4	51	0	51
409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Not a TEC	0.8	14	0	14
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Not a TEC	7.3	0	79	79
469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not a TEC	1.0	0	14	14
746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Not a TEC	2.1	0	36	36
1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Not a TEC	8.8	0	352	352

27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	27_Good	No	43	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	36_Good	Yes	68	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	2110	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	55_Good	Yes	72	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_Good	Yes	175	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW						
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	Yes	173	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	3336	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Low	Yes	29	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	565	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	141_Good	No	410	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion

145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	145_Good	Yes	608	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions This includes PCT's: 201, 202, 1384	-	202_Good	Yes	179	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	North-west Alluvial Sand Woodlands This includes PCT's: 71, 206, 227, 376, 428	North-west Alluvial Sand Woodlands >=50% and <70%	206_Good	Yes	89	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	**Like-for-like credit retirement options**

Class	Trading group	Zone	HBT	Credits	IBRA region
Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	244_Good	Yes	430	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709	Western Slopes Dry Sclerophyll Forests >=50% and <70%	255_Good	Yes	127	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	256_Good	No	5	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_Good_fire_affected	No	102	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_Good	Yes	596	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_DNG	No	233	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	397_Good	No	52	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	398_Good	Yes	5029	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					

399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398,	Western Slopes Dry Sclerophyll Forests <50%	399_Good	Yes	480	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468,	Western Slopes Dry Sclerophyll Forests <50%	404_Good	Yes	481	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324,	Western Slopes Dry Sclerophyll Forests <50%	406_Good	Yes	51	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or

	325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398,	Western Slopes Dry Sclerophyll Forests <50%	409_Good	Yes	14	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468,	Western Slopes Dry Sclerophyll Forests <50%	414_Good_fire_affected	No	79	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324,	Western Slopes Dry Sclerophyll Forests <50%	469_Good	No	14	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or

	325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398,	Western Slopes Dry Sclerophyll Forests <50%	746_Good	No	36	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=70% and <90%	1384_Good	No	352	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. 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
Aepyprymnus rufescens / Rufous Bettong	**88_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 409_Good**	178.3	5395.00
Burhinus grallarius / Bush Stone-curlew	**27_Good, 78_Good, 88_Good, 88_Low, 244_Good, 394_Good, 397_Good, 398_Good, 1384_Good**	311.9	8189.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**88_Good, 202_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good**	192.1	5309.00
Cercartetus nanus / Eastern Pygmy-possum	**36_Good, 78_Good, 88_Good, 141_Good, 202_Good, 244_Good, 255_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 414_Good_fire_affected, 746_Good, 1384_Good**	511.2	13542.00

Commersonia procumbens / Commersonia procumbens	**88_Good, 141_Good, 256_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 409_Good, 414_Good_fire_affected, 1384_Good**	321.1	9552.00
Dichanthium setosum / Bluegrass	**202_Good**	3.5	174.00
Diuris tricolor / Pine Donkey Orchid	**88_Good, 88_DNG, 141_Good, 202_Good, 397_Good, 398_Good, 399_Good, 404_Good**	145.2	2888.00
Hieraaetus morphnoides / Little Eagle	**36_Good, 55_Good, 78_Good, 88_Good, 145_Good, 206_Good, 244_Good, 394_Good_fire_affected, 394_Good, 398_Good, 399_Good, 404_Good, 406_Good, 409_Good, 1384_Good**	246.7	4861.00

Hoplocephalus bitorquatus / Pale-headed Snake	**36_Good, 56_Good, 78_Good, 88_Good, 141_Good, 202_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 1384_Good**	154.0	4204.00
Lepidium aschersonii / Spiny Peppercress	**88_Good, 88_DNG, 202_Good, 398_Good, 404_Good**	121.4	3169.00
Lophoictinia isura / Square-tailed Kite	**36_Good, 55_Good, 56_Good, 78_Good, 88_Good, 145_Good, 206_Good, 244_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 746_Good**	234.4	4664.00
Ninox connivens / Barking Owl	**56_Good, 78_Good, 88_Good, 202_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 1384_Good**	123.6	3558.00

Petaurus norfolcensis / Squirrel Glider	**36_Good, 78_Good, 88_Good, 88_Low, 141_Good, 202_Good, 244_Good, 255_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 746_Good, 1384_Good**	379.0	9821.00
Phascolarctos cinereus / Koala	**88_Good, 394_Good**	12.0	266.00
Polygala linariifolia / Native Milkwort	**88_Good, 88_DNG**	49.6	1053.00
Pterostylis cobarensis / Greenhood Orchid	**88_Good, 88_DNG, 141_Good, 202_Good, 244_Good, 256_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 409_Good, 414_Good_fire_affected, 1384_Good**	267.9	6674.00
Swainsona murrayana / Slender Darling Pea	**202_Good, 244_Good**	7.8	250.00
Swainsona sericea / Silky Swainson-pea	**49_Good, 202_Good, 244_Good, 398_Good**	78.9	2472.00
Tylophora linearis / Tylophora linearis	**141_Good, 202_Good, 398_Good, 1384_Good**	32.1	1071.00

Tyto novaehollandiae / Masked Owl	**56_Good, 78_Good, 88_Good, 202_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 1384_Good**	109.3	3238.00
Zieria ingramii / Keith's Zieria	**398_Good**	48.6	1605.00

Credit Retirement Options

Like-for-like credit retirement options

Aepyprymnus rufescens / Rufous Bettong	Spp	IBRA subregion
	Aepyprymnus rufescens / Rufous Bettong	Any in NSW
Burhinus grallarius / Bush Stone-curlew	Spp	IBRA subregion
	Burhinus grallarius / Bush Stone-curlew	Any in NSW
Calyptorhynchus lathami / Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami / Glossy Black-Cockatoo	Any in NSW
Cercartetus nanus / Eastern Pygmy-possum	Spp	IBRA subregion
	Cercartetus nanus / Eastern Pygmy-possum	Any in NSW

Commersonia procumbens / Commersonia procumbens	Spp	IBRA subregion
	Commersonia procumbens / Commersonia procumbens	Any in NSW
Dichanthium setosum / Bluegrass	Spp	IBRA subregion
	Dichanthium setosum / Bluegrass	Any in NSW
Diuris tricolor / Pine Donkey Orchid	Spp	IBRA subregion
	Diuris tricolor / Pine Donkey Orchid	Any in NSW
Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion
	Hieraaetus morphnoides / Little Eagle	Any in NSW
Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Lepidium aschersonii / Spiny Peppercress	Spp	IBRA subregion
	Lepidium aschersonii / Spiny Peppercress	Any in NSW
Lophoictinia isura / Square-tailed Kite	Spp	IBRA subregion

	Lophoictinia isura / Square-tailed Kite	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW
Polygala linariifolia / Native Milkwort	Spp	IBRA subregion
	Polygala linariifolia / Native Milkwort	Any in NSW
Pterostylis cobarensis / Greenhood Orchid	Spp	IBRA subregion
	Pterostylis cobarensis / Greenhood Orchid	Any in NSW
Swainsona murrayana / Slender Darling Pea	Spp	IBRA subregion
	Swainsona murrayana / Slender Darling Pea	Any in NSW

Swainsona sericea / Silky Swainson-pea	Spp	IBRA subregion
	Swainsona sericea / Silky Swainson-pea	Any in NSW
Tylophora linearis / Tylophora linearis	Spp	IBRA subregion
	Tylophora linearis / Tylophora linearis	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW
Zieria ingramii / Keith's Zieria	Spp	IBRA subregion
	Zieria ingramii / Keith's Zieria	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00029287	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 3	Assessment Type Major Projects	Date Finalised 17/08/2022

* 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
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	Endangered Ecological Community	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Species
Nil

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
35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	7.3	44	111	155
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	98.0	0	2186	2186
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	12.0	404	23	427
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	108.9	1430	552	1982
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Not a TEC	1.9	0	22	22
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	5.8	92	0	92
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	Not a TEC	141.6	1185	1493	2678
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Not a TEC	0.2	0	7	7

394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Not a TEC	19.0	399	0	399
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Not a TEC	14.7	290	0	290
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Not a TEC	179.3	3971	0	3971
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Not a TEC	31.9	681	0	681
435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	5.4	19	129	148
473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Not a TEC	20.1	400	0	400
589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Not a TEC	1.0	22	0	22

35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions This includes PCT's: 35, 56, 87, 101, 244, 445, 629	-	35_Good	Yes	44	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions This includes PCT's: 35, 56, 87, 101, 244, 445, 629	-	35_DNG	No	111	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	2186	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	Yes	404	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_DNG	No	23	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	1430	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	552	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion						
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	141_Good	No	22	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	145_DNG	Yes	92	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion						
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 148, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=50% and <70%	148_Good	Yes	1185	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 148, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=50% and <70%	148_DNG	No	1493	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion

168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains

Like-for-like credit retirement options

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

394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_Good	Yes	399	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	397_Good	Yes	290	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion						
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617,	Western Slopes Dry Sclerophyll Forests <50%	398_Good	Yes	3815	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473,	Western Slopes Dry Sclerophyll Forests <50%	398_Mod_shrubs_removed	Yes	156	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333,	Western Slopes Dry Sclerophyll Forests <50%	399_Good	Yes	681	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					

435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492,	-	435_Good	Yes	19	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	435_DNG	No	129	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291,	Western Slopes Dry Sclerophyll Forests <50%	473_Good	Yes	400	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the

	309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771					impacted site.
	Western Slopes Dry Sclerophyll Forests	Western Slopes Dry Sclerophyll Forests	473_DNG	No	0	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga.

	This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709,	<50%				or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1711, 1770, 1771					
589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	589_Mod_logged	Yes	22	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. 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
Aepyprymnus rufescens / Rufous Bettong	**35_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	179.6	5205.00
Burhinus grallarius / Bush Stone-curlew	**35_Good, 78_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	206.2	5910.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**35_Good, 78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	131.3	3933.00
Cercartetus nanus / Eastern Pygmy-possum	**78_Good, 88_Good, 141_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good, 589_Mod_logged**	324.1	9255.00

Commersonia procumbens / Commersonia procumbens	**88_Good, 141_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	251.8	7186.00
Cyperus conicus / Cyperus conicus	**88_Good, 88_DNG, 148_Good**	50.8	1164.00
Diuris tricolor / Pine Donkey Orchid	**88_Good, 88_DNG, 148_Good, 148_DNG, 397_Good, 398_Good, 399_Good, 473_Good**	243.0	4288.00
Hieraaetus morphnoides / Little Eagle	**78_Good, 88_Good, 148_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 435_Good, 473_Good**	180.3	3950.00
Hoplocephalus bitorquatus / Pale-headed Snake	**35_Good, 78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	102.1	3081.00
Lepidium aschersonii / Spiny Peppercress	**88_Good, 88_DNG, 148_Good, 148_DNG, 398_Good, 399_Good, 473_Good**	217.4	5063.00
Lepidium monoplocoides / Winged Peppercress	**78_Good, 88_Good, 88_DNG, 148_Good, 148_DNG**	139.6	2766.00

Lophoictinia isura / Square-tailed Kite	**78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 399_Good, 435_Good, 473_Good**	136.0	2996.00
Ninox connivens / Barking Owl	**35_Good, 78_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	127.3	3639.00
Petaurus norfolcensis / Squirrel Glider	**78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	271.8	7797.00
Phascolarctos cinereus / Koala	**88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 435_Good, 473_Good, 589_Mod_logged**	245.2	6921.00
Polygala linariifolia / Native Milkwort	**88_Good, 88_DNG, 148_Good, 148_DNG, 398_Good, 399_Good**	213.6	4970.00
Pomaderris queenslandica / Scant Pomaderris	**148_Good**	9.1	267.00

Pterostylis cobarensis / Greenhood Orchid	**88_Good, 88_DNG, 141_Good, 394_Good, 397_Good, 398_Good, 399_Good**	174.7	4582.00
Tylophora linearis / Tylophora linearis	**399_Good**	5.8	165.00
Tyto novaehollandiae / Masked Owl	**35_Good, 78_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	68.1	2015.00

Credit Retirement Options

Like-for-like credit retirement options

Aepyprymnus rufescens / Rufous Bettong	Spp	IBRA subregion
	Aepyprymnus rufescens / Rufous Bettong	Any in NSW
Burhinus grallarius / Bush Stone-curlew	Spp	IBRA subregion
	Burhinus grallarius / Bush Stone-curlew	Any in NSW
Calyptorhynchus lathami / Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami / Glossy Black-Cockatoo	Any in NSW
Cercartetus nanus / Eastern Pygmy-possum	Spp	IBRA subregion

	Cercartetus nanus / Eastern Pygmy-possum	Any in NSW
Commersonia procumbens / Commersonia procumbens	Spp	IBRA subregion
	Commersonia procumbens / Commersonia procumbens	Any in NSW
Cyperus conicus / Cyperus conicus	Spp	IBRA subregion
	Cyperus conicus / Cyperus conicus	Any in NSW
Diuris tricolor / Pine Donkey Orchid	Spp	IBRA subregion
	Diuris tricolor / Pine Donkey Orchid	Any in NSW
Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion
	Hieraaetus morphnoides / Little Eagle	Any in NSW
Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Lepidium aschersonii / Spiny Peppercress	Spp	IBRA subregion
	Lepidium aschersonii / Spiny Peppercress	Any in NSW

Lepidium monoplocoides / Winged Peppercress	Spp	IBRA subregion
	Lepidium monoplocoides / Winged Peppercress	Any in NSW
Lophoictinia isura / Square-tailed Kite	Spp	IBRA subregion
	Lophoictinia isura / Square-tailed Kite	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW
Polygala linariifolia / Native Milkwort	Spp	IBRA subregion
	Polygala linariifolia / Native Milkwort	Any in NSW
Pomaderris queenslandica / Scant Pomaderris	Spp	IBRA subregion

	Pomaderris queenslandica / Scant Pomaderris	Any in NSW
Pterostylis cobarensis / Greenhood Orchid	Spp	IBRA subregion
	Pterostylis cobarensis / Greenhood Orchid	Any in NSW
Tylophora linearis / Tylophora linearis	Spp	IBRA subregion
	Tylophora linearis / Tylophora linearis	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00029284	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 4	Assessment Type Major Projects	Date Finalised 17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Not a TEC	2.8	65	0	65
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	11.7	0	437	437
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	0.6	30	0	30
81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not a TEC	0.9	36	0	36
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	19.5	348	7	355
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	Not a TEC	16.3	482	0	482
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Not a TEC	4.3	100	0	100
599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	3.0	117	0	117

36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	36_Good	Yes	65	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	437	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_Good	Yes	30	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	81_Good	Yes	36	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	348	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	7	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	248_Good	Yes	482	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709	Western Slopes Dry Sclerophyll Forests >=50% and <70%	255_Good	Yes	100	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	599_Good	Yes	117	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. 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
Burhinus grallarius / Bush Stone-curlew	**88_Good, 248_Good**	8.0	226.00
Hieraaetus morphnoides / Little Eagle	**36_Good, 56_Good, 248_Good, 255_Good**	13.3	289.00
Hoplocephalus bitorquatus / Pale-headed Snake	**36_Good, 81_Good, 248_Good, 599_Good**	11.4	367.00

Lophoictinia isura / Square-tailed Kite	**36_Good, 56_Good, 248_Good, 255_Good**	13.3	289.00

Credit Retirement Options

Like-for-like credit retirement options

Burhinus grallarius / Bush Stone-curlew	Spp	IBRA subregion
	Burhinus grallarius / Bush Stone-curlew	Any in NSW
Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion
	Hieraaetus morphnoides / Little Eagle	Any in NSW
Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Lophoictinia isura / Square-tailed Kite	Spp	IBRA subregion
	Lophoictinia isura / Square-tailed Kite	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00029286	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 3	Assessment Type Major Projects	Date Finalised 17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	4.6	0	132	132
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	122.2	0	5015	5015
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	31.2	469	369	838

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	8.7	221	0	221
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	16.7	321	45	366
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	15.8	291	0	291
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	5.2	180	0	180
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Not a TEC	19.7	859	0	859
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	Not a TEC	1.7	72	0	72

27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	27_Good	No	132	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	5015	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_Good	Yes	469	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_DNG	No	369	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	Yes	221	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	321	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	45	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	145_Good	Yes	291	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Alluvial Sand Woodlands This includes PCT's: 71, 206, 227, 376, 428	North-west Alluvial Sand Woodlands >=50% and <70%	206_Good	Yes	180	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	244_Good	Yes	859	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	444_Good	Yes	72	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. 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
Burhinus grallarius / Bush Stone-curlew	**27_Good, 78_Good, 88_Good, 244_Good**	23.2	836.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**88_Good, 244_Good**	1.3	54.00
Hieraaetus morphnoides / Little Eagle	**56_Good, 78_Good, 88_Good, 145_Good, 244_Good, 444_Good**	25.3	662.00

Hoplocephalus bitorquatus / Pale-headed Snake	**27_Good, 56_Good, 78_Good, 88_Good, 244_Good**	18.4	615.00
Lepidium monoplocoides / Winged Peppercress	**56_Good, 56_DNG, 88_Good, 88_DNG**	36.2	944.00
Lophoictinia isura / Square-tailed Kite	**56_Good, 78_Good, 88_Good, 145_Good, 206_Good, 244_Good, 444_Good**	23.4	634.00
Ninox connivens / Barking Owl	**78_Good, 88_Good, 244_Good**	7.5	251.00
Phascolarctos cinereus / Koala	**56_Good**	2.9	106.00
Swainsona murrayana / Slender Darling Pea	**27_Good, 49_Good, 56_Good, 56_DNG**	42.3	1771.00
Tyto novaehollandiae / Masked Owl	**78_Good, 88_Good, 244_Good**	8.4	290.00

Credit Retirement Options

Like-for-like credit retirement options

Burhinus grallarius / Bush Stone-curlew	Spp	IBRA subregion
	Burhinus grallarius / Bush Stone-curlew	Any in NSW
Calyptorhynchus lathami / Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami / Glossy Black-Cockatoo	Any in NSW
Hieraaetus morphnoides / Little Eagle	Spp	IBRA subregion

	Hieraaetus morphnoides / Little Eagle	Any in NSW
Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Lepidium monoplocoides / Winged Peppercress	Spp	IBRA subregion
	Lepidium monoplocoides / Winged Peppercress	Any in NSW
Lophoictinia isura / Square-tailed Kite	Spp	IBRA subregion
	Lophoictinia isura / Square-tailed Kite	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW
Swainsona murrayana / Slender Darling Pea	Spp	IBRA subregion
	Swainsona murrayana / Slender Darling Pea	Any in NSW

Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00023994/BAAS17011/21/00029283	Proposal Name Inland Rail - Narromine to Narrabri - BAM 2020	BAM data last updated * 16/06/2022
Assessor Name Kirsten Crosby	Assessor Number BAAS17011	BAM Data version * 54
Proponent Names ARTC	Report Created 17/08/2022	BAM Case Status Finalised
Assessment Revision 5	Assessment Type Major Projects	Date Finalised 17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Not a TEC	13.5	51	0	51

BAM Biodiversity Credit Report (Like for like)

185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	185_DNG	No	0	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	185_Good	Yes	51	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00029288

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Not a TEC	7.1	0	237	237.00
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	1.4	0	26	26.00
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	0.2	7	0	7.00

55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	55_Good	Yes	7	Liverpool Plains,Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Grassy sub-formation)	Tier 2 or higher threat status	55_Good	Yes (including artificial)	7	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	No	26	Liverpool Plains,Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Forested Wetlands	Tier 3 or higher threat status	78_Good	No	26	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	168_Good	No	237	Liverpool Plains,Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Arid Shrublands (Chenopod sub-formation)	Tier 4 or higher threat status	168_Good	No	237	IBRA Region: Brigalow Belt South, 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
Burhinus grallarius / Bush Stone-curlew	**78_Good**	0.2	4.00
Cercartetus nanus / Eastern Pygmy-possum	**78_Good**	0.2	4.00
Hieraaetus morphnoides / Little Eagle	**78_Good**	0.2	3.00

Hoplocephalus bitorquatus / Pale-headed Snake	**78_Good**	0.5	10.00
Lophoictinia isura / Square-tailed Kite	**78_Good**	0.2	3.00
Petaurus norfolcensis / Squirrel Glider	**78_Good**	0.2	4.00

Credit Retirement Options

Like-for-like options

Burhinus grallarius/ Bush Stone-curlew	Spp		IBRA region
	Burhinus grallarius/Bush Stone-curlew		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Cercartetus nanus/ Eastern Pygmy-possum	Spp		IBRA region
	Cercartetus nanus/Eastern Pygmy-possum		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing	IBRA region

		under Part 4 of the BC Act shown below	
	Fauna	Vulnerable	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	Spp	IBRA region	
	Hieraaetus morphnoides/Little Eagle	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hoplocephalus bitorquatus/ Pale-headed Snake	Spp	IBRA region	

	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lophoictinia isura/ Square-tailed Kite	Spp	IBRA region	
	Lophoictinia isura/Square-tailed Kite	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Plains, Castlereagh-Barwon, Kaputar, Liverpool Range, Northern Basalts, Northern Outwash, Peel, Pilliga and Pilliga Outwash. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00023995

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
12

Assessment Type
Major Projects

Date Finalised
17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	7.1	0	89	89.00
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	0.7	23	0	23.00

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	89	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 3 or higher threat status	49_Good	No	89	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	55_Good	Yes	23	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Grassy sub-formation)	Tier 2 or higher threat status	55_Good	Yes (including artificial)	23	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00029285

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
4

Assessment Type
Major Projects

Date Finalised
17/08/2022

* 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
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Species
Nil

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
27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	1.9	0	43	43.00
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Not a TEC	3.0	68	0	68.00
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	91.1	0	2110	2110.00
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	3.1	72	0	72.00
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	6.5	175	0	175.00

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	8.5	173	0	173.00
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	257.0	3365	565	3930.00
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Not a TEC	29.0	0	410	410.00
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	49.3	608	0	608.00
202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	3.6	179	0	179.00
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	4.9	89	0	89.00
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Not a TEC	24.2	430	0	430.00
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Not a TEC	7.9	127	0	127.00
256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Not a TEC	0.3	0	5	5.00

394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Not a TEC	62.1	596	335	931.00
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Not a TEC	3.1	0	52	52.00
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Not a TEC	203.0	5029	0	5029.00
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Not a TEC	22.9	480	0	480.00
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Not a TEC	25.1	481	0	481.00
406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Not a TEC	2.4	51	0	51.00
409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Not a TEC	0.8	14	0	14.00
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Not a TEC	7.3	0	79	79.00
469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	Not a TEC	1.0	0	14	14.00

746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Not a TEC	2.1	0	36	36.00
1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Not a TEC	8.8	0	352	352.00

27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	27_Good	No	43	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Semi-arid Woodlands (Grassy sub-formation)	Tier 3 or higher threat status	27_Good	No	43	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	36_Good	Yes	68	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Forested Wetlands	Tier 3 or higher threat status	36_Good	Yes (including artificial)	68	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	2110	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 3 or higher threat status	49_Good	No	2110	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	55_Good	Yes	72	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Grassy sub-formation)	Tier 2 or higher threat status	55_Good	Yes (including artificial)	72	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_Good	Yes	175	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	56_Good	Yes (including artificial)	175	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	Yes	173	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Forested Wetlands	Tier 3 or higher threat status	78_Good	Yes (including artificial)	173	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	3336	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Low	Yes	29	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	565	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_Good	Yes (including artificial)	3336	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_Low	Yes (including artificial)	29	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_DNG	No	565	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	141_Good	No	410	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	141_Good	No	410	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	145_Good	Yes	608	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Woodlands (Shrubby sub-formation)	Tier 2 or higher threat status	145_Good	Yes (including artificial)	608	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions This includes PCT's: 201, 202, 1384	-	202_Good	Yes	179	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 3 or higher threat status	202_Good	Yes (including artificial)	179	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Alluvial Sand Woodlands This includes PCT's: 71, 206, 227, 376, 428	North-west Alluvial Sand Woodlands >=50% and <70%	206_Good	Yes	89	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 3 or higher threat status	206_Good	Yes (including artificial)	89	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	244_Good	Yes	430	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Grassy Woodlands	Tier 2 or higher threat status	244_Good	Yes (including artificial)	430	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709	Western Slopes Dry Sclerophyll Forests >=50% and <70%	255_Good	Yes	127	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 3 or higher threat status	255_Good	Yes (including artificial)	127	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	256_Good	No	5	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 4 or higher threat status	256_Good	No	5	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_Good_fire_affected	No	102	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_Good	Yes	596	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_DNG	No	233	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	394_Good_fire_affected	No	102	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	394_Good	Yes (including artificial)	596	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	394_DNG	No	233	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	397_Good	No	52	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	397_Good	No	52	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	398_Good	Yes	5029	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	398_Good	Yes (including artificial)	5029	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	399_Good	Yes	480	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	399_Good	Yes (including artificial)	480	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	404_Good	Yes	481	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	404_Good	Yes (including artificial)	481	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	406_Good	Yes	51	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	406_Good	Yes (including artificial)	51	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	409_Good	Yes	14	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	409_Good	Yes (including artificial)	14	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	414_Good_fire_affected	No	79	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	414_Good_fire_affected	No	79	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	469_Good	No	14	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	469_Good	No	14	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	746_Good	No	36	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	746_Good	No	36	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=70% and <90%	1384_Good	No	352	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 2 or higher threat status	1384_Good	No	352	IBRA Region: Brigalow Belt South, 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
Aepyprymnus rufescens / Rufous Bettong	**88_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 409_Good**	178.3	5395.00
Burhinus grallarius / Bush Stone-curlew	**27_Good, 78_Good, 88_Good, 88_Low, 244_Good, 394_Good, 397_Good, 398_Good, 1384_Good**	311.9	8189.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**88_Good, 202_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good**	192.1	5309.00
Cercartetus nanus / Eastern Pygmy-possum	**36_Good, 78_Good, 88_Good, 141_Good, 202_Good, 244_Good, 255_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 414_Good_fire_affected, 746_Good, 1384_Good**	511.2	13542.00
Commersonia procumbens / Commersonia procumbens	**88_Good, 141_Good, 256_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 409_Good, 414_Good_fire_affected, 1384_Good**	321.1	9552.00
Dichanthium setosum / Bluegrass	**202_Good**	3.5	174.00

Diuris tricolor / Pine Donkey Orchid	**88_Good, 88_DNG, 141_Good, 202_Good, 397_Good, 398_Good, 399_Good, 404_Good**	145.2	2888.00
Hieraaetus morphnoides / Little Eagle	**36_Good, 55_Good, 78_Good, 88_Good, 145_Good, 206_Good, 244_Good, 394_Good_fire_affected, 394_Good, 398_Good, 399_Good, 404_Good, 406_Good, 409_Good, 1384_Good**	246.7	4861.00
Hoplocephalus bitorquatus / Pale-headed Snake	**36_Good, 56_Good, 78_Good, 88_Good, 141_Good, 202_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 1384_Good**	154.0	4204.00
Lepidium aschersonii / Spiny Peppercress	**88_Good, 88_DNG, 202_Good, 398_Good, 404_Good**	121.4	3169.00
Lophoictinia isura / Square-tailed Kite	**36_Good, 55_Good, 56_Good, 78_Good, 88_Good, 145_Good, 206_Good, 244_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 746_Good**	234.4	4664.00

Ninox connivens / Barking Owl	**56_Good, 78_Good, 88_Good, 202_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 1384_Good**	123.6	3558.00
Petaurus norfolcensis / Squirrel Glider	**36_Good, 78_Good, 88_Good, 88_Low, 141_Good, 202_Good, 244_Good, 255_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 746_Good, 1384_Good**	379.0	9821.00
Phascolarctos cinereus / Koala	**88_Good, 394_Good**	12.0	266.00
Polygala linariifolia / Native Milkwort	**88_Good, 88_DNG**	49.6	1053.00
Pterostylis cobarensis / Greenhood Orchid	**88_Good, 88_DNG, 141_Good, 202_Good, 244_Good, 256_Good, 394_Good_fire_affected, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 406_Good, 409_Good, 414_Good_fire_affected, 1384_Good**	267.9	6674.00
Swainsona murrayana / Slender Darling Pea	**202_Good, 244_Good**	7.8	250.00
Swainsona sericea / Silky Swainson-pea	**49_Good, 202_Good, 244_Good, 398_Good**	78.9	2472.00
Tylophora linearis / Tylophora linearis	**141_Good, 202_Good, 398_Good, 1384_Good**	32.1	1071.00

Tyto novaehollandiae / Masked Owl	**56_Good, 78_Good, 88_Good, 202_Good, 394_Good, 397_Good, 398_Good, 399_Good, 404_Good, 1384_Good**	109.3	3238.00
Zieria ingramii / Keith's Zieria	**398_Good**	48.6	1605.00

Credit Retirement Options

Like-for-like options

Aepyprymnus rufescens/ Rufous Bettong	Spp		IBRA region
	Aepyprymnus rufescens/Rufous Bettong		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Burhinus grallarius/ Bush Stone-curlew	Spp		IBRA region
	Burhinus grallarius/Bush Stone-curlew		Any in NSW

Burhinus grallarius/ Bush Stone-curlew	**Variation options**		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Calyptorhynchus lathami/ Glossy Black-Cockatoo	Spp	IBRA region	
	Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Cercartetus nanus/ Eastern Pygmy-possum	Spp	IBRA region	
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Commersonia procumbens/ Commersonia procumbens	Spp	IBRA region	
	Commersonia procumbens/Commersonia procumbens	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Dichanthium setosum/ Bluegrass	Spp	IBRA region	
	Dichanthium setosum/Bluegrass	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Diuris tricolor/ Pine Donkey Orchid	Spp		IBRA region
	Diuris tricolor/Pine Donkey Orchid		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	Spp		IBRA region
	Hieraaetus morphnoides/Little Eagle		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hoplocephalus bitorquatus/ Pale-headed Snake	Spp	IBRA region	
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lepidium aschersonii/ Spiny Peppercress	Spp	IBRA region	
	Lepidium aschersonii/Spiny Peppercress	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lophoictinia isura/ Square-tailed Kite	Spp	IBRA region	
	Lophoictinia isura/Square-tailed Kite	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Ninox connivens/ Barking Owl	Spp		IBRA region
	Ninox connivens/Barking Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis/Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp	IBRA region	
	Phascolarctos cinereus/Koala	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Polygala linariifolia/ Native Milkwort	Spp	IBRA region	
	Polygala linariifolia/Native Milkwort	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Pterostylis cobarensis/ Greenhood Orchid	Spp	IBRA region	
	Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Swainsona murrayana/ Slender Darling Pea	Spp		IBRA region
	Swainsona murrayana/Slender Darling Pea		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Swainsona sericea/ Silky Swainson-pea	Spp		IBRA region
	Swainsona sericea/Silky Swainson-pea		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tylophora linearis/ Tylophora linearis	Spp	IBRA region	
	Tylophora linearis/Tylophora linearis	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp	IBRA region	
	Tyto novaehollandiae/Masked Owl	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Zieria ingramii/ Keith's Zieria	Spp	IBRA region	
	Zieria ingramii/Keith's Zieria	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00029287

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
17/08/2022

* 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
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	Endangered Ecological Community	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Species
Nil

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
35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	7.3	44	111	155.00
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	98.0	0	2186	2186.00
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	12.0	404	23	427.00
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	108.9	1430	552	1982.00

141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Not a TEC	1.9	0	22	22.00
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	5.8	92	0	92.00
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	Not a TEC	141.6	1185	1493	2678.00
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Not a TEC	0.2	0	7	7.00
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Not a TEC	19.0	399	0	399.00
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Not a TEC	14.7	290	0	290.00
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Not a TEC	179.3	3971	0	3971.00
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Not a TEC	31.9	681	0	681.00
435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	5.4	19	129	148.00

473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Not a TEC	20.1	400	0	400.00
589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Not a TEC	1.0	22	0	22.00

35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions This includes PCT's: 35, 56, 87, 101, 244, 445, 629	-	35_Good	Yes	44	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions This includes PCT's: 35, 56, 87, 101, 244, 445, 629	-	35_DNG	No	111	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Woodlands (Grassy sub-formation)	Tier 1	35_Good	Yes (including artificial)	44	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Semi-arid Woodlands (Grassy sub-formation)	Tier 1	35_DNG	No	111	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	2186	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 3 or higher threat status	49_Good	No	2186	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	Yes	404	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_DNG	No	23	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Forested Wetlands	Tier 3 or higher threat status	78_Good	Yes (including artificial)	404	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Forested Wetlands	Tier 3 or higher threat status	78_DNG	No	23	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	1430	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	552	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_Good	Yes (including artificial)	1430	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_DNG	No	552	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	141_Good	No	22	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	141_Good	No	22	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	145_DNG	Yes	92	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Woodlands (Shrubby sub-formation)	Tier 2 or higher threat status	145_DNG	Yes (including artificial)	92	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 148, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=50% and <70%	148_Good	Yes	1185	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 148, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=50% and <70%	148_DNG	No	1493	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	148_Good	Yes (including artificial)	1185	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	148_DNG	No	1493	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	168_Good	No	7	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Arid Shrublands (Chenopod sub-formation)	Tier 4 or higher threat status	168_Good	No	7	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	394_Good	Yes	399	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	394_Good	Yes (including artificial)	399	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	397_Good	Yes	290	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Variation options**					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	397_Good	Yes (including artificial)	290	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	398_Good	Yes	3815	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	398_Mod_shrubs_removed	Yes	156	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	398_Good	Yes (including artificial)	3815	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	398_Mod_shrubs_removed	Yes (including artificial)	156	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	399_Good	Yes	681	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	399_Good	Yes (including artificial)	681	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	435_Good	Yes	19	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	435_DNG	No	129	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	473_Good	Yes	400	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	473_DNG	No	0	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	473_Good	Yes (including artificial)	400	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	473_DNG	No	0	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	589_Mod_logged	Yes	22	Pilliga Outwash,Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Grassy Woodlands	Tier 2 or higher threat status	589_Mod_logged	Yes (including artificial)	22	IBRA Region: Brigalow Belt South, 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
Aepyprymnus rufescens / Rufous Bettong	**35_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	179.6	5205.00
Burhinus grallarius / Bush Stone-curlew	**35_Good, 78_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	206.2	5910.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**35_Good, 78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	131.3	3933.00
Cercartetus nanus / Eastern Pygmy-possum	**78_Good, 88_Good, 141_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good, 589_Mod_logged**	324.1	9255.00

Commersonia procumbens / Commersonia procumbens	**88_Good, 141_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	251.8	7186.00
Cyperus conicus / Cyperus conicus	**88_Good, 88_DNG, 148_Good**	50.8	1164.00
Diuris tricolor / Pine Donkey Orchid	**88_Good, 88_DNG, 148_Good, 148_DNG, 397_Good, 398_Good, 399_Good, 473_Good**	243.0	4288.00
Hieraaetus morphnoides / Little Eagle	**78_Good, 88_Good, 148_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 435_Good, 473_Good**	180.3	3950.00
Hoplocephalus bitorquatus / Pale-headed Snake	**35_Good, 78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	102.1	3081.00
Lepidium aschersonii / Spiny Peppercress	**88_Good, 88_DNG, 148_Good, 148_DNG, 398_Good, 399_Good, 473_Good**	217.4	5063.00
Lepidium monoplocoides / Winged Peppercress	**78_Good, 88_Good, 88_DNG, 148_Good, 148_DNG**	139.6	2766.00
Lophoictinia isura / Square-tailed Kite	**78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 399_Good, 435_Good, 473_Good**	136.0	2996.00

Ninox connivens / Barking Owl	**35_Good, 78_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	127.3	3639.00
Petaurus norfolcensis / Squirrel Glider	**78_Good, 88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 473_Good**	271.8	7797.00
Phascolarctos cinereus / Koala	**88_Good, 148_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good, 435_Good, 473_Good, 589_Mod_logged**	245.2	6921.00
Polygala linariifolia / Native Milkwort	**88_Good, 88_DNG, 148_Good, 148_DNG, 398_Good, 399_Good**	213.6	4970.00
Pomaderris queenslandica / Scant Pomaderris	**148_Good**	9.1	267.00
Pterostylis cobarensis / Greenhood Orchid	**88_Good, 88_DNG, 141_Good, 394_Good, 397_Good, 398_Good, 399_Good**	174.7	4582.00
Tylophora linearis / Tylophora linearis	**399_Good**	5.8	165.00
Tyto novaehollandiae / Masked Owl	**35_Good, 78_Good, 88_Good, 394_Good, 397_Good, 398_Good, 398_Mod_shrubs_removed, 399_Good**	68.1	2015.00

Credit Retirement Options

Like-for-like options

Aepyprymnus rufescens/ Rufous Bettong	Spp		IBRA region
	Aepyprymnus rufescens/Rufous Bettong		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Burhinus grallarius/ Bush Stone-curlew	Spp		IBRA region
	Burhinus grallarius/Bush Stone-curlew		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Endangered	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Calyptorhynchus lathami/ Glossy Black-Cockatoo	Spp		IBRA region
	Calyptorhynchus lathami/Glossy Black-Cockatoo		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Cercartetus nanus/ Eastern Pygmy-possum	Spp		IBRA region
	Cercartetus nanus/Eastern Pygmy-possum		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Commersonia procumbens/ Commersonia procumbens	Spp	IBRA region	
	Commersonia procumbens/Commersonia procumbens	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Cyperus conicus/ Cyperus conicus	Spp	IBRA region	
	Cyperus conicus/Cyperus conicus	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Endangered	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Diuris tricolor/ Pine Donkey Orchid	Spp	IBRA region	
	Diuris tricolor/Pine Donkey Orchid	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	Spp	IBRA region	
	Hieraaetus morphnoides/Little Eagle	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hoplocephalus bitorquatus/ Pale-headed Snake	Spp		IBRA region
	Hoplocephalus bitorquatus/Pale-headed Snake		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lepidium aschersonii/ Spiny Peppercress	Spp		IBRA region
	Lepidium aschersonii/Spiny Peppercress		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lepidium monoplocoides/ Winged Peppercress	Spp	IBRA region	
	Lepidium monoplocoides/Winged Peppercress	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Endangered	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lophoictinia isura/ Square-tailed Kite	Spp	IBRA region	
	Lophoictinia isura/Square-tailed Kite	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp	IBRA region	
	Phascolarctos cinereus/Koala	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Polygala linariifolia/ Native Milkwort	Spp	IBRA region	
	Polygala linariifolia/Native Milkwort	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Endangered	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Pomaderris queenslandica/ Scant Pomaderris	Spp	IBRA region	
	Pomaderris queenslandica/Scant Pomaderris	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Endangered	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Pterostylis cobarensis/ Greenhood Orchid	Spp	IBRA region	
	Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tylophora linearis/ Tylophora linearis	Spp	IBRA region	
	Tylophora linearis/Tylophora linearis	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp	IBRA region	
	Tyto novaehollandiae/Masked Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga Outwash, Castlereagh-Barwon, Liverpool Plains and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00029284

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
4

Assessment Type
Major Projects

Date Finalised
17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Not a TEC	2.8	65	0	65.00
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	11.7	0	437	437.00
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	0.6	30	0	30.00
81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Not a TEC	0.9	36	0	36.00
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	19.5	348	7	355.00
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	Not a TEC	16.3	482	0	482.00
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Not a TEC	4.3	100	0	100.00

599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	3.0	117	0	117.00

36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	36_Good	Yes	65	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Forested Wetlands	Tier 3 or higher threat status	36_Good	Yes (including artificial)	65	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	437	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 3 or higher threat status	49_Good	No	437	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_Good	Yes	30	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Grassy Woodlands	Tier 2 or higher threat status	56_Good	Yes (including artificial)	30	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	81_Good	Yes	36	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	81_Good	Yes (including artificial)	36	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	348	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	7	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_Good	Yes (including artificial)	348	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_DNG	No	7	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	248_Good	Yes	482	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	248_Good	Yes (including artificial)	482	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709	Western Slopes Dry Sclerophyll Forests >=50% and <70%	255_Good	Yes	100	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 3 or higher threat status	255_Good	Yes (including artificial)	100	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	599_Good	Yes	117	Bogan-Macquarie,Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	599_Good	Yes (including artificial)	117	IBRA Region: Darling Riverine Plains, 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
Burhinus grallarius / Bush Stone-curlew	**88_Good, 248_Good**	8.0	226.00
Hieraaetus morphnoides / Little Eagle	**36_Good, 56_Good, 248_Good, 255_Good**	13.3	289.00
Hoplocephalus bitorquatus / Pale-headed Snake	**36_Good, 81_Good, 248_Good, 599_Good**	11.4	367.00
Lophoictinia isura / Square-tailed Kite	**36_Good, 56_Good, 248_Good, 255_Good**	13.3	289.00

Credit Retirement Options

	Like-for-like options		
Burhinus grallarius/ Bush Stone-curlew	Spp		IBRA region
	Burhinus grallarius/Bush Stone-curlew		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	Spp		IBRA region
	Hieraaetus morphnoides/Little Eagle		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hoplocephalus bitorquatus/ Pale-headed Snake	Spp	IBRA region	
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lophoictinia isura/ Square-tailed Kite	Spp	IBRA region	
	Lophoictinia isura/Square-tailed Kite	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Bogan-Macquarie, Boorindal Plains, Canbelego Downs, Castlereagh-Barwon, Inland Slopes, Lower Slopes, Nymagee and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00029286

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	4.6	0	132	132.00
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	122.2	0	5015	5015.00
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	31.2	469	369	838.00
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	8.7	221	0	221.00
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	16.7	321	45	366.00
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	15.8	291	0	291.00

206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	5.2	180	0	180.00
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Not a TEC	19.7	859	0	859.00
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	Not a TEC	1.7	72	0	72.00

27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	27_Good	No	132	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Semi-arid Woodlands (Grassy sub-formation)	Tier 3 or higher threat status	27_Good	No	132	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	49_Good	No	5015	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 3 or higher threat status	49_Good	No	5015	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_Good	Yes	469	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	56_DNG	No	369	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Grassy Woodlands	Tier 2 or higher threat status	56_Good	Yes (including artificial)	469	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Grassy Woodlands	Tier 2 or higher threat status	56_DNG	No	369	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 79, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	78_Good	Yes	221	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Forested Wetlands	Tier 3 or higher threat status	78_Good	Yes (including artificial)	221	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_Good	Yes	321	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	88_DNG	No	45	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_Good	Yes (including artificial)	321	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	88_DNG	No	45	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	145_Good	Yes	291	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Woodlands (Shrubby sub-formation)	Tier 2 or higher threat status	145_Good	Yes (including artificial)	291	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	North-west Alluvial Sand Woodlands This includes PCT's: 71, 206, 227, 376, 428	North-west Alluvial Sand Woodlands >=50% and <70%	206_Good	Yes	180	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 3 or higher threat status	206_Good	Yes (including artificial)	180	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	244_Good	Yes	859	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	244_Good	Yes (including artificial)	859	IBRA Region: Darling Riverine Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	444_Good	Yes	72	Castlereagh-Barwon,Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	444_Good	Yes (including artificial)	72	IBRA Region: Darling Riverine Plains, 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
Burhinus grallarius / Bush Stone-curlew	**27_Good, 78_Good, 88_Good, 244_Good**	23.2	836.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**88_Good, 244_Good**	1.3	54.00
Hieraaetus morphnoides / Little Eagle	**56_Good, 78_Good, 88_Good, 145_Good, 244_Good, 444_Good**	25.3	662.00
Hoplocephalus bitorquatus / Pale-headed Snake	**27_Good, 56_Good, 78_Good, 88_Good, 244_Good**	18.4	615.00

Lepidium monoplocoides / Winged Peppercress	**56_Good, 56_DNG, 88_Good, 88_DNG**	36.2	944.00
Lophoictinia isura / Square-tailed Kite	**56_Good, 78_Good, 88_Good, 145_Good, 206_Good, 244_Good, 444_Good**	23.4	634.00
Ninox connivens / Barking Owl	**78_Good, 88_Good, 244_Good**	7.5	251.00
Phascolarctos cinereus / Koala	**56_Good**	2.9	106.00
Swainsona murrayana / Slender Darling Pea	**27_Good, 49_Good, 56_Good, 56_DNG**	42.3	1771.00
Tyto novaehollandiae / Masked Owl	**78_Good, 88_Good, 244_Good**	8.4	290.00

Credit Retirement Options

Like-for-like options

Burhinus grallarius/ Bush Stone-curlew	Spp		IBRA region
	Burhinus grallarius/Bush Stone-curlew		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Endangered	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Calyptorhynchus lathami/ Glossy Black-Cockatoo	Spp	IBRA region	
	Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	Spp	IBRA region	
	Hieraaetus morphnoides/Little Eagle	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hoplocephalus bitorquatus/ Pale-headed Snake	Spp	IBRA region	
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lepidium monoplocoides/ Winged Peppercress	Spp	IBRA region	
	Lepidium monoplocoides/Winged Peppercress	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Endangered	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lophoictinia isura/ Square-tailed Kite	Spp	IBRA region	
	Lophoictinia isura/Square-tailed Kite	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp	IBRA region	
	Phascolarctos cinereus/Koala	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Endangered	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Swainsona murrayana/ Slender Darling Pea	Spp	IBRA region	
	Swainsona murrayana/Slender Darling Pea	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp	IBRA region	
	Tyto novaehollandiae/Masked Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Castlereagh-Barwon, Bogan-Macquarie, Boorindal Plains, Culgoa-Bokhara, Liverpool Plains, Louth Plains, Moonie-Barwon Interfluve, Narrandool, Nebine Plains, Northern Basalts, Northern Outwash, Pilliga, Pilliga Outwash and Warrambool-Moonie. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00023994/BAAS17011/21/00029283

Proposal Name
Inland Rail - Narromine to Narrabri - BAM 2020

BAM data last updated *
16/06/2022

Assessor Name
Kirsten Crosby

Assessor Number
BAAS17011

BAM Data version *
54

Proponent Name(s)
ARTC

Report Created
17/08/2022

BAM Case Status
Finalised

Assessment Revision
5

Assessment Type
Major Projects

Date Finalised
17/08/2022

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

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
185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Not a TEC	13.5	51	0	51.00

185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	185_DNG	No	0	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	185_Good	Yes	51	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 4 or higher threat status	185_DNG	No	0	IBRA Region: NSW South Western Slopes, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 4 or higher threat status	185_Good	Yes (including artificial)	51	IBRA Region: NSW South Western Slopes, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like options

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029288	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
3		17/08/2022

* 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)
Australian Painted Snipe	Rostratula australis	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Barking Owl	Ninox connivens	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Black Falcon	Falco subniger	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Black-breasted Buzzard	Hamirostra melanosternon	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Black-breasted Buzzard	Hamirostra melanosternon	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Brolga	Grus rubicunda	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Diamond Firetail	Stagonopleura guttata	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Dusky Woodswallow	Artamus cyanopterus cyanopterus	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Freckled Duck	Stictonetta naevosa	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Grey Falcon	Falco hypoleucos	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Grey-headed Flying-fox	Pteropus poliocephalus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Little Eagle	Hieraaetus morphnoides	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Little Lorikeet	Glossopsitta pusilla	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Little Pied Bat	Chalinolobus picatus	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Little Pied Bat	Chalinolobus picatus	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Magpie Goose	Anseranas semipalmata	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Painted Honeyeater	Grantiella picta	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Pied Honeyeater	Certhionyx variegatus	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Powerful Owl	Ninox strenua	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Scarlet Robin	Petroica boodang	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Spotted Harrier	Circus assimilis	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Spotted Harrier	Circus assimilis	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Spotted-tailed Quoll	Dasyurus maculatus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Stripe-faced Dunnart	Sminthopsis macroura	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Superb Parrot	Polytelis swainsonii	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Swift Parrot	Lathamus discolor	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Turquoise Parrot	Neophema pulchella	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
White-bellied Sea-Eagle	Haliaeetus leucogaster	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
White-fronted Chat	Epthianura albifrons	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains

White-throated Needletail	Hirundapus caudacutus	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

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 Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00023995	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
12		17/08/2022

* 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)
Australian Painted Snipe	Rostratula australis	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Barking Owl	Ninox connivens	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Black Falcon	Falco subniger	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Black-breasted Buzzard	Hamirostra melanosternon	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Brolga	Grus rubicunda	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Diamond Firetail	Stagonopleura guttata	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Dusky Woodswallow	Artamus cyanopterus cyanopterus	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Five-clawed Worm-skink	Anomalopus mackayi	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Glossy Black-Cockatoo	Calyptorhynchus lathami	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Grey-headed Flying-fox	Pteropus poliocephalus	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Large Bent-winged Bat	Miniopterus orianae oceanensis	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Little Eagle	Hieraaetus morphnoides	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Little Pied Bat	Chalinolobus picatus	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Masked Owl	Tyto novaehollandiae	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Painted Honeyeater	Grantiella picta	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Speckled Warbler	Chthonicola sagittata	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Spotted Harrier	Circus assimilis	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Square-tailed Kite	Lophoictinia isura	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Stripe-faced Dunnart	Sminthopsis macroura	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Varied Sittella	Daphoenositta chrysoptera	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
White-throated Needletail	Hirundapus caudacutus	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

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 Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029285	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
4		17/08/2022

* 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	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
Australian Painted Snipe	Rostratula australis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Barking Owl	Ninox connivens	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Barking Owl	Ninox connivens	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Barking Owl	Ninox connivens	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Black Falcon	Falco subniger	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion

Black Falcon	Falco subniger	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
Black-breasted Buzzard	Hamirostra melanosternon	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Black-striped Wallaby	Macropus dorsalis	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Black-striped Wallaby	Macropus dorsalis	404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Brolga	Grus rubicunda	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Corben's Long-eared Bat	Nyctophilus corbeni	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Corben's Long-eared Bat	Nyctophilus corbeni	469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion

Diamond Firetail	Stagonopleura guttata	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Flame Robin	Petroica phoenicea	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
Freckled Duck	Stictonetta naevosa	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Gilbert's Whistler	Pachycephala inornata	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Gilbert's Whistler	Pachycephala inornata	746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Glossy Black-Cockatoo	Calyptorhynchus lathami	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Greater Broad-nosed Bat	Scoteanax rueppellii	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
Grey Falcon	Falco hypoleucos	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Grey Falcon	Falco hypoleucos	145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion

Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion

Grey-headed Flying-fox	Pteropus poliocephalus	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

Large Bent-winged Bat	Miniopterus orianae oceanensis	406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Little Eagle	Hieraaetus morphnoides	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion

Little Eagle	Hieraaetus morphnoides	1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

Little Pied Bat	Chalinolobus picatus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Little Pied Bat	Chalinolobus picatus	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Magpie Goose	Anseranas semipalmata	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Major Mitchell's Cockatoo	Lophochroa leadbeateri	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Major Mitchell's Cockatoo	Lophochroa leadbeateri	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

Malleefowl	Leipoa ocellata	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Masked Owl	Tyto novaehollandiae	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Painted Honeyeater	Grantiella picta	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion

Painted Honeyeater	Grantiella picta	414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Pilliga Mouse	Pseudomys pilligaensis	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Pilliga Mouse	Pseudomys pilligaensis	746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Powerful Owl	Ninox strenua	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
Regent Honeyeater	Anthochaera phrygia	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Scarlet Robin	Petroica boodang	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Scarlet Robin	Petroica boodang	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Speckled Warbler	Chthonicola sagittata	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Spotted Harrier	Circus assimilis	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

Spotted-tailed Quoll	Dasyurus maculatus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Square-tailed Kite	Lophoictinia isura	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Square-tailed Kite	Lophoictinia isura	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Stripe-faced Dunnart	Sminthopsis macroura	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Superb Parrot	Polytelis swainsonii	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Superb Parrot	Polytelis swainsonii	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Swift Parrot	Lathamus discolor	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
Turquoise Parrot	Neophema pulchella	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Turquoise Parrot	Neophema pulchella	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Turquoise Parrot	Neophema pulchella	469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Varied Sittella	Daphoenositta chrysoptera	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

White-bellied Sea-Eagle	Haliaeetus leucogaster	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
White-fronted Chat	Epthianura albifrons	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

White-throated Needletail	Hirundapus caudacutus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

White-throated Needletail	Hirundapus caudacutus	404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		469-White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

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 Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029287	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
3		17/08/2022

* 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)
Australian Painted Snipe	Rostratula australis	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Barking Owl	Ninox connivens	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion

Barking Owl	Ninox connivens	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Black Falcon	Falco subniger	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains

Black Falcon	Falco subniger	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Black-breasted Buzzard	Hamirostra melanosternon	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Black-striped Wallaby	Macropus dorsalis	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Brolga	Grus rubicunda	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
Corben's Long-eared Bat	Nyctophilus corbeni	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Corben's Long-eared Bat	Nyctophilus corbeni	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Diamond Firetail	Stagonopleura guttata	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Diamond Firetail	Stagonopleura guttata	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains

Dusky Woodswallow	Artamus cyanopterus cyanopterus	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Five-clawed Worm-skink	Anomalopus mackayi	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion

Freckled Duck	Stictonetta naevosa	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Gilbert's Whistler	Pachycephala inornata	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Glossy Black-Cockatoo	Calyptorhynchus lathami	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Grey Falcon	Falco hypoleucos	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion

Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Little Eagle	Hieraaetus morphnoides	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Little Eagle	Hieraaetus morphnoides	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Little Lorikeet	Glossopsitta pusilla	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Little Lorikeet	Glossopsitta pusilla	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Little Pied Bat	Chalinolobus picatus	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Little Pied Bat	Chalinolobus picatus	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Magpie Goose	Anseranas semipalmata	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
Major Mitchell's Cockatoo	Lophochroa leadbeateri	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Major Mitchell's Cockatoo	Lophochroa leadbeateri	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
Malleefowl	Leipoa ocellata	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Masked Owl	Tyto novaehollandiae	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Painted Honeyeater	Grantiella picta	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion

Pilliga Mouse	Pseudomys pilligaensis	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Speckled Warbler	Chthonicola sagittata	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Spotted Harrier	Circus assimilis	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Spotted Harrier	Circus assimilis	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Square-tailed Kite	Lophoictinia isura	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Square-tailed Kite	Lophoictinia isura	148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Stripe-faced Dunnart	Sminthopsis macroura	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
Superb Parrot	Polytelis swainsonii	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Superb Parrot	Polytelis swainsonii	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion

Swift Parrot	Lathamus discolor	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Turquoise Parrot	Neophema pulchella	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Turquoise Parrot	Neophema pulchella	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Varied Sittella	Daphoenositta chrysoptera	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion

Varied Sittella	Daphoenositta chrysoptera	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
White-throated Needletail	Hirundapus caudacutus	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

White-throated Needletail	Hirundapus caudacutus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion

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 Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029284	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
4		17/08/2022

* 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	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
Australian Painted Snipe	Rostratula australis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Barking Owl	Ninox connivens	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

Barking Owl	Ninox connivens	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Black Falcon	Falco subniger	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Black-breasted Buzzard	Hamirostra melanosternon	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
Brolga	Grus rubicunda	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion

Corben's Long-eared Bat	Nyctophilus corbeni	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Diamond Firetail	Stagonopleura guttata	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

Eastern Osprey	Pandion cristatus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
Flame Robin	Petroica phoenicea	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Freckled Duck	Stictonetta naevosa	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
Gilbert's Whistler	Pachycephala inornata	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Grey Falcon	Falco hypoleucos	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Grey Falcon	Falco hypoleucos	248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Kultarr	Antechinomys laniger	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
Little Eagle	Hieraaetus morphnoides	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Little Pied Bat	Chalinolobus picatus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion

Little Pied Bat	Chalinolobus picatus	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Magpie Goose	Anseranas semipalmata	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Major Mitchell's Cockatoo	Lophochroa leadbeateri	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
Malleefowl	Leipoa ocellata	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Masked Owl	Tyto novaehollandiae	81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Painted Honeyeater	Grantiella picta	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Pied Honeyeater	Certhionyx variegatus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
Red-tailed Black-Cockatoo (inland subspecies)	Calyptorhynchus banksii samueli	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Red-tailed Black-Cockatoo (inland subspecies)	Calyptorhynchus banksii samueli	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
Speckled Warbler	Chthonicola sagittata	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Spotted Harrier	Circus assimilis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

Square-tailed Kite	Lophoictinia isura	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Stripe-faced Dunnart	Sminthopsis macroura	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
Superb Parrot	Polytelis swainsonii	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

Superb Parrot	Polytelis swainsonii	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
Turquoise Parrot	Neophema pulchella	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Varied Sittella	Daphoenositta chrysoptera	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
White-fronted Chat	Epthianura albifrons	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Woma	Aspidites ramsayi	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		81-Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

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 Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029286	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
3		17/08/2022

* 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)
Australian Painted Snipe	Rostratula australis	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Barking Owl	Ninox connivens	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Barking Owl	Ninox connivens	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Black Falcon	Falco subniger	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Black-breasted Buzzard	Hamirostra melanosternon	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Black-necked Stork	Ephippiorhynchus asiaticus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Brolga	Grus rubicunda	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Diamond Firetail	Stagonopleura guttata	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Eastern Grass Owl	Tyto longimembris	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Five-clawed Worm-skink	Anomalopus mackayi	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Five-clawed Worm-skink	Anomalopus mackayi	145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Flock Bronzewing	Phaps histrionica	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
Freckled Duck	Stictonetta naevosa	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Grey Falcon	Falco hypoleucos	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Grey Falcon	Falco hypoleucos	145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Kultarr	Antechinomys laniger	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Little Eagle	Hieraaetus morphnoides	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion

Little Pied Bat	Chalinolobus picatus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Magpie Goose	Anseranas semipalmata	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
Major Mitchell's Cockatoo	Lophochroa leadbeateri	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Major Mitchell's Cockatoo	Lophochroa leadbeateri	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Masked Owl	Tyto novaehollandiae	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Painted Honeyeater	Grantiella picta	444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Pied Honeyeater	Certhionyx variegatus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Red-tailed Black-Cockatoo (inland subspecies)	Calyptorhynchus banksii samueli	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Scarlet Robin	Petroica boodang	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Speckled Warbler	Chthonicola sagittata	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Speckled Warbler	Chthonicola sagittata	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Square-tailed Kite	Lophoictinia isura	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Stripe-faced Dunnart	Sminthopsis macroura	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
Superb Parrot	Polytelis swainsonii	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Superb Parrot	Polytelis swainsonii	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Turquoise Parrot	Neophema pulchella	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
White-fronted Chat	Epthianura albifrons	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

White-throated Needletail	Hirundapus caudacutus	444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
Woma	Aspidites ramsayi	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion

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 Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023994/BAAS17011/21/00029283	Inland Rail - Narromine to Narrabri - BAM 2020	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Kirsten Crosby	17/08/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17011	Major Projects	Finalised
Assessment Revision		**Date Finalised**
5		17/08/2022

* 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 Falcon	Falco subniger	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Flame Robin	Petroica phoenicea	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

Major Mitchell's Cockatoo	Lophochroa leadbeateri	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Scarlet Robin	Petroica boodang	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
Speckled Warbler	Chthonicola sagittata	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
White-throated Needletail	Hirundapus caudacutus	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

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