FLORASEARCH

MOLYBDENUM RECOVERY PLANT RELOCATION MODIFICATION

ECOLOGICAL ASSESSMENT

Prepared for Cadia Holdings Pty. Ltd.

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FloraSearch

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EXECUTIVE SUMMARY

FloraSearch was commissioned by Cadia Holdings Pty. Ltd. to conduct an ecological assessment for the proposed relocation of the Molybdenum Recovery Plant (the Modification) at the Cadia Valley Operations (CVO) mine at Cadia, New South Wales (NSW). Approval for the Modification is being sought via a modification to Project Approval PA 06_0295 under section 75W of the NSW *Environmental Planning and Assessment Act, 1979*.

The Modification would be located 25 kilometres south-west of Orange, adjacent to Rodds Creek Water Holdings Dam. The Modification impacts an area that has already been disturbed by the establishment of a forestry plantation of exotic Monterey Pines (*Pinus radiata*). Approximately 6.6 hectares (ha) of exotic pine forest would be removed for the Modification.

Flora

Previous surveys have identified 483 flora taxa including 315 native taxa and 168 introduced taxa on CVO land.

Fauna

Multiple previous comprehensive studies of fauna on CVO land has identified a total of 206 vertebrate fauna species comprising one fish, 13 amphibians, 31 reptiles, 131 birds and 30 mammals.

Threatened Biodiversity

- Previous studies on CVO land identified one threatened flora species, the Mt Canobolas Candlebark *(Eucalyptus canobolensis),* and 13 threatened fauna species, 10 birds and three mammals.

- Nine threatened flora species identified as having potential to occur on the study area by the Commonwealth *Environment Protect and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool were assessed as unlikely to occur owing to lack of habitat.

- Database searches and reports of previous surveys on CVO land identified 34 threatened fauna species that may potentially occur on the study area. Following habitat filtering, two species were considered to have some potential to utilise the study area for foraging following dispersal from their breeding areas, the Flame Robin and the Scarlet Robin, both listed as Vulnerable under the NSW *Biodiversity Conservation Act* (BC Act).

- No threatened ecological communities, populations or Critical Habitat listed under the BC Act or the EPBC Act occur on the study area.

Biodiversity Impacts of the Modification

- The proposal would clear 6.6 ha of exotic pine plantation, which is not native vegetation. The Modification would not result in the loss of any native vegetation.

- The existing pine plantation may form a small part of the foraging habitat used by two bird species listed as Vulnerable under the BC Act; the Flame Robin and the Scarlet Robin.

Avoidance and Mitigation

- Owing to the lack of impacts on native vegetation, no avoidance or mitigation measures are considered to be necessary.

Impact Assessment

- No impact assessment was considered necessary for flora species, since no threatened flora is considered likely to occur on the study area.

- Impact assessments were conducted on two fauna species that may occasionally use the study area for foraging in the non-breeding season, the Flame Robin and the Scarlet Robin, both listed as Vulnerable under the BC Act. It was concluded the Modification would have no significant impact on local populations of these species.

- The analyses indicate that no biodiversity listed as threatened under the EPBC Act would be impacted by the Modification. Consequently, there is no requirement to refer the Modification to Department of the Environment and Energy on account of threatened biodiversity.

- No tree species listed in Schedule 2 of NSW State Environment Planning Policy No 44 – Koala Habitat Protection (SEPP 44) as preferred Koala (*Phascolarctos cinereus*) food trees occur on the study areas and no Koala populations have been recorded on CVO land or in the surrounds. Accordingly, a SEPP 44 plan of management is not required.

1 INTRODUCTION

FloraSearch was commissioned by Cadia Holdings Pty. Ltd. to conduct an ecological assessment for the proposed Molybdenum Recovery Plant Relocation Modification (the Modification) at the Cadia Valley Operations (CVO) mine at Cadia, New South Wales (NSW) (the study area) (Figure 1). Approval for the Modification is being sought via a modification to Project Approval PA 06_0295 under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act).

The Modification would be located 25 kilometres (km) south-west of Orange, adjacent to the existing CVO infrastructure (Figure 1). The Modification impacts an area that has already been disturbed by the establishment of a forestry plantation of exotic Monterey Pines (*Pinus radiata*). Approximately 6.6 hectares (ha) of exotic pine forest would be removed for the Modification.

The CVO Project Approval (PA 06_0295) includes the construction and operation of a molybdenum recovery plant, which is a facility to process the product concentrate to enable molybdenum contained in this concentrate to be extracted and separately sold as a product. Whilst this facility is approved, it has not yet been constructed. The Modification involves the relocation of the molybdenum recovery plant from its approved location at the CVO ore processing facilities to the eastern side of the CVO complex (near Rodds Creek Water Holding Dam).

Additionally, an approved site access road stemming off of Cadia Road from the east would be upgraded and relocated slightly to the north of the existing approved location, also in the pine forest.

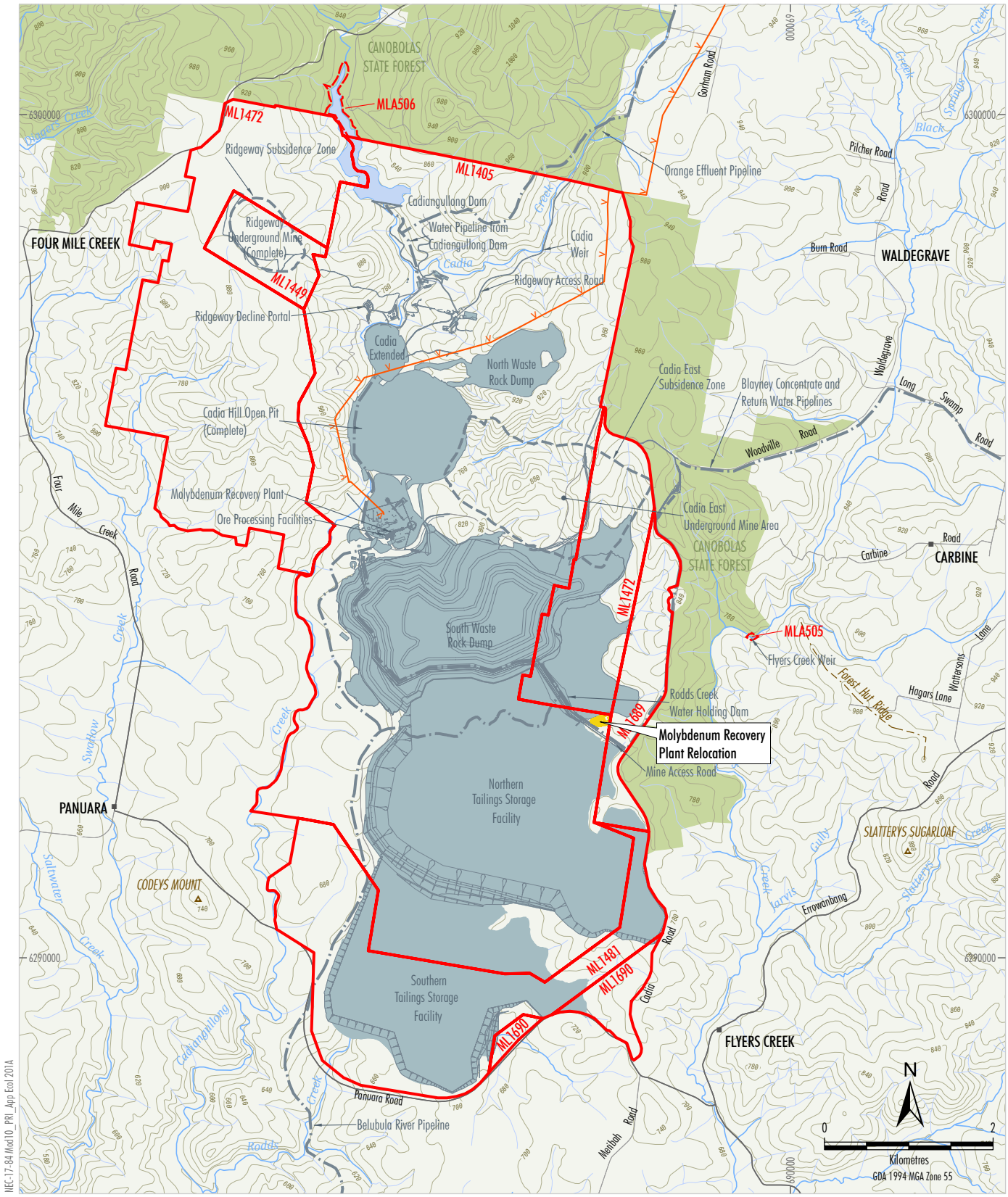
1.1 OBJECTIVES

The objectives of this report are to:

1. Conduct a desktop review of available literature and previous studies undertaken in the vicinity of the Modification study area and conduct database searches for threatened flora and fauna species.
2. Describe and illustrate the vegetation on the Modification study area and its condition.
3. Determine whether any threatened ecological communities are likely to be present according to the relevant State (*Biodiversity Conservation Act 2016* (BC Act)) and Commonwealth (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) listings.
4. Describe the suitability of the vegetation for fauna, particularly threatened species.
5. Prepare a Biodiversity Assessment report, in accordance with the requirements of Part 4 of the EP&A Act.

1.2 THE STUDY AREA

The study area for this Modification is a small area of exotic pine plantation (6.6 ha) south of Rodds Creek Water Holding Dam) (Figure 2).



NEC-17-84 Mod10_PRI_App Ecol 201A

LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary
- State Forest
- Powerline
- Existing/Approved Mine Infrastructure and Landforms
- Proposed Modifciation Infrastructure

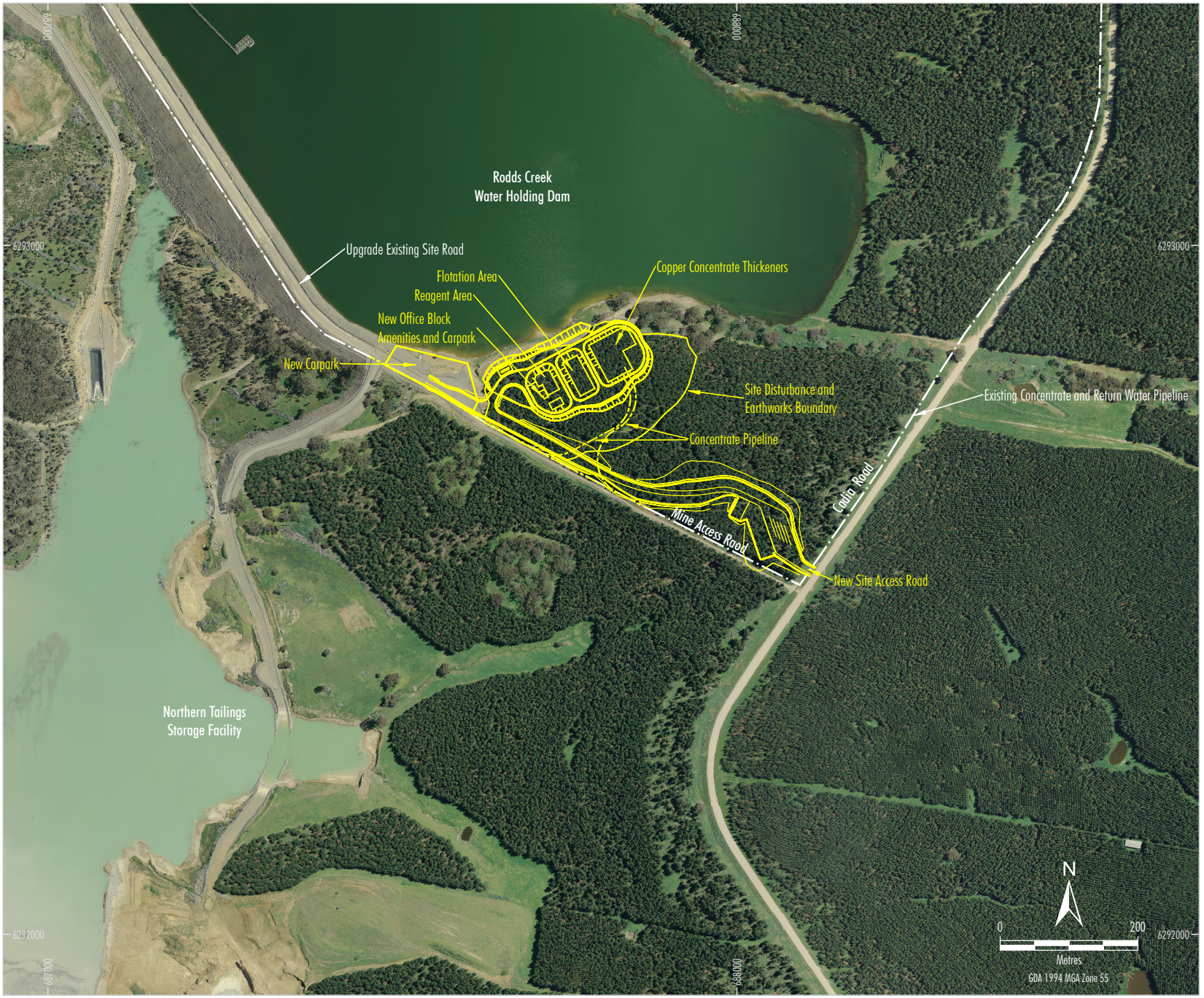
Source: Land and Property Infromation (2017);
NSW Planning & Environment Resource & Energy (2017)

NEWCREST MINING LIMITED

CADIA VALLEY OPERATIONS MODIFICATION 10

Cadia Valley Operations
Modification 10 General Arrangement

Figure 1



LEGEND

Proposed Modifciation Infrastructure

Source: CHPL - Orthophoto (Nov 2016)

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CADIA VALLEY OPERATIONS MODIFICATION 10

Relocated Molybdenum Recovery Plant Location

Figure 2

NEC-17-84 Mod10_PRI_App Ecol 202A

1.2.1 Geology and Soils

The study area lies within the Ordovician age Molong Geanticline which comprised a volcanic arc interspersed with shallow water sediments and coral reefs. The rocks include andesite and associated tuffs, shales and siltstones, and scattered limestones. The study area lies within the Panuara Soil Landscape comprising Red Podzolic Soils, Red Earths, Yellow Podzolic Soils, Brown Podzolic Soils, Brown/Red Earths, Chocolate Soils, Euchrozems and Yellow Solodic Soils (Kovac *et al*., 1990).

1.2.2 Land Use

The study area is within a former State Forest plantation of Monterey Pine (*Pinus radiata*). Pine plantations are established after bulldozing, windrowing and burning the original native vegetation. The planted pine seedlings quickly establish a dense monoculture that completely shades the ground preventing the regrowth of any native vegetation. The entire study area is within the plantation (Plates 1 to 3).

1.2.3 Biogeographical and Botanical Regions

The study area lies in the north of the South Eastern Highlands (SEH) Bioregion as defined in the Interim Biogeographic Regionalisation of Australia (Thackway and Cresswell, 1995). Within the SEH Bioregion, the study area falls within the Orange Subregion (Sahukar *et al.*, 2003), which is characterised by a low hilly to hilly plateau of Ordovician, Silurian and Tertiary volcanic origins (Sahukar *et al*., 2003).

The study area also lies within the NSW Central Tablelands Botanical Division (Anderson, 1961) and the catchment of the Lachlan River.

1.3 LITERATURE

There have been no comprehensive region-wide flora surveys of the western parts of the Central Tablelands encompassing an area of approximately 2 million hectares from Mudgee to Oberon and west to Orange (Department of Environment and Conservation, 2006). All detailed vegetation classification and mapping studies within the nearby region have been confined to relatively small parcels of land, mainly conservation reserves under state or local government control, including Nature Reserves (NR), State Conservation Areas (SCA) and other smaller reserves. Reserves that have been surveyed within the northern part of the SEH Bioregion around Orange include Barton NR, Mount Canobolas SCA, Mullion Range SCA, Freemantle NR and Girralang NR (Porteners, 2000; Hunter, 2002). These studies were commissioned by the Office of Environment and Heritage (OEH), or its predecessors, and only one has been published in a scientific journal, a survey of the Mt Canobolas SCA (Hunter, 2002).

Other relevant publications include Giles (1961) that listed the plants around Mt Canobolas, Bower *et al.* (2002), which discusses the native trees and their associations in Central Western NSW and Bower (2012) on the vegetation of reserves managed by Orange City Council. A number of studies have been associated with environmental impact assessments for various stages of the Cadia Hill, Ridgeway and Cadia East mine developments, principally Bower and Medd (1995), Bower *et al.* (1998) and FloraSearch (2005).

Plate 1. View from north of pine plantation to where the Molybdenum Recovery Plant will be located.

Plate 2. Molybdenum Recovery Plant site within pine plantation.

Plate 3. Molybdenum Recovery Plant site within pine plantation.

As for flora, there have been few studies of native fauna in the Orange region. Goldney and Bowie (1987) includes a regional compilation of fauna for Central Western NSW. More than twelve studies of fauna have been made for various stages of the Cadia Hill, Ridgeway and Cadia East gold mines, principally Fisher and Goldney (1995), Charles Sturt University and Resource Strategies (1998), James Warren and Associates (2000a), Cenwest Environmental Services (2005) and Western Research Institute (2007).

The above literature and other reports referred to in this document underpin much of the information on biodiversity summarised in the following sections. Summaries of studies published between 1995 and 2007 are given in Western Research Institute and Resource Strategies (2009) for fauna and FloraSearch and Resource Strategies (2009) for flora.

1.4 BIODIVERSITY PREVIOUSLY IDENTIFIED ON CVO LAND

1.4.1 Vegetation Communities

On ground field surveys conducted for previous CVO projects are considered to reasonably accurately reflect native vegetation composition at the CVO. Five native vegetation communities were recognised in previous studies on CVO land, including two with two sub-communities each (FloraSearch and Resource Strategies, 2009). The five communities are equivalent to five Plant Community Types (PCT) described in the NSW BioNet Vegetation Classification (BioNet, 2017) (Table 1).

1.4.2 Flora Species

The results of eight previous flora surveys conducted for CVO in the Cadia Valley were collated in FloraSearch and Resource Strategies (2009). This compilation identified 483 flora taxa from previous studies including 315 native taxa and 168 introduced taxa. These numbers are somewhat inflated by specimens that could only be identified to the level of genus, 22 of which are likely to represent duplicate records of other specimens identified to species.

The pre-2008 surveys identified one threatened flora species, the Mt Canobolas Candlebark, *Eucalyptus canobolensis*, which was restricted to a basalt plateau adjacent to Four Mile Creek Road 5 km north west of the current study area (Table 2).

1.4.3 Fauna Species

The results of 12 fauna surveys conducted on CVO land were collated by Western Research Institute and Resource Strategies (2009). A total of 206 vertebrate fauna species were identified, comprising one fish, 13 amphibians, 31 reptiles, 131 birds and 30 mammals. Of these, six birds and eight mammals are introduced. The lists included 28 threatened fauna species; 18 birds and 10 mammals, which are discussed in more detail below (Table 3).

Table 1. Native Vegetation Communities Previously Identified on CVO Lands.

Landscape Position	Formation (Keith, 2004)	Class (Keith, 2004)	Vegetation Community (FloraSearch and Resource Strategies, 2009)			Nearest Equivalent PCT (BioNet, 2017)	
			Community Number	Common Name	Scientific Name	PCT No.	Broad Vegetation Type Name
Upper slopes, fertile soils	Grassy Woodlands	Western Slopes Grassy Woodlands	1a	White Box Woodland	*E. albens*	266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
Mid slopes, fertile soils			2a	Long-leaved Box/Blakely's Red Gum/ Yellow Box Tall Woodland	*E. goniocalyx/ E. blakelyi/E. melliodora*	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Lower slopes, fertile soils			2b	Apple Box/Blakely's Red Gum/Yellow Box Tall Woodland	*E. bridgesiana/ E. blakelyi/E. melliodora*		
Upper slopes, infertile soils	Dry Sclerophyll Forests (shrubby subformation)	Western Slopes Dry Sclerophyll Forests	3a	Red Stringybark/Long-leaved Box Open Forest	*E. macrorhyncha/ E. goniocalyx*	287	Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion
Skeletal soils			3b	Red Box/Red Stringybark Open Forest	*E. polyanthemos/ E. macrorhyncha*		
Valley floor	Grassy Woodlands	Southern Tableland Grassy Woodlands	4a	Ribbon Gum/Blackwood Forest	*E. viminalis/ Acacia melanoxylon*	732	Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the SEH Bioregion
Riparian	Forested Wetlands	Eastern Riverine Forests	5a	River Sheoak Forest	*Casuarina cunninghamiana*	85	River Oak forest and woodland wetland of the NSW South Western Slopes and SEH Bioregion

Table 2. Threatened Flora Species Returned by Database Searches of the Surrounding Region.

Scientific Name	Common Name	Data Source		Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
		BioNet	PMST	BC Act	EPBC Act		
Eucalyptus aggregata	Black Gum	-	✓	V	V	Nil	Black Gum occurs south of Orange in high altitude, low lying swampy areas along Gosling Creek with deep clay soils. However, such habitats do not occur on the study area where altitudes are lower and the soils are better drained.
Eucalyptus canobolensis	Mt Canobolas Candlebark	✓	✓	V	E	Nil	Mt Canobolas Candlebark occurs on basaltic soils derived from the Mt Canobolas volcano at altitudes generally above 850 metre (m) (OEH, 2017a). The study area does not have basaltic soils and is below 800 m altitude.
Eucalyptus pulverulenta	Silver-leaved Mountain Gum	-	✓	V	V	Nil	Grows in shallow soils in open forest, typically dominated by Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Broad-leafed Peppermint (*E. dives*) and Apple Box (*E. bridgesiana*) (OEH, 2017a). All native trees have been eliminated from the study area.
Euphrasia arguta	-	-	✓	CE	CE	Nil	*Euphrasia arguta* has been recorded from grassy areas near rivers at elevations up to 700 m above sea level in central western NSW, and grassy forests or regrowth vegetation on the Northern Tablelands (DoEE, 2017b). Suitable habitat is lacking on the study area.
Leucochrysum albicans var. *tricolor*	Hoary Sunray	-	✓	-	E	Nil	A plant principally of grasslands and grassy woodlands on relatively fertile soils, often clays or clay-loams derived from basalt or dolerite, or at higher altitudes, from sedimentary parent material. Potentially suitable native grasslands are lacking on the study area, and there are no nearby records.
Prasophyllum petilum	Tarengo Leek Orchid	-	✓	E	E	Nil	Grows in open sites in natural temperate grassland, grassy woodland and in grassy Box-Gum Woodland. Highly susceptible to grazing, being retained only at little-grazed travelling stock reserves and in cemeteries (OEH, 2017a). Suitable native grassy woodland is lacking on the study area.
Swainsona recta	Small Purple-pea	-	✓	E	E	Nil	Small Purple-pea occurs mainly in the grassy understorey of Box-Gum Woodlands and open-forests in association with understorey dominants that include Kangaroo Grass (*Themeda australis*), poa tussocks (*Poa* spp.) and spear-grasses (*Austrostipa* spp.) (OEH, 2017a). These habitats have been eliminated from the study area.

Scientific Name	Common Name	Data Source		Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
		BioNet	PMST	BC Act	EPBC Act		
Thesium australe	Austral Toadflax	-	✓	V	V	Nil	Austral Toadflax was formerly widespread in grasslands and grassy woodlands in eastern Australia from the Bunya Mountains in Queensland to Tasmania. It is mainly hemiparasitic on Kangaroo Grass (*Themeda australis*) and possibly *Poa* species on a wide range of substrates (Department of Sustainability and Environment, 2003). Kangaroo Grass is absent on the study area.
Tylophora linearis	-	-	✓	V	E	Nil	Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *E. fibrosa, E. sideroxylon, E. albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii* (OEH, 2017a). On coarse-grained sediments. Distributed to the north of the study area from east of Boggabri, Pilliga Scrub, Peak Hill and Dubbo. Suitable habitat is absent from the study area.

E Endangered.
CE Critically Endangered.
V Vulnerable.

Table 3. Threatened Fauna Species Returned by Database Searches of the Surrounding Region.

Class	Scientific Name	Common Name	Data Source			Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
			CVO[1]	BioNet	PMST	BC Act	EPBC Act		
Actinopterygii (ray-finned fishes)[2]	*Maccullochella peelii*	Murray Cod	-	-	✓	-	V	Nil	These two fish species occur in large permanent rivers with deep waterholes (DoEE, 2017b). No suitable permanent watercourses occur on or near the study area.
	Macquaria australasica	Macquarie Perch	-	-	✓	-	E	Nil	
Amphibia	*Litoria booroolongensis*	Booroolong Frog	-	-	✓	E	E	Nil	The Booroolong Frog is a small riverine frog that inhabits rocky permanent streams ranging from small slow-flowing creeks to large rivers (DoEE, 2017b). Suitable habitat does not occur on the study area or surrounds.
	Litoria castanea	Yellow-spotted Tree Frog	-	-	✓	CE	E	Nil	The Yellow-spotted Tree Frog require large permanent ponds or slow flowing 'chain-of-ponds' streams with abundant emergent vegetation such as bulrushes and aquatic vegetation. Suitable habitat is absent from the study area and surrounds.
Reptilia	*Aprasia parapulchella*	Pink-tailed Worm-lizard	-	-	✓	V	V	Nil	The Pink-tailed Worm-lizard inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks (OEH, 2017a). Suitable habitat does not occur on the study area.
	Delma impar	Striped Legless Lizard	-	-	✓	V	V	Nil	Found mainly on the Southern Tablelands and South West Slopes in Natural Temperate Grassland but may also occur in grasslands with a high exotic component. Occasionally found in open Box-Gum Woodland. Shelters beneath logs and/or rocks in winter (OEH, 2017a). Predicted as potentially occurring on the Study Area by PMST (DoEE, 2017b), but is not known north of Goulburn. Suitable habitat is lacking on the Study Area.
Aves (birds)	*Leipoa ocellata*	Mallee Fowl	-	-	✓	E	V	Nil	The Mallee Fowl was predicted to potentially occur on the study area by the PMST. Mallee Fowl are found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding (Benshemesh, 2007). Suitable habitat is absent from the study area and surrounding regions.

Class	Scientific Name	Common Name	Data Source			Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
			CVO[1]	BioNet	PMST	BC Act	EPBC Act		
Aves (birds)	*Hieraaetus morphnoides*	Little Eagle	✓	-	-	V	-	Nil	Little Eagle occurs throughout NSW and soars over open country seeking prey (Blakers *et al*., 1984). There are two records in the region around Orange in BioNet (2017). It is known to breed close to the study area (FloraSearch, 2014). However, it is unlikely to inhabit exotic pine plantations.
	Rostratula australis	Australian Painted Snipe	-	-	✓	E	E	Nil	Australian Painted Snipe inhabits freshwater swamps and marshes (Blakers *et al*., 1984). Suitable habitat is absent from the study area.
	Calidris ferruginea	Curlew Sandpiper	-	-	✓	E	CE, M	Nil	Forages mainly on coastal estuarine mudflats, but also in inland lakes and lagoons with extensive shallows (OEH, 2017a). Suitable habitat is absent from the Study Area.
	Numenius madagascariensis	Eastern Curlew	-	-	✓	-	CE, M	Nil	The Eastern Curlew has a primarily coastal distribution on mudflats in estuaries. The species is found in all states, particularly the north, east, and south-east regions including Tasmania (DoEE, 2017b). Eastern curlews are rarely recorded in inland wetlands, which in any event are absent from the Study Area.
	Glossopsitta pusilla	Little Lorikeet	✓	-	-	V	-	Nil	The Little Lorikeet is occasionally recorded close to Orange and in the surrounding region (Bower, personal observations; BioNet, 2017). It is a nomadic species that forages on flowering eucalypts which are absent from the study area.
	Lathamus discolor	Swift Parrot	✓	-	✓	E	CE	Nil	The Swift Parrot is a migratory species that breeds in Tasmania and winters on the mainland, where it feeds on flowering eucalypts (OEH, 2017a). There are two records near Orange (BioNet, 2017). Recorded in a previous CVO survey (WRI & RS, 2009). It requires winter flowering eucalypts, which are absent from the study area.
	Polytelis swainsonii	Superb Parrot	✓	✓	✓	V	V	Nil	The Superb Parrot occurs in tall grassy Box-Gum Woodlands and forests west of the Tablelands (Blakers *et al*., 1984). There are many records of the species close to, and west of, Orange, including several on CVO land (WRI & RS, 2009; BioNet, 2017). Box-Gum Woodland and suitable breeding and/or feeding habitat is absent from the study area.

Class	Scientific Name	Common Name	Data Source			Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
			CVO[1]	BioNet	PMST	BC Act	EPBC Act		
Aves (birds)	*Neophema pulchella*	Turquoise Parrot	✓	-	-	V	-	Nil	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks. Spends most of the day on the ground searching for the seeds of grasses and herbaceous plants, or browsing on vegetable matter. A single recording in a previous CVO survey may represent a nomadic dispersing individual (WRI & RS, 2009). The habitat on the study areas is not considered suitable for this species.
	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	✓	-	-	V	-	Nil	There are several records of this subspecies near Orange (BioNet, 2017) and it has been recorded twice on CVO land (WRI & RS, 2009). It inhabits grassy woodlands with rough-barked trees at close to natural densities, sparse shrub cover and fallen timber on the ground (OEH, 2017a). The habitat in the study areas is unsuitable for this species.
	Chthonicola sagittata	Speckled Warbler	✓	-	-	V	-	Nil	A sedentary species of natural relatively undisturbed open woodland on rocky ridges or in gullies. Recorded sparsely but widely in the surrounding region in larger blocks of remnant woodland (OEH, 2017b; BioNet, 2017). It has been recorded once on CVO land (WRI & RS, 2009), but is considered highly unlikely to utilise the study area.
	Anthochaera phrygia	Regent Honeyeater	✓	-	✓	CE	CE	Nil	A nomadic/migratory nectar-dependent species found in flowering eucalypts, which has been recorded rarely in the region around the study area (WRI & RS, 2009; BioNet, 2017). Suitable habitat is absent from the study area.
	Grantiella picta	Painted Honeyeater	-	-	✓	V	V	Nil	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*), Box-Gum Woodlands and Box-Ironbark Forests (OEH, 2017a). A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Suitable habitat and mistletoes are absent from the study area.
	Daphoenositta chrysoptera	Varied Sittella	✓	✓	-	V	-	Nil	Birds of woodlands and open forests, usually with rough-barked eucalypts. Regularly recorded in the surrounding region and has been recorded in five surveys on CVO land (WRI & RS, 2009; BioNet, 2017). However, it is unlikely to utilise exotic pine plantations.

Class	Scientific Name	Common Name	Data Source			Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
			CVO[1]	BioNet	PMST	BC Act	EPBC Act		
Aves (birds)	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	✓	✓	-	V	-	Nil	Found in larger blocks of woodland and dry open sclerophyll forests, usually dominated by eucalypts (Scientific Committee, 2017). Also recorded in shrublands, heathlands and regenerating forests. The understorey is typically open with sparse eucalypt saplings, acacias and other shrubs. It has been recorded three times on CVO land (WRI & RS, 2009; BioNet, 2017). However, potential habitat is absent from the study area.
	Petroica boodang	Scarlet Robin	✓	✓	-	V	-	Low	Breeds in high altitude eucalypt forest with an open understorey (Blakers *et al*., 1984), such as occurs on Mt Canobolas. Juveniles disperse to more open country at lower altitudes in autumn. Recorded in four surveys on CVO land (WRI & RS, 2009; BioNet, 2017). It is highly unlikely to breed on the study area, but may utilise it as part of a wide foraging range in autumn and winter.
	Petroica phoenicea	Flame Robin	✓	-	-	V	-	Low	The Flame Robin has been recorded on the western outskirts of Orange and several times on Mt Canobolas (BioNet, 2017). It breeds in high altitude forests and disperses to lower more open habitats in winter. Recorded in three surveys on CVO land (WRI & RS, 2009). It is highly unlikely to breed on the study area, but may utilise it as part of a wide foraging range in autumn and winter.
	Stagonopleura guttata	Diamond Firetail	✓	-	-	V	-	Nil	Widespread in open forest and woodland mostly on the inland side of the Great Dividing Range in eastern NSW (Blakers *et al*., 1984). Recorded on the western outskirts of Orange (BioNet, 2017) and in two surveys on CVO land (WRI & RS, 2009). Favours open grassy woodlands. Habitat is absent on the study area.
Mammalia (mammals)	*Dasyurus maculatus*	Spotted-tailed Quoll	-	-	✓	V	E	Nil	Generally confined to areas of native forest and woodland where it nests in rock caves or hollow logs (Edgar, 1983). Hollow logs and caves are absent from the study area.
	Phascolarctos cinereus	Koala	-	-	✓	V	V	Nil	Koalas are widespread in eastern NSW with populations in timbered country around Mullion Creek, and in the hills flanking the Macquarie River, particularly around Hill End, and west and north west of Manildra (BioNet, 2017). However, there are no records to the south west of Orange.

Class	Scientific Name	Common Name	Data Source			Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
			CVO[1]	BioNet	PMST	BC Act	EPBC Act		
Mammalia (mammals)	*Petaurus norfolcensis*	Squirrel Glider	✓	✓	-	V	-	Nil	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas (OEH, 2017a). Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites. Squirrel Gliders have been recorded on CVO land (WRI & RS, 2009; BioNet, 2017). However, there is no potential for them to occur on the study area.
	Petauroides volans	Greater Glider	-	-	✓	-	V	Nil	There are many records for the Greater Glider on Mt Canobolas (BioNet, 2017), and a few in the Mullion Ranges north of Orange. It is found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (DoEE, 2017b). The Greater Glider favours forests with a diversity of eucalypt species. The study area lacks montane forest and abundant hollows and is unsuitable for this species.
	Petrogale penicillata	Brush-tailed Rock Wallaby	-	-	✓	E	V	Nil	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north (OEH, 2017a). Such habitats are lacking on the study area.
	Pteropus poliocephalus	Grey-headed Flying-fox	-	-	✓	V	V	Nil	The Grey-headed Flying Fox mostly occurs on the eastern side of the Great Dividing Range, but may establish temporary roosts west of the divide when food supplies are abundant (OEH, 2017a). There are two records in BioNet (2017) close to Orange in 2006 and 2010. This species depends on eucalypt nectar and succulent fruits and is highly unlikely to utilise the study area.
	Nyctophilus corbeni	Corben's Long-eared Bat	-	-	✓	V	V	Nil	Corben's Long-eared Bat was predicted to potentially occur on the study area by the PMST. It is predominantly a western species in NSW, the nearest records to the study area being in the Hervey and Nangar Ranges and near Canowindra (BioNet, 2017). It is absent from the tablelands and unlikely to occur on the study area.
	Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	✓	-	-	V	-	Nil	The Yellow-bellied Sheathtail Bat has been recorded thrice on CVO lands (WRI & RS, 2009), on Mt Canobolas and north of the Freemantle NR (BioNet, 2017). It roosts in tree hollows and forages over the tree canopy or open country. There is no potential for it to roost on the study area..

Class	Scientific Name	Common Name	Data Source			Conservation Status		Likelihood to be on Study Area	Assessment of Likelihood
			CVO[1]	BioNet	PMST	BC Act	EPBC Act		
Mammalia (mammals)	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	✓	-	-	V	-	Nil	The Eastern Bentwing Bat is widespread in the Orange region (BioNet, 2017) and has been recorded twice at Cadia (Greg Richards and Associates, 2000, 2006). It roosts in caves and man-made structures such as mines and storm water drains and forages in wooded areas, flying above the tree tops. Roosting habitat is absent from the study area.
	Chalinolobus dwyeri	Large-eared Pied Bat	-	-	✓	V	V	Nil	Large-eared pied Bat has been recorded to the north east of the study area at Ophir Reserve and Hill End (BioNet, 2017). It roosts in caves, mine tunnels and the abandoned nests of Fairy Martins. It forages over areas of continuous forest habitat (Greg Richards and Associates, 2000, 2006), and may utilise the forested parts of CVO lands, although previous surveys have not recorded it. Roosting habitat is absent for the study area.

[1] Western Research Institute and Resource Strategies (2009).
[2] NSW *Fisheries Management Act 1994.*

1.5 THREATENED BIODIVERSITY

Database searches were made in December 2017 of the following data sources to compile lists of threatened biodiversity that has been recorded in the surrounding region and may therefore have potential to occur on the study area. This involved searching for historical records of threatened flora and fauna species, populations, ecological communities and critical habitat. The databases consulted, and the search areas within them, were:

- BioNet website – Searches the NSW National Parks and Wildlife Service, NSW State Forests, Australian Museum and Royal Botanic Gardens Sydney databases (BioNet, 2017). The search area comprised a 20 × 20 km square centred on the study area. This search returned a list of threatened species records from within the search area.

- Commonwealth Department of the Environment and Energy (DoEE) website – Protected Matters Search Tool (PMST) (DoEE, 2017a). The search area comprised the same 20 × 20 km square as for the BioNet search. The PMST uses actual records and habitat modelling to return a list of 'protected matters' that are known or predicted to occur in the search area, including threatened species, migratory species, ecological communities, wetlands of international significance, and national and world heritage properties.

- Previous reports of biodiversity surveys conducted on CVO land near the study area, including:

  Flora

  - FloraSearch and Resource Strategies (2009) *Cadia East Project Flora Assessment - Appendix B of the Cadia East Project Environmental Assessment.*
  - FloraSearch (2005) *Cadia East Study Area Flora Assessment*.
  - Resource Strategies (2002a) *Ridgeway Gold Mine Remnant Woodland Enhancement Programme Wire Gully Baseline Monitoring Survey*.
  - Resource Strategies (2002b) *Southern Remnant Flora and Fauna Survey*.
  - Resource Strategies (2002c) *Cadia Extended Modification Flora and Fauna Assessment*.
  - Bower and Resource Strategies (2000) *Ridgeway Project Flora Survey and Assessment Report.*
  - Bower (1999) *Flora Survey - Flyers Creek/Belubula River and Rodds Creek Study Sites*.
  - Bower *et. al.,* (1998) *Flora Survey of the Ridgeway Trial Development Application Area and Surrounds.*
  - Bower and Medd (1995) *Flora Report for Newcrest Mining on the Cadia Project.*

  Fauna

  - Western Research Institute and Resource Strategies (2009) *Vertebrate Fauna Assessment.* Appendix A of the Cadia East Project Environmental Assessment. [This report is referred to as WRI & RS, 2009 below].
  - Western Research Institute (2007) *Cadia East Project Terrestrial Vertebrate Fauna Surveys (Excluding Bats).*

- Greg Richards and Associates (2007) *A Survey of Bat Fauna at a Proposed Tailings Dam, Cadia East, NSW.*
- Cenwest Environmental Services (2005) *Cadia East Study Area Terrestrial Vertebrate Fauna Assessment*.
- Greg Richards and Associates (2005) *Cadia East Study Area Bat Fauna Assessment.*
- Resource Strategies (2002a) *Ridgeway Gold Mine Remnant Woodland Enhancement Programme Wire Gully Baseline Monitoring Survey*.
- Resource Strategies (2002b) *Southern Remnant Flora and Fauna Survey*.
- Resource Strategies (2002c) *Cadia Extended Modification Flora and Fauna Assessment*.
- James Warren and Associates (2000a) *Ridgeway Project Vertebrate Fauna Survey*.
- James Warren and Associates (2000b) *Swallow and Diggers Creeks Amphibian Survey – Ridgeway Project*.
- Greg Richards and Associates (2000) *An Assessment of the Bat Fauna in Infrastructure Zones at the Ridgeway Mining Project, Central New South Wales*.
- Charles Sturt University and Resource Strategies (1998) *A Vertebrate Survey of the RidgewayTrial Development Application Area and Surrounds*.
- Fisher and Goldney (1995) *Fauna Survey – Cadia Hill.*

1.5.1 Threatened Flora and Fauna Species

The database and literature searches returned nine threatened flora species and 34 threatened fauna species that have potential to occur in the vicinity of the CVO and broader region around Orange (Tables 2 and 3). The habitat requirements of these species were reviewed and compared with the habitats available on the study area, which is entirely occupied by part of an exotic pine plantation. Threatened species whose habitats do not occur on the study area are not considered further in this report.

Habitat filtering identified that none of the potential threatened flora species has any likelihood of occurring on the study area (Table 2). Similarly, potential habitat is considered to exist in the study area for two of the potentially occurring threatened fauna species (Table 3), both of which are considered to have a low likelihood of occurrence. The two fauna species identified as potentially utilising the study area are both birds, the Scarlet Robin (*Petroica boodang*) and the Flame Robin (*Petroica phoenicea*) which are both seasonal migrants to the area. Both species breed elsewhere and may visit the pine plantation in autumn and winter as part of a very much larger foraging area.

1.5.2 Endangered Populations

Twenty nine plant populations and 22 terrestrial fauna populations are listed as endangered under NSW BC Act, as at December 2017 (OEH, 2017a). None are applicable to the Study Area.

1.5.3 Threatened Ecological Communities (TEC)

The database searches indicated that seven threatened ecological communities listed in the schedules of the NSW BC Act and/or the Commonwealth EPBC Act may potentially occur on the study area (Table 4). Two of the communities are listed under both jurisdictions.

None of the potential ecological communities occur on the study area (Table 4) owing to the area's conversion to pine plantation, which is not classed as native vegetation according to the definition in the *Local Land Services Act 2016*.

1.5.4 Critical Habitat

No Critical Habitat for flora or fauna has been declared on or near the study area under the BC Act (OEH, 2017b) or the EPBC Act (DoEE, 2017b).

Table 4. Threatened Terrestrial Ecological Communities Known to Occur within the Wider Region.

Title(s)	Data Source			Conservation Status		Likelihood of Occurrence	Assessment of Likelihood
	CVO	BioNet	PMST	BC Act	EPBC Act		
Coolac-Tumut Serpentinite Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions.	-	✓		E	-	Nil	Serpentinite Shrubby Woodland is restricted to soils derived from serpentinite in the Tumut-Coolac-Gundagai area. The study area is outside the geographical range specified for this community and is not on serpentinite geology.
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	-	✓	-	E	-	Nil	This community occurs on brown loam or clay, alluvial or colluvial soils on prior streams, slight depressions on undulating plains of the western slopes. It occurs upslope of frequently inundated floodplain River Red Gum communities, as well as on lower slopes and valley flats (OEH, 2017a). This community occurs at lower altitudes than the study area and appropriate habitats are lacking.
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	Nil	This ecological community was identified by the PMST (DoEE, 2017b) as potentially occurring on or near the study area. Inland Grey Box (*E. microcarpa*) woodlands occur on the NSW western slopes and plains (OEH, 2017a) and have not been recorded on the tablelands. The nearest occurrences to the study area are in the Cudal area west of Orange and near Kerrs Creek, north of Orange. The community is absent from the study area.
Mt Canobolas Xanthoparmelia Lichen Community	-	✓	-	E	-	Nil	A unique community of lichens that occurs on rock faces and soils of the Mt Canobolas Tertiary volcanic complex (OEH, 2017a). Habitat for this community is absent from the study area.
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	-	✓	-	E	-	Nil	This Endangered Ecological Community occurs on high fertility soils on undulating or hilly terrain of the Central and Southern Tablelands of NSW between 600 and 900 metres Australian Height Datum (m AHD) (OEH, 2017a). The characteristic trees are *E. viminalis, E. radiata, E. dalrympleana* subsp. *dalrympleana* and *E. pauciflora*, which do not occur on the study area. This community occurs on basalt soils around Mt Canobolas (Bower, 2012).The characteristic trees and suitable soils are absent from the study area.
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions	-	✓	-	E	-	Nil	This ecological community is confined to high altitude areas (600 to 1400 m AHD) of the NSW Central and Southern Tablelands (OEH, 2017a). The community occupies '*valley floors, the margins of frost hollows, footslopes and undulating hills*'. The study area lacks all of the characteristic tree species of this community.

Title(s)	Data Source			Conservation Status		Likelihood of Occurrence	Assessment of Likelihood
	CVO	BioNet	PMST	BC Act	EPBC Act		
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)	✓	✓	✓	E	CE	Nil	This ecological community is commonly known as Box-Gum Woodland and is widespread in the SEH and NSW South West Slopes Bioregions (Department of Environment and Heritage, 2006). The study area is part of the SEH Bioregion. Box-Gum Woodland is widespread on the western slopes and tablelands of NSW and was formerly one of the dominant communities in the region around Orange. The characteristic species of this community are absent from the study area, although they may once have occurred there, and have been replaced by a plantation of exotic conifers.

2 METHODS

A site visit was made on 7 February 2018 to determine whether any native vegetation occurs within the disturbance area associated with the proposed Modification.

Rapid Assessment Samples were carried out at five sites within the disturbance area (Figure 3). The samples involved listing all overstorey, mid-storey and ground cover flora species present within a radius of 15 m of the centre point where a Geographic Positioning System (GPS) reading was taken from a hand-held GPS unit (Garmin 64; accuracy 3 m). Key features of each site were recorded including, canopy shading, leaf litter cover, rocks, logs, disturbance and the presence of Priority Weeds.

3 DISCUSSION

3.1 STUDY AREA HABITAT

The vegetation on the study area is wholly dominated by even-aged exotic Monterey Pines (*Pinus radiata*). There is no native shrub layer and the ground cover is predominantly a dense mat of pine needles. The pine plantation is approximately 20 years old and has not been thinned or selectively logged. The ground surface within the plantation is very uneven with furrows and mounds resulting from the original native vegetation clearance. There is very little light penetration to ground level except where occasional trees have died and along old forestry access tracks.

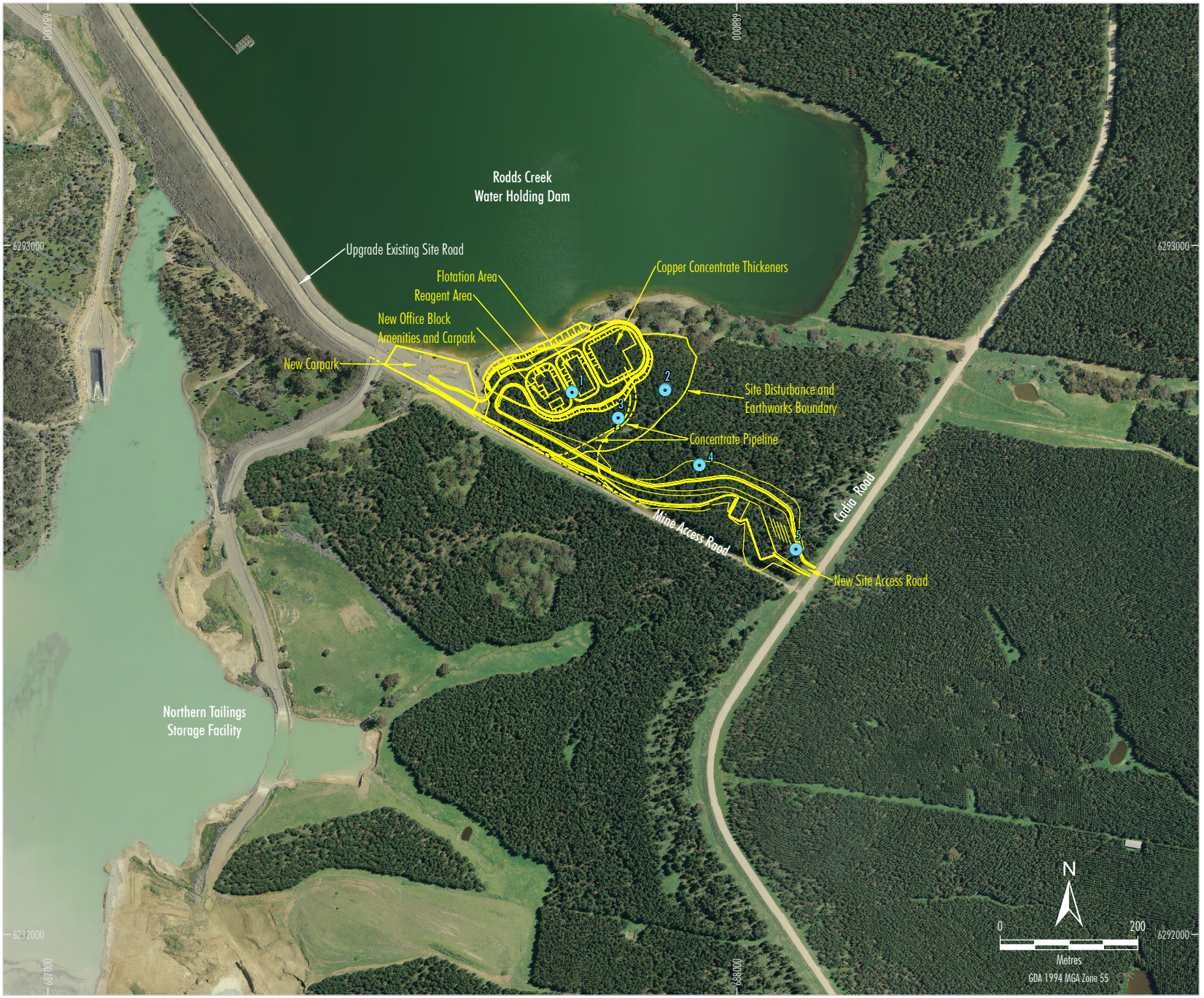
3.2 VEGETATION DESCRIPTION

A list of the flora species observed on the five rapid assessment sites is given in Attachment 1. A total of only 23 flora species was recorded, of eight (35%) are native and 15 (65%) are introduced. Except for one native Broad-leaved Peppermint (*Eucalyptus dives*) tree that germinated and grew after the initial vegetation clearance, the tree canopy of the study area is entirely comprised of Monterey Pine (*Pinus radiata*). Projected foliage cover of the canopy is close to 100%, such that almost all light is intercepted by the canopy and very little reaches the ground. As a consequence, there is no shrub layer and the ground cover is limited to occasional individuals of species tolerant of low light levels. The main native ground cover species found below the pine canopy include: Poison Rock Fern (*Cheilanthes sieberi*); an Oxalis (*Oxalis exilis*); and Weeping Grass (*Microlaena stipoides*). These occurred as widely scattered individuals. Scattered exotic species found below the pine canopy included mainly Tall Fleabane (*Conyza sumatrensis*), Common Sowthistle (*Sonchus oleraceus*) and Blackberry (*Rubus anglocandicans*).

Openings within the canopy, such as old forestry tracks and tree fall sites, allowed the survival of a greater number of flora species in higher densities than below continuous canopy. Native species in more open areas included: Stinging Nettle (*Urtica incisa*); an Oxalis (*Oxalis exilis*); Small Crumbweed (*Dysphania pumilio*); Climbing Saltbush (*Einadia nutans*); Kidney Weed (*Dichondra repens*); and Weeping Grass (*Microlaena stipoides*). Exotic species present in openings included: Spear Thistle (*Cirsium vulgare*); Tall Fleabane (*Conyza sumatrensis*); Sheep Sorrel (*Acetosella vulgaris*); Flatweed (*Hypochaeris radicata*); Phalaris (*Phalaris aquatica*); Paterson's Curse (*Echium plantagineum*); Blackberry Nightshade (*Solanum nigrum*); Common Sowthistle (*Sonchus oleraceus*); Red-flowered Mallow (*Modiola caroliniana*); Fat Hen (*Chenopodium album*); and Blackberry (*Rubus anglocandicans*).

3.3 PRIORITY WEEDS AND WEEDS OF NATIONAL SIGNIFICANCE

One introduced species recorded on the study area, Blackberry (*Rubus anglocandicans*), is listed as a Priority Weed in the Blayney Shire (Department of Primary Industries, 2018) and is also a Weed of National Significance (DoEE, 2018)



LEGEND

Proposed Modifciation Infrastructure

Flora Survey Sites

Source: CHPL - Orthophoto (Nov 2016)

NEWCREST MINING LIMITED

CADIA VALLEY OPERATIONS MODIFICATION 10

Relocated Molybdenum Recovery Plant
Flora Survey Sites

Figure 3

NEC-17-84 Mod10_PRI_App Ecol 203A

3.4 HABITAT SUITABILITY FOR THREATENED BIODIVERSITY

The habitat is unsuitable for almost all native flora species and is not reported to be favoured by any potential threatened flora species in their online profiles (OEH, 2017a).

Pine plantations also represent poor habitat for most native fauna species. A variety of common, adaptable native bird species are known to forage, shelter and breed in pine plantations, especially old plantations that have been thinned or selectively logged (Disney and Stokes, 1976). However, exotic pine plantations are not identified as important habitat in the species profiles of any threatened birds or other threatened fauna species (OEH, 2017a). The main value of pine plantations for native wildlife is daytime shelter for nocturnal macropods which graze in surrounding grasslands after dark.

The analysis of threatened biodiversity that may potentially occur in the region surrounding the study area indicates that only two threatened fauna species are likely to utilise the study area, the Scarlet Robin and the Flame Robin. These species may visit the area occasionally for foraging in autumn and winter, as part of a much wider foraging area. However, they are highly unlikely to be dependent on the plantation. The Flame Robin and Scarlet Robin are subjected to a Test of Significance below.

4 BIODIVERSITY IMPACT ASSESSMENT

4.1 IMPACTS ON BIODIVERSITY

The proposal would include the clearing of 6.6 ha of exotic pine plantation, which is not native vegetation. The pine plantation may form a small part of the foraging habitat used by two bird species listed as Vulnerable under the BC Act; the Flame Robin and the Scarlet Robin.

The project would not result in the loss of any native vegetation and is highly unlikely to affect any threatened flora species listed under State or Commonwealth legislation. No threatened populations or Critical Habitat listed under either jurisdiction would be affected.

4.2 AVOIDANCE MEASURES

Owing to the lack of impacts on native vegetation and negligible impacts on other threatened biodiversity (Section 4.1), no avoidance measures are considered to be necessary.

4.3 CUMULATIVE AND LONG TERM IMPACTS

The Modification would have no additional cumulative impacts on biodiversity at the local or regional scales.

4.4 BIODIVERSITY FOR IMPACT ASSESSMENT

The significance of the potential impacts of the Modification on the Scarlet Robin and the Flame Robin are given below.

4.5 IMPACT ASSESSMENT

This section provides an assessment of the impacts of the proposed Modification on biodiversity based on the preceding survey findings and analysis. The assessment is considered appropriate for a Modification under section 75W of the NSW EP&A Act.

The likelihood of the Modification significantly affecting the Scarlet Robin and the Flame Robin or their habitats is assessed below in accordance with the six factors of assessment set outlined in Appendix 3 of the *Guidelines for Threatened Species Assessment* (Department of Environment and Conservation & Department of Primary Industries, 2005) which are:

1. ***How is the proposal likely to affect the lifecycle of a threatened species and/or population?***
2. ***How is the proposal likely to affect the habitat of a threatened species, population or ecological community?***
3. ***Does the proposal affect any threatened species or populations that are at the limit of its known distribution?***
4. ***How is the proposal likely to affect current disturbance regimes?***
5. ***How is the proposal likely to affect habitat connectivity?***
6. ***How is the proposal likely to affect critical habitat?***

4.6 ASSESSMENT OF SIGNIFICANCE

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Neither the Scarlet Robin or the Flame Robin is likely to breed on the study area. Accordingly, the Modification would not displace breeding pairs or populations, or disrupt breeding behaviour. Other aspects of the life cycles of these species would also be unaffected including roosting, foraging and migratory behaviour. The main impact of the Modification would be a small reduction in the area of potential foraging habitat available to them, which is discussed in the next section.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

Juveniles of the Scarlet Robin and seasonally migrating Flame Robins may utilise the study areas as late autumn and winter nomadic visitors (Blakers *et al*. 1984; OEH, 2017b). These birds move widely through the landscape and would not be dependent on any one small area. Both species utilise very much larger areas for foraging than the habitats available on the study area. It is considered that the very small size and exotic nature of the habitat to be removed represents an insignificant part of the habitat available to them in the wider region, including elsewhere on CVO lands. Accordingly, it is highly unlikely that the Modification would significantly affect the habitat available to individuals of either threatened species.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Neither of the two threatened robins is at their known distribution limits (BioNet, 2017).

4. How is the proposal likely to affect current disturbance regimes?

The Modification would not change the essential nature of CVO operations. There are not expected to be any changes to fire regimes, or increased risk of fire. It is not expected that risks from environmental weeds or feral animals would change, or that any other Key Threatening Processes would be exacerbated. Most potential weed, vermin and feral species already occur in the highly disturbed landscapes of the Cadia district and CVO is committed to extensive weed and feral animal control programs.

5. How is the proposal likely to affect habitat connectivity?

The autumn / winter foraging habitat of the Scarlet Robin and Flame Robin is widespread in the region. In addition, both species are highly mobile in the landscape and capable of moving readily between habitat patches. That is, physical connectivity of habitat is not likely to be critical to these species and, in any case, pine plantation would remain intact outside of the study area.

6. How is the proposal likely to affect critical habitat?

Critical habitat, as defined by the BC Act or the EPBC Act, has not been declared for any of the subject species on the NSW Critical Habitat register (OEH, 2017b) or the Commonwealth Register of Critical Habitat (DoEE, 2017b) in the study area or surrounds.

Conclusion

It is concluded that:

a. the Modification would result in very small reductions in potential poor quality foraging habitat for the Scarlet Robin and Flame Robin; and

b. the reduction in foraging habitat would not significantly affect populations of either threatened fauna species, should they occur on the study area.

4.7 EPBC Act

The above analyses indicate that no biodiversity listed as threatened under the Commonwealth EPBC Act would be impacted by the Modification. Consequently, there is no requirement to refer the Modification to DoEE on account of threatened biodiversity.

4.8 NSW State Environment Planning Policy No 44 – Koala Habitat Protection

NSW State Environment Planning Policy No 44 – Koala Habitat Protection (SEPP 44) aims to protect habitat utilised by the Koala which is known to occur in areas surrounding Orange. No tree species listed in Schedule 2 of SEPP 44 as favoured Koala food trees occur on the study areas. Accordingly, there is no requirement under SEPP 44 for consideration of the study area as potential Koala habitat. In addition, the study area does not have an extant Koala population, and none is known to occur close by (BioNet, 2017). Therefore, the study area does not include ‘core’ Koala habitat and a SEPP 44 plan of management is not required.

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Attachment 1. Flora Species List

Scientific Name	Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Disturbed
CLASS FILICOPSIDA							
Pteridaceae							
Cheilanthes sieberi subsp. sierbi	Poison rock fern	●		●			
CLASS CONIFEROPSIDA							
Pinaceae							
**Pinus radiata*	Monterey Pine	●	●	●	●	●	
CLASS MAGNOLIOPSIDA							
SUBCLASS MAGNOLIIDAE							
Asteraceae							
**Arctotheca calendula*	Capeweed						●
**Cirsium vulgare*	Spear Thistle				●	●	●
**Conyza sumatrensis*	Tall Fleabane	●		●	●		
**Crepis capillaris*	Smooth Hawksbeard						●
**Hypochaeris radicata*	Flatweed				●		
**Sonchus oleraceus*	Common Sowthistle			●		●	
Boraginaceae							
**Echium plantagineum*	Paterson's Curse					●	
Chenopodiaceae							
**Chenopodium album*	Fat Hen					●	
Dysphania pumilio	Small Crumbweed					●	●
Einadia nutans	Climbing Saltbush				●		
Convolvulaceae							
Dichondra repens	Kidney Weed				●		
Cucurbitaceae							
**Citrullus lanatus*	Camel Melon						●
Malvaceae							
**Modiola caroliniana*	Red-flowered Mallow					●	
Myrtaceae							
Eucalyptus dives	Broad-leaved Peppermint			●			
Oxalidaceae							
Oxalis exilis		●		●	●		
Polygonaceae							
**Acetosella vulgaris*	Sheep Sorrel				●		●
Rosaceae							
**Rubus anglocandicans*	Blackberry			●		●	
Solanaceae							
**Solanum nigrum*	Black-berry Nightshade					●	●
Urticaceae							
Urtica incisa	Stinging Nettle				●	●	●
SUBCLASS LILIIDAE							
Poaceae							
Microlaena stipoides	Weeping Grass			●	●	●	●
**Phalaris aquatica*	Phalaris					●	
Total Native Species	**8**						
Total Introduced Species	**15**						
Total Species	**23**						

* Introduced species