

Preliminary Flora and Fauna assessment

Proposed Residential Subdivision
277 Cargo Road, Orange NSW



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0	R15156ff	29 March 2023	Eliza Hurst BSc & BNSc Environmental Scientist	Leah Desborough CEnvP Senior Environmental Scientist	
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Envirowest Consulting Pty Ltd
9 Cameron Place
PO Box 8158
Orange NSW 2800
T 02 6361 4954

6/72 Corporation Avenue
Bathurst NSW 2795
T 02 6334 3312

E admin@envirowest.net.au
W envirowest.net.au

Executive Summary

Background

A residential subdivision is proposed for 277 Cargo Road, Orange NSW. The proposed development will include seventy-two residential lots and one public recreation reserve. Two dwellings and several small sheds exist in the north-eastern corner of the lot where land-use will not change. The structures will be allocated to two of the proposed residential lots. The site has a current land-use of sheep and horse grazing with a land-use history of apple orcharding.

The subject site is 277 Cargo Road, Orange NSW and has an area of approximately 11.1 hectares located adjacent to an existing developing residential area. Land to the east has been developed for residential land-use, land to the north and west remains agricultural land and to the south is residential and commercial with the Orange Broken Hill Railway Line.

An assessment of the development is required to determine impacts on flora and fauna as part of the development application.

Scope

This report is a preliminary flora and fauna assessment for the existence of key habitats or threatened species, provides an overview of the flora and fauna species present and assesses the impact of the residential subdivision on flora and fauna.

Summary

An assessment of the impacts of the subdivision was undertaken by site inspection and desktop study.

The subject site comprises predominantly introduced pasture grasses and broadleaved weeds with minor native grasses, herbs and rushes. Isolated stands of fruit trees and conifer wind breaks exist on-site. Vegetation has been extensively modified through historical practices associated with apple orcharding from the 1960's to 1990's, pasture improvement and livestock grazing. Current livestock grazing practices are expected to impact on the usage of the grassland by fauna. Grazing increases bare ground cover, reduces native vegetation cover and diversity, increases the risk of weed invasion and reduces foraging habitat and shelter for fauna derived from the grasslands. No threatened floral species were identified on the subject site.

Faunal habitat comprised limited nesting areas due to lack of significant trees and understorey. The conifer windbreak and apple trees may provide fauna that do not require hollows with nesting sites. Farm dams and tall grasses provide shelter and foraging habitat for fauna. Food sources include insects, berries, seeds, aquatic invertebrates and grazing fodder. No threatened fauna species were identified on the subject site.

An area of native rushes, tussock grass, and herb located at the natural drainage depression to the south, on the lower slopes to the west and at the horse yards will be removed to create residential lots and access roads. No other native vegetation will be removed.

No impacts on threatened species with potential to occur in the study area from the development were identified in the Biodiversity Conservation Act (2016) Test of Significance or EPBC Act considerations. The area to be cleared is less than the threshold for native vegetation clearing. The site is not located within land with high biodiversity value as defined by clause 7.3(3) of the Biodiversity Conservation Regulation 2017 from a review of the biodiversity values map. The proposed development does not trigger the Biodiversity Offset Scheme Thresholds.

The development is not expected to have a significant impact on the long-term survival of threatened species and communities in the South Eastern Highlands Bioregion.

Recommendations

The following actions are recommended:

- Avoid the introduction of additional introduced plants that may become weeds in adjacent areas.
- Implementation of erosion and sediment control plans prior to construction activities.

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1. Background

A residential subdivision is proposed for 277 Cargo Road, Orange NSW. The proposed development will include seventy-two residential lots and a public recreation reserve. Two dwellings and several small sheds exist in the north-eastern corner of the lot where land-use will not change. The structures will be located at one of the proposed residential lots. The site has a current land-use of sheep and horse grazing with a land-use history of apple orcharding.

An assessment of the development is required to determine impacts on flora and fauna as part of the development application.

The subject site is 277 Cargo Road, Orange NSW and has an area of approximately 11.1 hectares located adjacent to an existing developing residential area. Land to the east has been developed for residential land-use, land to the north and west remains agricultural land and to the south is residential and commercial with the Orange Broken Hill Railway Line.

2. Scope of report

Envirowest Consulting Pty Ltd was commissioned by Fenlor Group Pty Ltd to undertake a preliminary flora and fauna assessment of 277 Cargo Road, Orange NSW.

The assessment will assess the existence of habitat and give an overview of the flora species present. The assessment aims to identify impacts the development may have on threatened flora and fauna species, their communities and any ecological interactions that may occur on the site.

3. Site description

3.1 Location

The subject site is the area directly affected by the proposed development. The subject site has an area of approximately 11.1ha and includes access roads, sewage infrastructure, underground services, a slip lane from Cargo Road and one public recreation reserve (Figure 3).

The study area are additional areas likely to be affected (directly or indirectly) by the development and includes the subject site. The study area consists of 277 Cargo Road and a 50m buffer in all directions from the subject site (Figure 1).

The study area is located along the fringes of west Orange (Figure 1) and is located in the South Eastern Highlands Bioregion.

3.2 Climate

Climatic data from the nearest recording station located at Orange Airport indicates the study area has an average annual rainfall of 945mm. Rainfall is most significant in November with an average of 94.1 mm. April is the driest month of the year receiving a rainfall average of 45.3mm.

Availability of soil moisture is lowest in summer and not usually limiting in winter when rainfall exceeds evaporation. Low winter temperatures restrict plant growth from May to September so that plant growth is most active during spring and autumn.

3.3 Topography

The subject site is located on a mid-slope with a predominant westerly and southerly aspect. Elevation ranges between 907 and 913 metres above sea level with inclines ranging between 1 and 2%. The lowest elevation occurs on the western boundary of the site.

3.4 Vegetation

Ground cover was dominated by introduced pasture species including *Phalaris* and bulbous oat grass. Vegetation cover was generally 95% across the subject site. A stand of *Pinus radiata* (radiata pine) and conifer spp. are located along the southern boundary. It is expected the southern boundary was maintained as a wind break during historical orcharding activities.

Vegetation on the site has been modified through historical clearing and agricultural practices. Historical imagery indicates the site comprised an apple orchard from the 1960's and the use of fertilisers and herbicides is considered likely. A remnant stand of approximately fifty apple trees remains in the central southern section of the subject site. Remnant fruit trees are also located on the western boundary and as isolated paddock trees across the site. Ornamental species including ivy and grape vines are located around the existing dwellings located in the north-eastern corner of the site.

A detailed description of the vegetation on the subject site is given in Section 6.1.

3.5 Land-uses

The land-use is rural. The subject site is currently used for sheep grazing and holding yards and pasture for horses. Historical grazing and orcharding activities have included land clearing, introduction of exotic species and application of fertilisers and herbicides.

Land-use to the east comprises residential development, land to the north and east is predominantly grazing and to the south is residential and commercial with the Orange Broken Hill Railway Line.

3.6 Soils and geology

The site is located within the Towac Soil Landscape. Soil in the Towac Soil Landscape is located on undulating to rolling low hills and consists of krasnozems and yellow podzolic/solodic soils. Parent material is *in situ* and colluvial- alluvial materials derived from basalt flows separated by layers of volcanic ash. Basalts are alkaline olivines, with trachytes and some shales and slates.

No evidence of erosion or salinity was observed within the subject site.

3.7 Surface water

Surface water is largely expected to infiltrate. Excess surface water flows will follow topography on the site and flow towards farm dams located in the western section of the site and towards the natural drainage depression to the south.

3.8 Groundwater

No groundwater bores are known to be located on the site. The NSW Office of Water groundwater database identifies six bores located within 500m of the site. A summary of bore details is given in Table 1.

Table 1. Groundwater bores within 500m of the site

No.	Date drilled	Location	SWL (m)	Use	Status
GW802690	22/08/2003	300m NE	10	Domestic	Unknown
GW053937	01/09/1981	400m N	-	Irrigation	Unknown
GW802391	13/12/2004	400m NE	-	Stock, domestic	Unknown
GW803608	14/07/2008	450m NE	29	Stock, domestic	Unknown
GW056843	01/01/1983	400m SW	18.3	Stock, domestic	Unknown
GW064525	01/11/1987	450m SW	8.6	Stock, domestic	Unknown

4. Proposed development

The development proposes subdivision of the subject site into seventy-two residential lots and one public recreation reserve (Figure 3).

The seventy-two residential lots are expected to be connected to reticulated water and sewerage infrastructure and be accessible from sealed access roads. The development will remove all existing vegetation at the location of fifty-three of these residential lots. Vegetation at the final two residential lots comprising the two existing dwellings will have a stand of approximately five ornamental trees on the boundary removed to enable the construction of a slip lane to the subdivision. The stand of *Pinus radiata* (radiata pine) and conifer spp. located on the southern boundary of the subject site are to be retained and incorporated into a public nature reserve. Remnant fruit trees across the site will be removed.

A temporary retention basin may be constructed within the southwestern section of the subject site which will incorporate the two existing dams in the area. The retention basin will be filled and levelled following completion of stage 1 of the development and developed as residential lots and access roads.

5. Methodology

5.1 Desktop study

A desktop study was undertaken to collect information on individual species and in particular the presence of any threatened or endangered species. This was determined primarily by habitat assessment of the subject site and a search of the OEH Bionet database. The area for the database search covered a 5km radius from the subject site.

The Office of Environment and Heritage (OEH) NSW Threatened Species Website was reviewed for threatened species, populations and communities known or predicted to occur within the Orange Local Government Area.

The impact of the proposed development on flora and fauna on the subject site was assessed in accordance with the Test of Significance under Section 7.3 of the *Biodiversity Conservation Act* (2016) and EPBC Act considerations. The habitat, life cycles and general ecology of a range of both plant and animal species was researched. This and all other information has been used to make impact assessments.

The proposed development was assessed against the Biodiversity Offset Scheme thresholds in accordance with the *Biodiversity Conservation Act 2016* to determine if the Biodiversity Assessment Method applied.

5.2 Field surveys

An overall description of the subject site was completed by conducting a general field survey. The aim of the survey was to assess the subject site and study area which included a vegetation and topography assessment, identification of major land-uses, species identification, a land and water degradation assessment and evaluation of potential habitat for fauna.

The survey was undertaken on 27 January and 21 March 2023. The conditions on the day were fine and warm. Representative photographs of the site are presented in Figure 5.

The field data for flora species was recorded on a presence or absence basis.

6. Results and discussion

6.1 Flora

The study area consists of modified grasslands.

The subject site has an agricultural land-use history of apple orcharding and livestock grazing. The site is currently a rural holding currently grazed by sheep and horses. Vegetation across the subject site has been impacted by the orchard land-use history and current grazing practices.

The subject site consists primarily of modified grasslands dominated by introduced pasture grasses and broadleaved weeds including *Arrhenatherum elatius* (false oat grass), *Phalaris arundinacea* (reed canary grass), *Phalaris aquatica* (bulbous canary grass), *Bromus catharticus* (prairie grass), *Plantago lanceolata* (plantain), *Taraxacum officinale* (dandelion), *Onopordum acanthium* (scotch thistle) and *Echium plantagineum* (Paterson's curse). Small isolated stands of *Rubus fruticosus* (blackberry bush), *Crataegus monogyna* (hawthorn) and apple tree spp. are scattered across the site. Stands of *Pinus radiata* (radiata pine) are located on the southern boundary of the subject site and along the western and eastern boundary of the southern section.

Native species *Carex appressa* (tall sedge) and *Juncus usitatus* (common rush) were identified as closed rushland at the natural drainage depression to the south and on the banks of the two dams to the west. The total area of closed rushland on the subject site was approximately 0.79ha. Native rush species were also identified as very sparse on the lower slopes of the subject site to the west in an area of mixed grassland. A quadrat method was applied to estimate the total groundcover area of native rushes in this area. Rush species were estimated to occupy an average groundcover area of 0.022m² per plant with an average of four plants per 5m² quadrat. The calculated area of groundcover of rush species was 0.016ha.

Gnaphalium involucrellum (star cudweed) was identified as isolated vegetation in an area actively grazed by horses on-site and comprised an estimated total area of less than 0.0001ha. *Poa labillardierei* (poa tussock) was identified as isolated grasses in the southern paddock and comprised an estimated total area of approximately 0.0018ha. *C. appressa*, *J. usitatus*, *P. labillardierei* and *G. involucrellum* are not deemed dominant species in the subject site and represents a small area of native vegetation.

Vegetation located around the existing dwelling and residential yard located in the northern section of the subject site consists primarily of ornamental and introduced species. Vegetation located along Cargo Road proposed to be removed as part of development works included introduced species *Cedrus deodara* (Himalayan cedar), *Hedera helix* (English ivy), *Pyracantha coccinea* (golden firethorn), *Calocedrus decurrens* (California incense cedar), *Quercus ellipsoidalis* (northern pink oak) and *Sansevieria* sp. (snake plant). Native species *Callitris endlicheri* (black cypress pine) were identified on the eastern boundary of the residential yard and will not be affected by clearing works.

No threatened or endangered species were observed within the grasslands of the subject site. Flora recorded during the field surveys are presented in Table 2.

Table 2. Flora species recorded for each vegetation type

Scientific name	Common name	Species origin
Trees		
<i>Callitris endlicheri</i>	Black cypress pine	Native
<i>Calocedrus decurrens</i>	California incense cedar	Introduced
<i>Cedrus deodara</i>	Himalayan cedar	Introduced
<i>Crataegus monogyna</i>	Common hawthorn	Introduced
<i>Malus</i> sp.	Apple tree	Introduced
<i>Pinus radiata</i>	Radiata pine	Introduced
<i>Prunus</i> sp.	Plum tree	Introduced
<i>Quercus ellipsoidalis</i>	Northern pink oak	Introduced
Shrubs		
<i>Rubus fruticosus</i>	Blackberry	Introduced
<i>Pyracantha coccinea</i>	Golden firethorn	Introduced
Vines		
<i>Hedera helix</i>	English ivy	Introduced
<i>Vitis</i> sp.	Grape vine	Introduced
Herbs		
<i>Amaranthus</i> sp.	Amaranth	Introduced
<i>Centaureum erythraea</i>	Common centaury	Introduced
<i>Chenopodium album</i>	White goosefoot	Introduced
<i>Cichorium intybus</i>	Chicory	Introduced
<i>Cirsium vulgare</i>	Black thistle	Introduced
<i>Echium plantagineum</i>	Paterson's curse	Introduced
<i>Euchiton sphaericus</i>	Star cudweed	Native
<i>Foeniculum vulgare</i>	Wild fennel	Introduced
<i>Hypericum perforatum</i>	St John's Wort	Introduced
<i>Hypochaeris radicata</i>	Catsear	Introduced
<i>Leontodon taraxacoides</i>	Hairy hawkbit	Introduced
<i>Malva parviflora</i>	Common mallow weed	Introduced
<i>Marrubium vulgare</i>	White horehound	Introduced
<i>Modiola caroliniana</i>	Creeping mallow	Introduced
<i>Plantago lanceolata</i>	Plantain	Introduced
<i>Rumex crispus</i>	Curly dock	Introduced
<i>Sinapis arvensis</i>	Wild mustard	Introduced
<i>Sonchus oleraceus</i>	Sow thistle	Introduced
<i>Taraxacum officinale</i>	Dandelion	Introduced
<i>Trifolium glomeratum</i>	Cluster clover	Introduced
<i>Trifolium repens</i>	White clover	Introduced
Grasses		
<i>Arrhenatherum elatius</i>	Bulbous oat grass	Introduced
<i>Bromus catharticus</i>	Prairie grass	Introduced
<i>Dactylis glomerata</i>	Cocksfoot grass	Introduced
<i>Paspalum dilatatum</i>	Paspalum grass	Introduced
<i>Pennisetum clandestinum</i>	Kikuyu grass	Introduced
<i>Phalaris arundinacea</i>	Reed canary grass	Introduced
<i>Phalaris aquatica</i>	Phalaris	Introduced
<i>Poa labillardierei</i>	Poa tussock	Native
Rushes		
<i>Carex appressa</i>	Tall sedge	Native
<i>Juncus usitatus</i>	Common rush	Native
Succulents		
<i>Sansevieria</i> sp.	Snake plant	Introduced

6.2 Fauna

Faunal habitat within the subject site was dominated by modified grasslands with isolated shrubs, apple trees and stands of radiata pine as wind breaks. The trees may be used by fauna as a food source in the form of insects, nesting in branches (birds) and habitat for reptiles. Logs and dead

standing timber were identified around the trees in the southern paddock and at a stockpile which may provide habitat for reptiles.

Groundcover vegetation would provide fauna with food (grazing, seeds and insects) and shelter. The presence of livestock and domestic animals is expected to impact on the usage of the grassland by fauna. Livestock grazing increases bare ground cover, reduces native vegetation cover and richness, increases the risk of weed invasion and reduces foraging habitat and shelter derived from the grasslands for fauna.

The dams on site may provide food for wading birds and a source of water for fauna on-site. Aquatic fauna may be present within the dams. Water tolerant vegetation is present at the natural drainage depression located in the southern section of the site and may provide habitat to fauna.

Fauna recorded during the field surveys are presented in Table 3.

No threatened or endangered fauna species were observed within the subject site.

Table 3. Fauna species identified in opportunistic observations

Scientific Name	Common Name	Comments
<i>Apis mellifera</i>	European honeybee	Sighted
<i>Enallagma cyathigerum</i>	Common blue damselfly	Sighted
<i>Equus caballus</i>	Domestic horse	Sighted farmstock
<i>Felis catus</i>	Feral cat	Sighted
<i>Gymnorhina tibicen</i>	Australian magpie	Sighted
<i>Hortophora</i> sp.	Orb spider	Sighted
<i>Ovis aries</i>	Domestic sheep	Sighted farmstock
<i>Platycercus elegans</i>	Crimson rosella	Sighted

6.3 Threatened species

6.3.1 Threatened species recorded within the study area

No threatened species or populations were identified on the subject site. No threatened species are listed on the OEH Bionet database as being recorded within the study area.

6.3.2 Threatened species recorded in the vicinity

Threatened flora and fauna species, which have been recorded in the vicinity, are listed in Table 4. The data was obtained from the OEH Bionet database. Each species is listed based on the opinion of the Scientific Committee according to the Biodiversity Conservation Act 2016 or in accordance with the EPBC Act (1999). The search area covered a 5km radius from the subject site.

Nineteen threatened species have been recorded within 5km of the subject site (Table 4). These are *Artamus cyanopterus cyanopterus*, *Certhionyx variegatus*, *Chthonicola sagittata*, *Daphoenositta chrysoptera*, *Eucalyptus aggregate*, *Eucalyptus canobolensis*, *Glossopsitta pusilla*, *Hieraaetus morphnoides*, *Oxyura australis*, *Petaurus norfolcensis*, *Petroica boodang*, *Petroica phoenicea*, *Phascolarctos cinereus*, *Polytelis swainsonii*, *Pteropus poliocephalus*, *Miniopterus orianae oceanensis*, *Ninox connivens*, *Staggonopleura guttata* and *Swainsona sericea*. *Phascolarctos cinereus* (koala) was recorded in 2016 as roadkill located in the main street of Orange. The accuracy of the recorded location was noted as 10km. It is considered the sighting location is inaccurate.

6.3.3 Threatened species with potential to occur in the vicinity

Threatened flora and fauna species, with the potential to occur in the area, are listed in Table 4. The data was obtained from the OEH Bionet database. The search area covered the Orange Local Government Area.

Habitat attributes for *Anthochaera phrygia*, *Burhinus grallarius*, *Chthonicola sagittata*, *Climacteris picumnus victoriae*, *Epthianura albifrons*, *Hieraaetus morphnoides*, *Litoria booroolongensis*, *Petroica boodang*, *Petroica phoenicea*, *Polytelis swansonii*, *Rostratula australis*, *Saccolaimus flaviventris* and *Stagonopleura guttata* are found within the subject site. The survival of these species is not expected to be impacted by the development due to the relatively small amount of suitable habitat and availability of suitable alternative habitat elsewhere in the locality. The impact of the development on these species has been assessed in accordance with the Assessment of Significance (Appendix 2) and EPBC Act considerations (Appendix 3).

Habitat attributes for the remainder of the species listed in Table 4 are not found within the subject site though may occur elsewhere in the study area and/or vicinity. The survival of these species is not expected to be impacted by the development.

Table 4. Threatened species predicted to occur on the site from the NSW Threatened Species Website and recorded occurrence of threatened species on the NSW OEH Bionet (Search area – 5km radius of subject site)

Scientific Name	Common Name	Last recorded date	Distance from the site (km)	NSW Status	Federal Status
Mammals					
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	NR	-	V	Not listed
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	NR	-	V	V
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	NR	-	V	E
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	2020	2.8km W	V	Not listed
<i>Myotis macropus</i>	Southern Myotis	NR	-	V	Not listed
<i>Petauroides volans</i>	Greater Glider	NR	-	Not listed	V
<i>Petaurus australis</i>	Yellow-bellied Glider	NR	-	V	Not listed
<i>Petaurus norfolcensis</i>	Squirrel Glider	2016	4km N	V	Not listed
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	NR	-	V	Not listed
<i>Phascolarctos cinereus</i>	Koala	2014	3.2km N ¹	V	V
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	2019	1.1km NE	V	V
<i>Saccolaimus flaviventris</i>	Yellow Bellied Sheath-tail Bat	NR	-	V	Not listed
Avifauna					
<i>Anthochaera phrygia</i>	Regent Honeyeater	NR	-	E4A	CE
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	2008	3.2km SW	V	Not listed
<i>Botaurus poiciloptilus</i>	Australasian Bittern	NR	-	E1	E
<i>Burhinus grallarius</i>	Bush Stone-curlew	NR	-	E1	Not listed
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	NR	-	V	Not listed
<i>Calyptorhynchus lathami</i>	Glossy Black Cockatoo	NR	-	V	Not listed
<i>Certhionyx variegatus</i>	Pied Honeyeater	2002	2.5km W	V	Not listed
<i>Chthonicola sagittata</i>	Speckled Warbler	1990	1km NW	V	Not listed
<i>Circus assimilis</i>	Spotted Harrier	NR	-	V	Not listed
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	2007	3.2km N	V	Not listed
<i>Daphoenositta chrysoptera</i>	Varied Sittella	1993	0.5km W	V	Not listed
<i>Epthianura albifrons</i>	White fronted Chat	NR	-	V	Not listed
<i>Falco subniger</i>	Black Falcon	NR	-	V	Not listed
<i>Glossopsitta pusilla</i>	Little Lorikeet	1993	0.6km W	V	Not listed
<i>Grantiella picta</i>	Painted Honeyeater	NR	-	V	V
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	NR	-	V	Not listed
<i>Hieraaetus morphnoides</i>	Little Eagle	1994	0.5km W	V	Not listed
<i>Lathamus discolor</i>	Swift Parrot	NR	-	E1	CE
<i>Limosa limosa</i>	Black-tailed Godwit	NR	-	V	Not listed
<i>Lophoictinia isura</i>	Square Tailed Kite	NR	-	V	Not listed

<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south eastern form)	NR	-	V	Not listed
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	NR	-	V	Not listed
<i>Neophema pulchella</i>	Turquoise Parrot	NR	-	V	Not listed
<i>Ninox connivens</i>	Barking Owl	2018	4.9km E	V	Not listed
<i>Ninox strenua</i>	Powerful Owl	NR	-	V	Not listed
<i>Oxyura australis</i>	Blue-billed Duck	1991	4km E ³	V	Not listed
<i>Petroica boodang</i>	Scarlet Robin	2017	0.5km E	V	Not listed
<i>Petroica phoenicea</i>	Flame Robin	1994	0.8km W	V	Not listed
<i>Polytelis swainsonii</i>	Superb Parrot	2017	3km N	V	V
<i>Pomastostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	NR	-	V	Not listed
<i>Rostratula australis</i>	Australian Painted Snipe	NR	-	E1	E
<i>Stagonopleura guttata</i>	Diamond Firetail	1987	0.9km W	V	Not listed
<i>Stictonetta naevosa</i>	Freckled Duck	NR	-	V	Not listed
Amphibia					
<i>Litoria booroolongensis</i>	Booroolong Frog	NR	-	E1	E
<i>Litoria castanea</i>	Yellow-spotted Tree Frog	NR	-	E4A	E
Reptilia					
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	NR	-	V	V
<i>Varanus rosenbergi</i>	Rosenberg's Goanna	NR	-	V	Not listed
Flora					
<i>Acacia meiantha</i>	Wattle	NR	-	E1	E
<i>Eucalyptus aggregata</i>	Black Gum	2022	3.5km S	V	V
<i>Eucalyptus canobolensis</i>	Silver-leaf Candlebark	1963	2km E ³	V	E
<i>Eucalyptus robertsonii subsp. hemisphaerica</i>	Robertson's Peppermint	NR	-	V	V
<i>Leucochrysum albicans</i>	Hoary Sunray	NR	-	Not listed	E
<i>Prostanthera gilesii</i>	Mintbush	NR	-	E4A	Not Listed
<i>Swainsona recta</i>	Small Purple-pea	NR	-	E1	E
<i>Swainsona sericea</i>	Silky Swainson-pea	1926	4.5km NE ²	V	Not listed
Community					
<i>Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion</i>	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregions	NR	-	E4	Not listed
<i>Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions</i>	Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	NR	-	E3	Not listed
<i>Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions</i>	Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	NR	-	E4	Not listed
<i>White Box Yellow Box Blakely's Red Gum Woodland</i>	White Box Yellow Box Blakely's Red Gum Woodland	NR	-	E3	CE

¹ Species was recorded as roadkill with a location accuracy of 10km. The recorded sighting is in the main street of Orange and is not considered accurate. ² Species was recorded in 1926. Location was recorded in what is now a residential area. Species is not considered to still exist at this location. ³ Species identified in the main street of Orange and is not considered accurate.

NSW Status - Legal status of a species according to the Biodiversity Conservation Act (2016)

E1 – Endangered

E2 – Endangered population

E3 – Endangered ecological community

E4 – Extinct

E4A – Critically endangered

E4B – Critically endangered ecological community

V – Vulnerable

V2 – Vulnerable ecological community

Federal Status - Legal status of a species according to the Environment Protection and Biodiversity Conservation Act (1999)

CE – Critically endangered

E – Endangered

V – Vulnerable

E – Extinct

6.4 Impacts of the development on flora and fauna

A residential subdivision is proposed for the site. Development will include the creation of residential lots, access roads, installation of underground services, removal of degraded pine trees and

creation of a public recreation reserve. Vegetation across the subject site is dominated by modified grasslands and will be removed as part of site development works for road construction, installation of underground services and contouring. The total area of disturbance from the development works across the subject site is approximately 10ha.

Areas of native vegetation will require removal. Native vegetation on the subject site includes rush, herb and tussock grass species. Herb and tussock grass were identified as isolated vegetation in the horse holding yards and southern paddock. Rushes were identified as closed rushland on the banks of the two dams and natural drainage depression to the south, and as very sparse on the lower slopes to the west. The total area of native vegetation removal is approximately 0.82ha.

A slip lane will be constructed from Cargo Road at the existing access point to allow road users to access the residential area. Several cedar and oak tree species are located adjacent to the access point and will require removal. No native tree species were identified in the area of removal. The total area of disturbance from construction of a slip lane is approximately 750m².

All soil disturbance works on the site will be undertaken in accordance with a sediment and erosion control plan which will manage potential impacts on waterways from sediment. The controls to be implemented are expected to include retaining vegetation to reduce surface water velocity, use of surface diversion banks and revegetation of disturbed areas.

The Test of Significance under Section 7.3 of the *Biodiversity Conservation Act* (2016) for threatened and endangered species which inhabit or have potential to inhabit the subject site are presented in Appendix 2. EPBC Act considerations for listed vulnerable and endangered species are presented in Appendix 3. No threatened or endangered flora or fauna are expected to inhabit the subject site due to modification through historical orcharding and grazing land-use. Species with potential to occur on the site due to habitat features will not be impacted as these species are highly mobile. The development is not expected to have a significant impact on the long-term survival of threatened species and communities within the South Eastern Highlands Bioregion.

6.5 Biodiversity Offsets Scheme thresholds

6.5.1 Thresholds

Whether the amount of native vegetation being cleared exceeds a threshold area based on the minimum lot size associated with the property

The minimum lot size permitted for the site is 100 hectares (Orange LEP 2011). The development is permitted to clear up to 1ha. Native rush, herb and common tussock will be removed equating to approximately 0.82ha of native vegetation. The area to be cleared is less than the threshold for native vegetation clearing.

Whether the impacts occur on an area mapped on the Biodiversity Values map published by the Minister for the Environment

The site is not located within land with high biodiversity value as defined by clause 7.3(3) of the Biodiversity Conservation Regulation 2017 from a review of the biodiversity values map.

The test of significance indicates no significant impact

No significant impacts on threatened flora, fauna or communities were identified in the test of significance.

6.5.2 Requirement for Biodiversity Offset Scheme

The triggers for assessing if the Biodiversity Offset Scheme applies have not been exceeded and the Biodiversity Offset Scheme does not apply.

7. Conclusions

An assessment of the impacts of the subdivision was undertaken by site inspection and desktop study.

The subject site comprises predominantly introduced pasture grasses and broadleaved weeds with minor native grasses, herbs and rushes. Isolated stands of fruit trees and conifer wind breaks exist on-site. Vegetation has been extensively modified through historical practices associated with apple orcharding from the 1960's to 1990's, pasture improvement and livestock grazing. Current livestock grazing practices are expected to impact on the usage of the grassland by fauna. Grazing increases bare ground cover, reduces native vegetation cover and diversity, increases the risk of weed invasion and reduces foraging habitat and shelter for fauna derived from the grasslands. No threatened floral species were identified on the subject site.

Faunal habitat comprised limited nesting areas due to lack of significant trees and understorey. The conifer windbreak and apple trees may provide fauna that do not require hollows with nesting sites. Farm dams and tall grasses provide shelter and foraging habitat for fauna. Food sources include insects, berries, seeds, aquatic invertebrates and grazing fodder. No threatened fauna species were identified on the subject site.

An area of native rushes, tussock grass, and herb located at the natural drainage depression to the south, on the lower slopes to the west and at the horse yards will be removed to create residential lots and access roads. No other native vegetation will be removed.

No impacts on threatened species with potential to occur in the study area from the development were identified in the Biodiversity Conservation Act (2016) Test of Significance or EPBC Act considerations. The area to be cleared is less than the threshold for native vegetation clearing. The site is not located within land with high biodiversity value as defined by clause 7.3(3) of the Biodiversity Conservation Regulation 2017 from a review of the biodiversity values map. The proposed development does not trigger the Biodiversity Offset Scheme Thresholds.

The development is not expected to have a significant impact on the long-term survival of threatened species and communities in the South Eastern Highlands Bioregion.

8. Recommendations

The following actions are recommended:

- Avoid the introduction of additional introduced plants that may become weeds in adjacent areas.
- Implementation of erosion and sediment control plans prior to construction activities.

9. Limitations

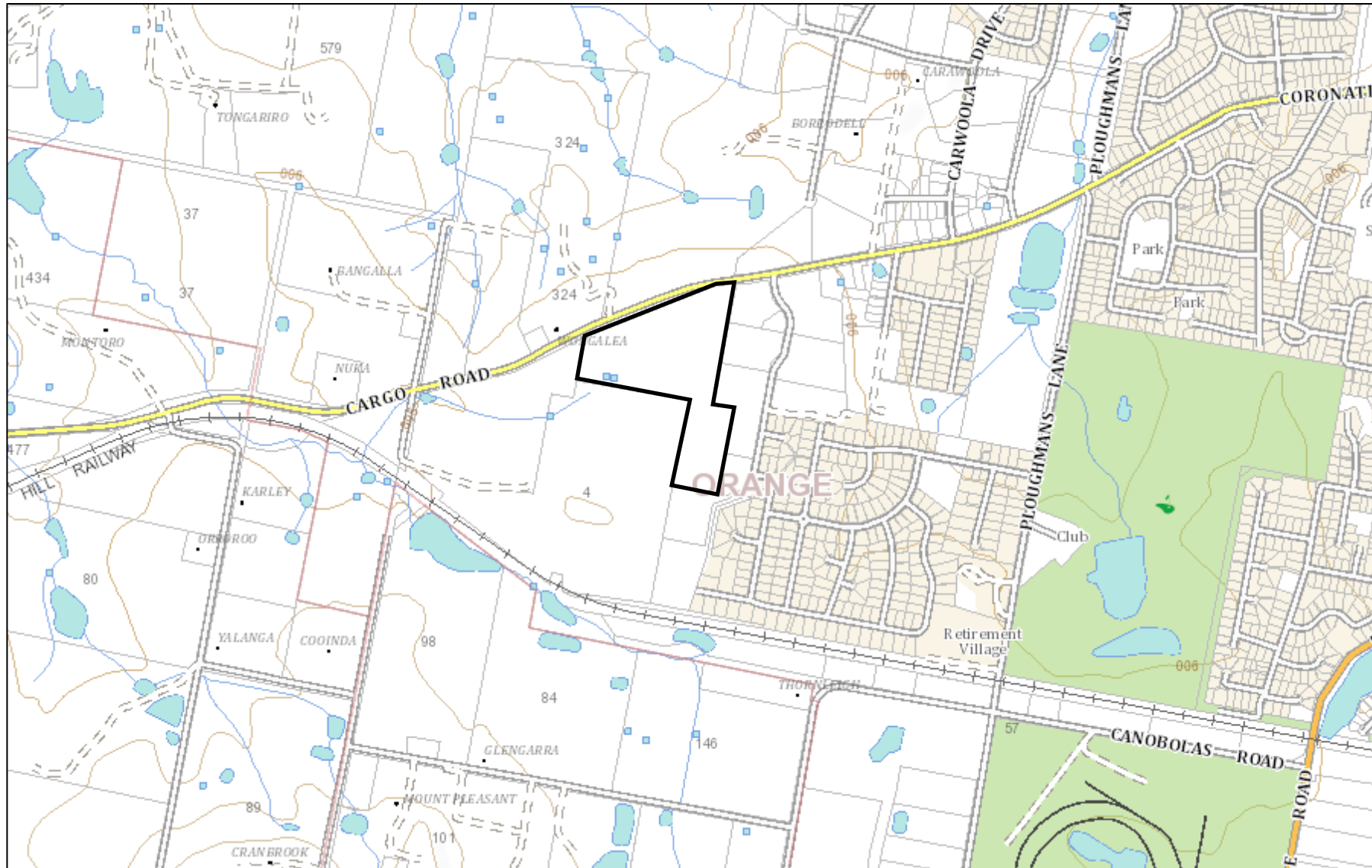
The assessment was preliminary and did not include a detailed trapping or spotlighting program. The information presented is thought to be accurate however Envirowest Consulting Pty Ltd will not be responsible for any errors of omissions or the results of any actions taken on the basis of the information.

10. References

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 <<https://www.environment.nsw.gov.au/biodiversity/entryrequirements.htm>>
- Wilding J.L, Barnett A.G and Amor R.L (1998) *Crop Weeds* (R.G & F.J Richardson)

Figures

- Figure 1.** Subject site locality map
- Figure 2.** Aerial photograph of subject site
- Figure 3.** Proposed development plan
- Figure 4.** Native vegetation to be removed
- Figure 5.** Photographs of the subject site



Legend

— Lot boundary

Figure 1. Site locality map

277 Cargo Road, Orange NSW

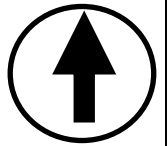


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Date: 23/03/2023



Approximate Scale 1: 4,500



Legend

- Subject site
- - Study area

Figure 2. Aerial photograph of the subject site

277 Cargo Road, Orange NSW

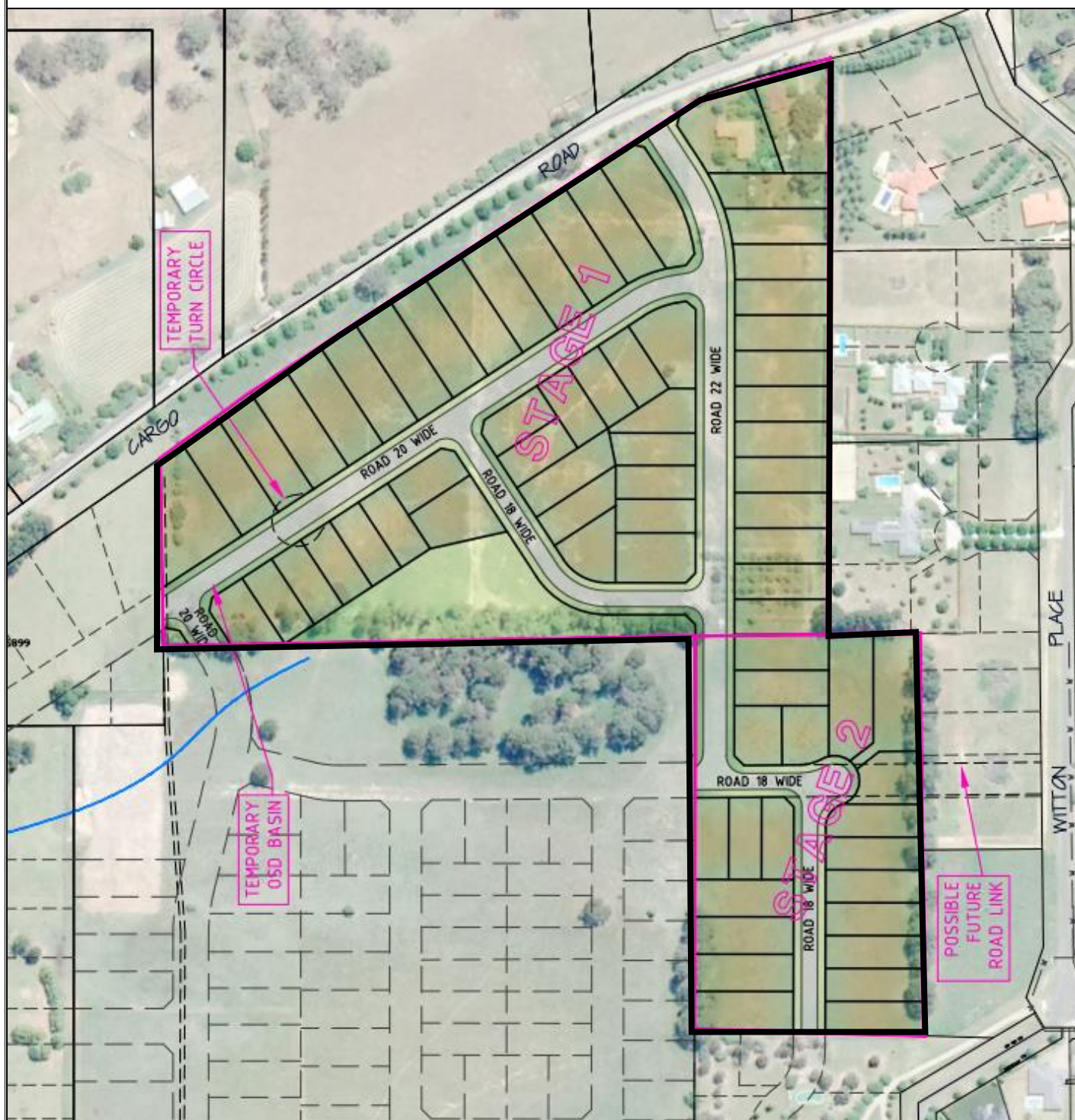
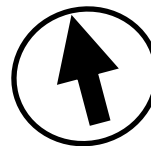


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Legend

— Subject site boundary

Figure 3. Proposed development plan

277 Cargo Road, Orange NSW

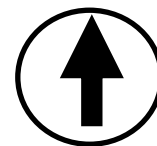


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Date: 23/03/2023



Legend

- Subject site
- - Study area
- - - Closed rushland to be removed (>70% coverage in feature area)
- . . . Very sparse rushland to be removed (<10% coverage in feature area)
- Isolated herb vegetation to be removed (singular plants)
- Isolated clumps of tussocks grass to be removed (<1% coverage in feature area)

Approximate Scale 1: 4,500



Figure 4. Native vegetation to be removed

277 Cargo Road, Orange NSW



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Figure 5. Photographs of the subject site



Appendices

Appendix 1. Impacts of the proposal on flora, fauna and communities

Appendix 2. Test of Significance

Appendix 3. EPBC Act considerations

Impacts of the proposal on flora, fauna and communities

1. Species unlikely to be present

The preferred habitat and ecology of some species, identified as possibly present from the NSW Threatened Species website or have been identified within 5km of the subject site (Table 4) indicate they are unlikely to be present on the site. Some species can be reasonably excluded and do not require evaluation in the Assessment of Significance, “seven-part test” or EPBC Act considerations. The species excluded and the basis for this are presented in the table below. Reasons for exclusion are listed as habitat likely to be impacted on. Information provided within the table, is referenced from the OEH Threatened Species Profile for individual species or Ayers *et al.* (1996).

Species	TSC Act	EPBC Act	Occurrence	Habitat requirements	Presence of habitat	Likelihood of occurrence	Potential impact
Mammals							
<i>Cercartetus nanus</i> Eastern Pygmy-possum	V	Not listed	P	Eastern pygmy-possums inhabit rainforest to sclerophyll forests and woodland to heath. They feed on nectar and pollen from banksias, eucalypts and bottlebrushes, insects and soft fruits when there are no flowers. The eastern pygmy-possum shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests or thickets of vegetation.	Absent	Unlikely	No
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	V	V	P	Large-eared pied bats roost in caves, crevices in cliffs, old mine workings and in disused, bottle-shaped mud nests of the Fairy Martin. They inhabit well-timbered areas containing gullies. It is thought that the species probably forages for small, flying insects below the forest canopy.	Absent	Unlikely	No
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	V	E	P	The spotted tailed quoll is recorded within a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. The spotted tailed quoll requires hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces within its range to be used as den sites. The spotted tailed quoll feeds on a variety of prey including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects. Rocks and boulder fields are important habitat features for the spotted tailed quoll.	Absent	Unlikely	No

<i>Miniopterus orianae oceanensis</i> Large Bent-wing-Bat	V	Not listed	P	Primarily roosts in caves but also uses derelict mines, stormwater tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the treetops.	Absent	Unlikely	No
<i>Myotis macropus</i> Southern myotis	V	Not listed	P	Found along the coast and rarely more than 100km inland, except along major rivers. Generally, roost in groups of 10 to 15 close to water in caves, mine shafts, hollow bearing trees, stormwater channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish.	Absent	Unlikely	No
<i>Petauroides volans</i> Greater glider	Not listed	V	P	Inhabits mature eucalypt forests and woodlands. Typically found in higher abundance in taller montane, moist eucalypt forests with mature trees and abundant hollows.	Absent	Unlikely	No
<i>Petaurus australis</i> Yellow-bellied Glider	V	Not listed	P	Occur in tall mature eucalypt forests generally in areas with high rainfall and nutrient rich soils. Den in hollows of large trees.	Absent	Unlikely	No
<i>Petaurus norfolcensis</i> Squirrel Glider	V	Not listed	K	Inhabits mature or old growth Box, Box-Ironbark woodlands. Prefers mixed species stands with a shrub or Acacia mid-storey.	Absent	Unlikely	No
<i>Phascogale tapoatafa</i> Brush-tailed Phascogale	V	Not listed	P	Prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25cm DBH or greater. Nest and shelter in tree hollows.	Absent	Unlikely	No
<i>Phascolarctos cinereus</i> Koala	V	V	K	The koala is an arboreal mammal and is dependent on good tree coverage. Koalas mainly occur on the central and north coasts with some populations in the western region. They inhabit eucalypt woodlands and forests where acceptable food trees are present.	Absent	Unlikely	No
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V	V	K	Grey headed flying foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies close to water. The grey headed flying fox feed on the pollen and nectar of native trees in particular eucalypts, melaleuca and banksia and fruits of rainforest trees and vines	Marginal	Unlikely	No

<i>Saccolaimus flaviventris</i> Yellow Bellied Sheath-tail Bat	V	Not listed	P	Yellow-bellied sheath-tail-bats forage in most habitats for insects. They roost singly or in groups in tree hollows and buildings. In treeless areas they are known to utilise mammal burrows.	Marginal	Possible	Yes
Avifauna							
<i>Anthochaera phrygia</i> Regent Honeyeater	E4	CE	P	Most commonly found in box-ironbark woodlands and will also inhabit swamp mahogany forests and riverine she-oak woodlands. Remnant stands of timber, roadside reserves, travelling stock routes and street trees also provide habitat. The regent honeyeater mainly feeds on the nectar from a wide range of eucalypts and mistletoes. They also feed on fruit from mistletoe and insects. A shrubby understorey is an important source of insects and nesting material.	Marginal	Unlikely	No
<i>Artamus cyanopterus</i> <i>cyanopterus</i> Dusky Woodswallow	V	Not listed	K	Widespread in eastern, southern and southwestern Australia in woodlands and dry sclerophyll forest usually dominated by eucalypts. It is also recorded in shrublands and heathlands. Nesting occurs from late September to late February. The nest is an open shallow untidy cup frequently in an open hollow, crevice or stump. They eat invertebrates, mainly insects which are captured whilst hovering and sallying over the canopy or water.	Marginal	Unlikely	No
<i>Botaurus poiciloptilus</i> Australasian Bittern	E1	E	P	Favours permanent freshwater wetlands with tall, dense vegetation particularly bulrushes and spikerushes. Feeds mainly at night on frogs, fish, yabbies, spiders, insects and snails.	Absent	Unlikely	No
<i>Burhinus grallarius</i> Bush Stone-curlew	E1	Not listed	P	Inhabits open forest and woodlands with a sparse grassy groundlayer and fallen timber. Also inhabits open plains. It is largely nocturnal and especially active on moonlit nights. The bush stone-curlew feeds on insects and small vertebrates such as frogs, lizards and snakes. They form a nest on the ground in a scrape or small bare patch.	Marginal	Possible	Yes
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	V	Not listed	P	In summer, generally found in tall mountain forests and woodlands particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open forests and woodlands particularly box-ironbark assemblages. Favours old growth attributes for nesting and roosting.	Absent	Unlikely	No

<i>Calyptorhynchus lathamii</i> Glossy Black Cockatoo	V	Not listed	P	Inhabits open forest and woodlands with stands of sheoak species.	Absent	Unlikely	No
<i>Certhionyx variegatus</i> Pied Honeyeater	V	Not listed	P	The pied honeyeater is widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. They are highly nomadic, following the erratic flowering of shrubs. Acacia, mallee and spinifex scrub communities were not identified on the subject site.	Absent	Unlikely	No
<i>Chthonicola sagittata</i> Speckled Warbler	V	Not listed	P	Lives in a wide range of <i>Eucalyptus</i> dominated communities that have a grassy understorey. Typical habitat includes scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Absent	Unlikely	No
<i>Circus assimilis</i> Spotted Harrier	V	Not listed	P	The Spotted Harrier is found in open wooded country in tropical and temperate Australia, particularly in arid and semi-arid areas. It hunts by day on ground birds, mice, rats, rabbits and lizards. The nest is built in trees in open or remnant woodland.	Absent	Unlikely	No
<i>Climacteris picumnus victoriae</i> Brown Treecreeper (eastern subspecies)	V	Not listed	K	Widespread within eastern Australia, occurring in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. They forage in trees and on the ground for insects, mostly ants. They also feed on nectar from Mugga Ironbark and paperbark, lizards and food scraps. The brown treecreeper nests in hollows of dead standing or live trees.	Marginal	Possible	Yes
<i>Daphoenositta chrysoptera</i> Varied Sittella	V	Not listed	K	Varied Sittella are found in eucalypt woodlands and forests. They prefer rough-barked trees like stringybarks and ironbarks or mature trees with hollows or dead branches. They feed mainly by gleaning on tree trunks or branches looking for insects. The nest is a deep open cup of bark and spiderweb.	Absent	Unlikely	No
<i>Epthianura albifrons</i> White fronted Chat	V	Not listed	P	Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000m above sea level. It occurs mostly in the southern half of NSW in damp open habitats along the coast and near waterways in the western part. Forages on bare or grassy ground in wetland areas.	Marginal	Possible	Yes

<i>Falco subniger</i> Black Falcon	V	Not listed	P	The black falcon is widely but sparsely distributed in NSW mostly occurring in inland regions. It inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded watercourses and agricultural land with scattered remnant trees and is usually associated with streams and wetlands. The black falcon feeds mostly on other birds but also some small mammals.	Marginal	Unlikely	No
<i>Glossopsitta pusilla</i> Little Lorikeet	V	Not listed	P	The Little Lorikeet is found in dry, open eucalypt forests and woodlands. They forage in small flocks, feeding primarily on nectar and pollen in the tree canopy. On the Western Slopes and Tablelands, White Box and Yellow Box are particularly important food sources for pollen and nectar. The nest hollows are located at heights of between 2 and 15m in living smooth-barked eucalypts.	Absent	Unlikely	No
<i>Grantiella picta</i> Painted Honeyeater	V	V	P	Inhabits boree, brigalow and box-gum woodlands and box-ironbark forests. Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Nest from spring to autumn in a small delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoes branches.	Marginal	Unlikely	No
<i>Haliaeetus leucogaster</i> White-bellied Sea Eagle	V	Not listed	P	The White-bellied Sea Eagle habitats are characterised by the presence of large areas of open water including rivers, swamps, lakes and the sea. Terrestrial habitat includes coastal dunes, tidal flats grassland, heathland, woodland and forest. In NSW it is widespread along the east coast, and all major rivers and waterways/ Breeding habitat consists of mature tall open forest, tall woodland and swamp sclerophyll forest.	Absent	Unlikely	No
<i>Hieraaetus morphnoides</i> Little Eagle	V	Not listed	P	The Little Eagle is seen over woodland and forested lands and open country extending into the arid zone. It tends to avoid rainforest and heavy forest. It searches for prey on the wind and from a high exposed perch. Prey includes rabbits, other live mammals and insects. They nest in mature living trees in open woodland or tree lined watercourses and rarely in isolated trees.	Marginal	Possible	Yes

<i>Lathamus discolor</i> Swift Parrot	E1	CE	P	Breeding in Tasmania and its nearby islands the swift parrot migrates to south-eastern Australia to feed during winter. Inhabiting winter flowering species such as Red Ironbark, Yellow Gum, White Box, Swamp Gum and Manna Gum that have an association with psyllid infestations.	Absent	Unlikely	No
<i>Limosa limosa</i> Black-tailed Godwit	V	Not listed	P	Primarily found along the coast, usually in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. This species also occurs inland on mudflats and in large muddy lakes and swamps where the water is less than 10cm deep. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water.	Absent	Unlikely	No
<i>Lophoictinia isura</i> Square Tailed Kite	V	Not listed	P	The square tailed kite ranges along coastal and subcoastal areas from south western to northern Australia. Scattered records in NSW indicate that the species is a regular resident in the north, north east and along the major west flowing river systems. The square tailed kite is found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Marginal	Unlikely	No
<i>Melanodryas cucullata</i> <i>cucullata</i> Hooded Robin (south eastern form)	V	Not listed	P	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee. The habitat needs to be structurally diverse with mature eucalypts, saplings, small shrubs and tall native grasses. The hooded robin feeds on insects. They nest in a tree fork or crevice using bark and grasses to form the nest.	Absent	Unlikely	No
<i>Melithreptus gularis</i> <i>gularis</i> Black-chinned Honeyeater (Eastern subspecies)	V	Not listed	P	Inhabits drier open forests or woodlands dominated by box and ironbark eucalypts. It also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. The black-chinned honeyeater moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers and honeydew is gleaned from foliage. The nest is placed high in the crown of the tree and hidden by foliage.	Absent	Unlikely	No

<i>Neophema pulchella</i> Turquoise Parrot	V	Not listed	P	Extending from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range the turquoise parrot lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. They prefer to feed in the shade of a tree and spends most of the day on the ground searching for the seeds of grasses and herbaceous plants. The turquoise parrot nests in tree hollows, logs or posts.	Marginal	Unlikely	No
<i>Ninox connivens</i> Barking Owl	V	Not listed	K	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. The barking owl feeds on a variety of prey with invertebrates predominant for most of the years and birds and small mammals becoming important during breeding.	Marginal	Unlikely	No
<i>Ninox strenua</i> Powerful Owl	V	Not listed	P	Primarily distributed on coast, inhabits dense vegetation & old trees in sheltered gullies. The powerful owl inhabits a range of vegetation types from woodland and open sclerophyll forest to tall open wet forest and rainforest. It requires large tracts of forest or woodland but can occur in fragmented landscapes. Breeding and hunting is undertaken in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats.	Marginal	Unlikely	No
<i>Oxyura australis</i> Blue-billed Duck	V	Not listed	K	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. Blue-billed ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland.	Absent	Unlikely	No
<i>Petroica boodang</i> Scarlet Robin	V	Not listed	K	The Scarlet Robin lives in mature and regrowth eucalypt forest and woodlands. In autumn and winter, many Scarlet Robins live in open grassy woodland and grasslands or grazed paddocks with scattered trees. They forage insects and other invertebrates from low perches, fenceposts or on the ground. The nest is an open cup made of plant fibres and cobwebs and is built in the fork of a tree.	Present	Possible	Yes

<i>Petroica phoenicea</i> Flame Robin	V	Not listed	P	The Flame Robin breeds in upland tall moist eucalypt forests and woodlands and prefer clearings or areas with open understoreys. In winter, they migrate to drier more open habitats in the lowlands and live in dry forests, open woodlands and in pastures and native grasslands with or without scattered trees. They forage small invertebrates from low perches or take flying insects in the air.	Marginal	Possible	Yes
<i>Polytelis swainsonii</i> Superb Parrot	V	V	K	Inhabits box-gum, box-cypress pine and boree woodlands and river red gum forest or woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. The superb parrot may forage up to 10km from nesting sites, primarily in grassy box woodland. They feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants.	Marginal	Unlikely	No
<i>Pomatostomus temporalis temporalis</i> Grey-crowned Babbler (eastern subspecies)	V	Not listed	P	Inhabits open box-gum woodland on the slopes and box-cypress pine and open box woodlands on alluvial plains. Flight is laborious with birds hopping to the top of a tree and gliding down to the next. Birds are generally unable to cross large open areas. The grey-crowned babbler feeds on invertebrates.	Marginal	Unlikely	No
<i>Rostratula australis</i> Australian Painted Snipe	E1	E	P	Inhabits fringes of swamps, dams and marshy areas with a cover of grasses, lignum, low scrub or open timber. The nest is constructed on the ground amongst tall vegetation such as grasses and leaves.	Present	Possible	Yes
<i>Stagonopleura guttata</i> Diamond Firetail	V	E	K	It is found in grassy woodlands as well as open forest, mallee and natural temperate grassland. The diamond firetail feeds on the ground on ripe and partly ripe grass and herb seeds, green leaves and insects. Nests are globular structures built in either the shrubby understorey or higher up. They roost in dense shrubs or in smaller nests.	Present	Possible	Yes
<i>Stictonetta naevosa</i> Freckled Duck	V	Not listed	P	Prefers permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. The freckled duck moves to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds during drier times. They rest during the day and feed at dawn, dusk and night on algae, seeds and vegetative parts of aquatic grasses and rushes and small invertebrates.	Marginal	Unlikely	No

Amphibia							
<i>Litoria booroolongensis</i> Booroolong Frog	E1	E	P	Aquatic species inhabiting vegetation within or at the edges of permanent or ephemeral water with some fringing vegetation cover. The booroolong frog shelters under rocks or amongst vegetation near the ground on the stream edge.	Present	Possible	Yes
<i>Litoria castanea</i> Yellow-spotted Tree Frog	E4A	E	P	There is only a single known population of the Yellow-spotted Tree Frog which occurs on the Southern Tablelands. Historically, this species occurred in two separate highland ranges including the central highlands from Bathurst/Orange to Bombala. The Yellow-spotted Tree Frog requires large permanent ponds or slow flowing streams with plenty of emergent vegetation such as bulrushes.	Marginal	Unlikely	No
Reptilia							
<i>Aprasia parapulchella</i> Pink-tailed Legless Lizard	V	V	P	The pink-tailed legless lizard is only known from the Central and Southern Tablelands and the South Western Slopes. Inhabits sloping, open woodlands with predominantly native grassy groundlayers particularly those dominated by kangaroo grass. Sites are typically well-drained, with rocky outcrops or scattered, partially buried rocks.	Absent	Unlikely	No
<i>Varanus rosenbergi</i> Rosenberg's Goanna	V	Not listed	P	Occurs on the Sydney Sandstone in Wollemi National Park, in the Goulburn and ACT regions and near Cooma in the south. Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nest in. Termite mounds are a critical habitat component. Feeds on carrion, birds, eggs, reptiles and small mammals. Shelters in hollow logs, rock crevices and in burrows.	Absent	Unlikely	No
Flora							
<i>Acacia meiantha</i>	E1	E	P	<i>Acacia meiantha</i> is an erect or sometimes straggling shrub to 1.5m. Three isolated populations occur within the Central Tablelands. The populations are found at Clarence, Mullions Range and Aarons Range. It occurs on different geologies and in different plant communities. At Mullions Range it occurs mainly in open eucalypt forest or woodland in association with <i>E. rossii</i> , <i>E. mannifera</i> , <i>E. dives</i> and <i>E. macrorhyncha</i> as well as <i>A. buxifolia</i> , <i>A. dealbata</i> and <i>A. gunnii</i> on gravelly clay or brown loamy soil in areas above 860m asl. <i>A. meiantha</i> was not identified on the site.	Marginal	Unlikely	No

<i>Eucalyptus aggregata</i> Black Gum	V	V	P	Black Gum occurs mainly in the wetter, cooler and higher parts of the Central and Southern Tablelands. They grow in the lowest parts of the landscape on alluvial soils on cold, poorly drained flats and hollows adjacent to creeks and small rivers, often grows with other cold-adapted eucalypts such as <i>E. pauciflora</i> , <i>E. viminalis</i> , <i>E. rubida</i> , <i>E. stellulata</i> and <i>E. ovata</i> .	Absent	Unlikely	No
<i>Eucalyptus canobolensis</i> Silver-leaf Candlebark	V	E	K	Known only from Mt Canobolas near Orange. Found predominantly between 1100-1300m. The species is more or less restricted to the Mt Canobolas State Recreation Area.	Absent	Unlikely	No
<i>Eucalyptus robertsonii</i> subsp. <i>hemisphaerica</i> Robertson's Peppermint	V	V	P	Found only in the central tablelands of NSW, east and south east of Bathurst and Orange. They are locally frequent in grassy or dry sclerophyll woodland or forest on lighter soils and often on granite. Associated vegetation includes mixed woodlands of <i>Eucalyptus piperita</i> , <i>E. goniocalyx</i> , <i>E. dalrympleana</i> , <i>E. dives</i> , <i>E. mannifera</i> and <i>E. rossii</i> . <i>E. robertsonii</i> was not identified on the site.	Marginal	Unlikely	No
<i>Leucochrysum albicans</i> var. <i>tricolor</i> Hoary Sunray	Not listed	E	P	Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. In NSW it currently occurs on the southern tablelands.	Marginal	Unlikely	No
<i>Prostanthera gilesii</i>	E4A	Not listed	P	Known only from Mount Canobolas State Conservation Area where it is known from two populations. One population occurs along a creek line in wet sclerophyll forest with deep basaltic clay loam on lower slopes. The second occurs in a steep rock crevice which is fed by seepage and the soil is likely to be formed from rock scree and detritus. Surrounding vegetation is heath. The species readily roots from layered stems and may be clonal suggesting genetic diversity is low.	Marginal	Unlikely	No
<i>Swainsona recta</i> Small Purple-pea	E1	E	P	Historically recorded from Carcoar, Culcairn and Wagga Wagga where it is now probably extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Before European settlement it occurred in the grassy understorey of woodlands and open forests dominated by <i>Eucalyptus blakelyi</i> , <i>E. melliodora</i> , <i>E. rubida</i> and <i>E. goniocalyx</i> .	Marginal	Unlikely	No

<i>Swainsona sericea</i> Silky Swainson-pea	V	Not listed	K	Found in temperate grassland and snow gum woodland on the Monaro and box-gum woodland in the southern tablelands and southwest slopes. Sometimes found in association with cypress pines.	Marginal	Unlikely	No
Ecological communities							
Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	E4	Not listed	P	Woodland with a sparse to very sparse tree layer dominated by <i>Eucalyptus pauciflora</i> either as a single species or with any of <i>Acacia melanoxylon</i> , <i>E. rubida</i> , <i>E. stellulata</i> and/or <i>E. viminalis</i> . Occurs in the Southern Tablelands of NSW occupying broad valley floors and slopes and low rises of moderately undulating tablelands.	Absent	Unlikely	No
Tablelands Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	E3	Not listed	P	Dominated by an open canopy of species including <i>E. viminalis</i> , <i>E. radiata</i> , <i>E. dalrympleana</i> subsp. <i>dalrympleana</i> and <i>E. pauciflora</i> . Typically occurs on loam or clay soils associated with basalt or less commonly alluvium, fine grained sedimentary rocks, granites and similar substrates. Occurs at altitudes between 600m to 900m above sea level.	Absent	Unlikely	No
Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	E4	Not listed	P	Woodland with a sparse to very sparse tree layer dominated by <i>Eucalyptus pauciflora</i> either as a single species or with <i>E. rubida</i> . Occurs in the Southern Tablelands of NSW occupying broad valley floors and slopes and low rises of moderately undulating Southern Tablelands.	Absent	Unlikely	No
White Box Yellow Box Blakely's Red Gum Woodland	E3	CE	K	Open woodland community in which the most obvious species are White Box, Yellow Box and/or Blakely's Red Gum. The NSW definition of this community differs from the federal definition. The woodland on the site does not comply with the Commonwealth definition.	Absent	Unlikely	No

Codes**Occurrence**

Species known to occur were identified in the search area on the Bionet database or from field surveys. Predicted (P) species were identified from the Bionet database.

Presence of habitat

- Present:** Potential or known suitable habitat features such as soil type, geology, moisture content, topography, aspect and/or altitude or presence of associated species/vegetation type.
- Marginal:** Some suitable habitat features such as soil type, geology, moisture content, topography, aspect and/or altitude or presence of some associated species/vegetation type.
- Absent:** No suitable resources/landscape/associated species present.

Likelihood of occurrence

- None:** Species does not occur on the site.
- Unlikely:** Species not likely to occur on the site.
- Possible:** Species could occur and habitat may be suitable.
- Present:** Species recorded on the site during site inspections.

Potential impact

- No:** The development would not impact the species or habitat and no impact expected. No Assessment of Significance and/or EPBC Act considerations required.
- Yes:** The development could impact the species and an Assessment of Significance and/or EPBC Act considerations has been undertaken.

Appendix 2. Test of significance

The test of significance was undertaken for the following species:

- *Anthochaera phrygia* Regent Honeyeater
- *Burhinus grallarius* Bush Stone-Curlew
- *Chthonicola sagittata* Speckled Warbler
- *Climacteris picumnus victoriae* Brown Treecreeper (eastern subspecies)
- *Epthianura albifrons* White Fronted Chat
- *Hieraaetus morphnoides* Little Eagle
- *Litoria booroolongensis* Booroolong Frog
- *Petroica boodang* Scarlet Robin
- *Petroica phoenicea* Flame Robin
- *Rostratula australis* Australian Painted Snipe
- *Saccolaimus flaviventris* Yellow Bellied Sheath-tail Bat
- *Stagonopleura guttata* Diamond Firetail

- a. **in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

The vegetation on the subject site is grassland with isolated stands of unmanaged apple trees, water tolerant vegetation and conifer trees as windbreaks. Threatened fauna with potential to occur on the subject site are highly mobile and expected to relocate to other areas in the study area. No threatened floral species were identified as potentially occurring on the site. No adverse impacts on the lifecycle or population size of threatened species is expected from the development.

- b. **in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**
- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
 - (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

No endangered ecological communities identified on the site.

- c. **in relation to the habitat of a threatened species or ecological community:**
- (i) **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**
 - (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**
 - (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,**

All grassland vegetation within the subject site will be removed. A small area of grassland and conifer will be integrated into a public recreation reserve. The vegetation removal is not expected to fragment or isolate other areas of potential habitat. The habitat is not considered important to the long-term survival of threatened species. Threatened fauna with potential to occur on the subject site are highly mobile and expected to relocate to other areas in the study area.

- d. **whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)**

The subject site or study area is not located in a declared area of outstanding biodiversity value.

- e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Key threatening process (KTP)	Comment
Clearing of native vegetation	Minor native grasses, rushes and herbs will be removed as part of the development. The proportion removed is a small distribution of the native vegetation which occurs in the locality.
Invasion and establishment of exotic vines and scramblers	Exotic vines and scramblers are not currently managed within the study area and are established on the subject site. The development is not expected to increase this KTP.
Invasion of native plant communities by exotic perennial grasses	Exotic perennial grasses are already established on the subject sites. The development is not expected to increase this KTP.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Native plant and animal habitat on the subject site has been impacted by agricultural activities including tree clearing, apple orcharding, livestock grazing and pasture improvement. Ornamental garden plants are expected to be contained around individual dwellings.
Predation by the Feral Cat <i>Felis catus</i> (Linnaeus, 1758)	The risk of predation to native animals and birds by feral cats may increase as domestic cat numbers within the area may increase. The increase is not expected to be significant. Feral cats are not currently managed within the study area and were observed on the day of investigation; therefore, native animals and birds are presently at risk from predation.
Removal of dead wood and dead trees	Fallen radiata pine timber was identified on the site. The quantity of dead trees and dead wood to be removed is not considered significant. The development will increase the occurrence of dead tree and wood removal.

Other key threatening processes are not expected to increase as a result of the development.

Appendix 3. EPBC Act considerations

EPBC Act considerations were undertaken for the following species:

- *Stagonopleura guttata* Diamond Firetail
- *Rostratula australis* Australian Painted Snipe
- *Litoria booroolongensis* Booroolong Frog

a. Is the action likely to lead to a long-term decrease in the size of the population?

Potential habitat for the Diamond Firetail, Australian Painted Snipe and Booroolong Frog was identified on the subject site. The fauna may use trees for nesting, grasslands and farm dams as a food source and water tolerant vegetation as shelter. The habitat on-site has been modified as a result of current and historical agricultural activities. Grasslands were dominated by introduced grass species. Vegetation around dams is expected to be disturbed by livestock. The faunal species are highly mobile and expected to relocate to other areas in the study area in search of foraging habitat and shelter. The action is unlikely to lead to a long-term decrease in the size of the population of threatened and endangered species identified.

b. Is the action likely to reduce the area of occupancy of the species?

The Diamond Firetail may use the trees as substrate for nesting and the grasslands as a food source. The Booroolong Frog and Australian Painted Snipe may use vegetation around the dams onsite as foraging habitat for invertebrates and as shelter. The habitat on-site has been modified as a result of agricultural activities and the grassland on-site was dominated by exotic grass species. The species are highly mobile and expected to relocate to areas in the study area. The small amount of potential habitat to be removed is not expected to reduce the area of occupancy of threatened and endangered species identified.

c. Is the action likely to fragment existing populations into two or more populations?

Fauna may use the trees as substrate for nesting, the grasslands as a food source and dam vegetation as foraging habitat and shelter. The habitat on-site has been extensively modified as a result of current and historical agricultural activities and the grassland on-site was dominated by introduced grass species. The faunal species are highly mobile and expected to relocate to areas in the study area. Removal of the habitat is not expected to result in the threatened or endangered populations becoming fragmented.

d. Is the action likely to adversely affect habitat critical to the survival of the species?

The habitat on the subject site comprising predominant introduced pasture and weed species has not been identified as critical habitat. Trees on-site are introduced species. The small amount of native habitat to be removed is not expected to adversely impact on habitat critical to the survival of the identified threatened and endangered species.

e. Is the action likely to disrupt the breeding cycle of a population?

Threatened and endangered fauna with potential to occur on the subject site are highly mobile and expected to relocate to other areas in the study area. No threatened floral species were identified as potentially occurring on the site. No adverse impacts on the breeding cycle of threatened or endangered species is expected from the development.

f. Is the action likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

Habitat on the subject site comprises conifer and fruit trees and modified grassland dominated by introduced and invasive weed species. The habitat on-site was considered marginal and the small amount of habitat to be removed

is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the identified threatened and endangered species is likely to decline.

g. Is the action likely to result in invasive species that are harmful to a critically endangered, endangered or vulnerable species becoming established in the critically endangered, endangered or vulnerable species' habitat?

The development is adjacent an existing residential area. Invasive species such as feral cats, English ivy and blackberry bush were identified on the site and therefore presently pose a risk to native species. It is unlikely the development will lead to an increase in invasive species that are not already present and that will be harmful to threatened species.

h. Is the action likely to introduce disease that may cause the species to decline?

Introduction of diseases that may cause the species to decline is not likely to increase.

i. Is the action likely to interfere with the recovery of the species?

Habitat on the subject site comprises conifer and fruit trees and grassland dominated by introduced species. The small amount of habitat to be removed is not expected to interfere with the recovery of identified threatened and endangered species.