# Warwick Farm Printing Project Spur Line (08_0088 MOD 1)

## Flora and Fauna Assessment

Prepared for
**Independent Print Media Group Pty Ltd**

5 August 2009

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| **PREPARED FOR** | **Independent Print Media Group Pty Ltd** |
| **PROJECT NO** | **09SUTHECO-0033** |
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# 1 Introduction

Independent Print Media Group Pty Ltd (IPMG) has an existing approval under Part 3A of the *Environmental Planning and Assessment Act 1979,* for the development of a printing, warehousing and distribution facility at 23 Scrivener Street, Warwick Farm (the site; Figure 1), within the Liverpool City Council Local Government Area (LGA). IPMG is currently seeking an amendment to the existing approval for the purpose of allowing the construction and operation of a spur line connecting the project to the Southern Sydney Freight Line (SSFL).

The SSFL is a project being undertaken by the Australian Rail and Track Corporation to construct, operate and maintain a dedicated freight line, adjacent to the existing electrified Main South Passenger Line and within the existing rail corridor, between Macarthur and Sefton.

A request to modify the Minister's approval was submitted to the Director-General who issued requirements for the environmental assessment of the proposed modification, which identified noise, soil and water, rail traffic, flora and fauna and visual impacts as key issues to be addressed. A request was submitted to the Department of Environment and Conservation (DECC) for Environmental Assessment requirements for the proposed modification, who identified flora, fauna, noise and vibration as key environmental issues which required addressing, specifically, the potential direct and indirect impacts to threatened flora and fauna species, impacts to sensitive downstream environments and mitigation and management measures were to be discussed.

This report aims to identify and address impacts to threatened flora and fauna species and their habitat, within and surrounding the site of the proposed modification and identify appropriate mitigation and management techniques to minimize these impacts.

## 1.1 STUDY AREA AND SURROUNDS

The study area includes all areas which would be either directly or indirectly impacted by the proposed modification and includes portions of the site and also includes portions of the existing rail corridor to the west and north of this area, for a distance of 150m (Figure 22). The portion of the site which would be directly impacted by the proposed development did not support any flora or fauna habitat, with this area currently consisting of an asphalt surface. Areas which currently support native flora and which may represent potential fauna habitat were considered to be restricted to the existing rail corridor.

## 1.2 PROPOSED WORKS

For the purpose of this assessment the proposed modification has been taken to involve the removal of existing vegetation, earthworks and construction within an area approximately 10 metre wide corridor, for a distance of approximately 150 metres (Figure 2).

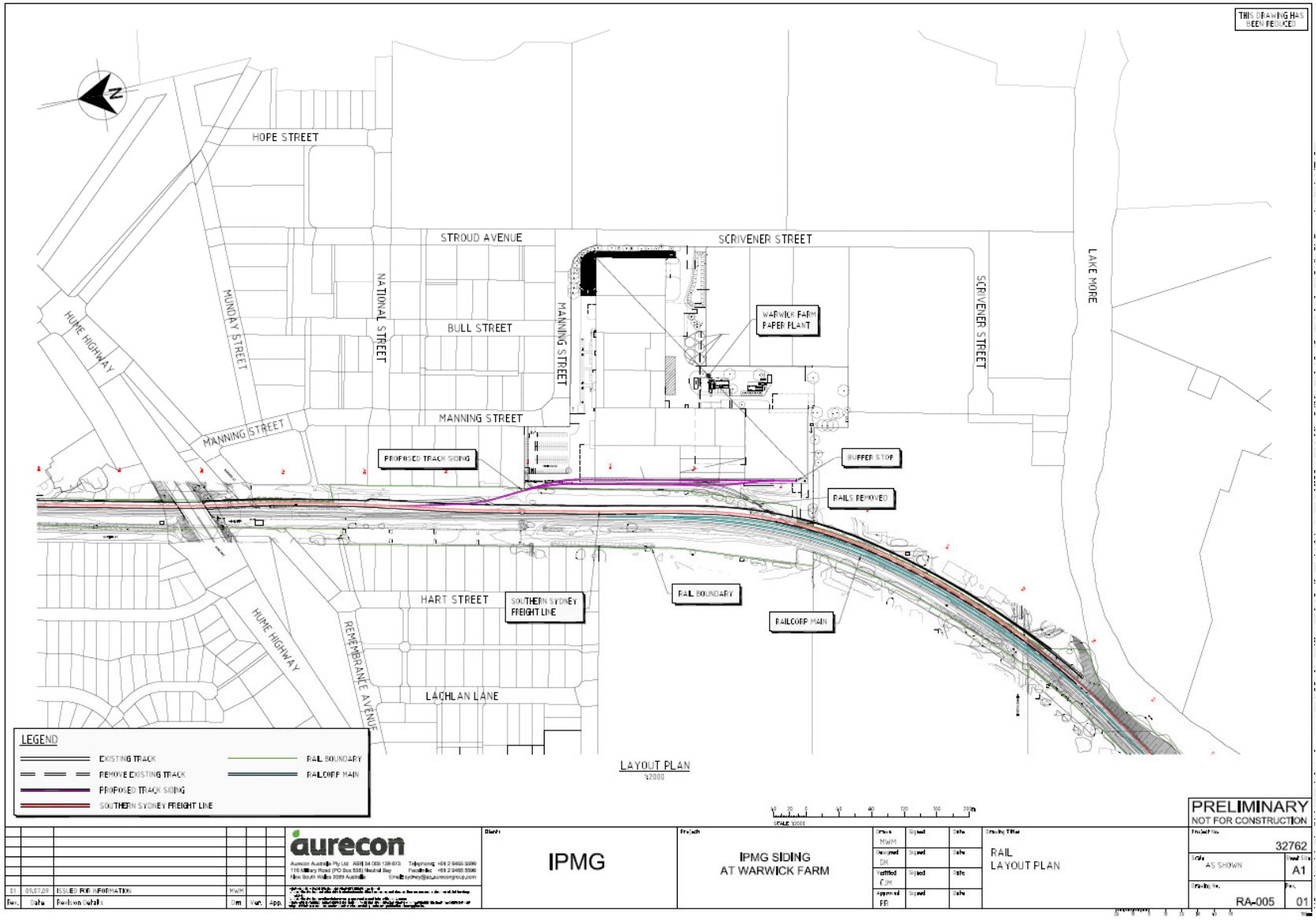


**Figure 1: Location of the proposed modification**

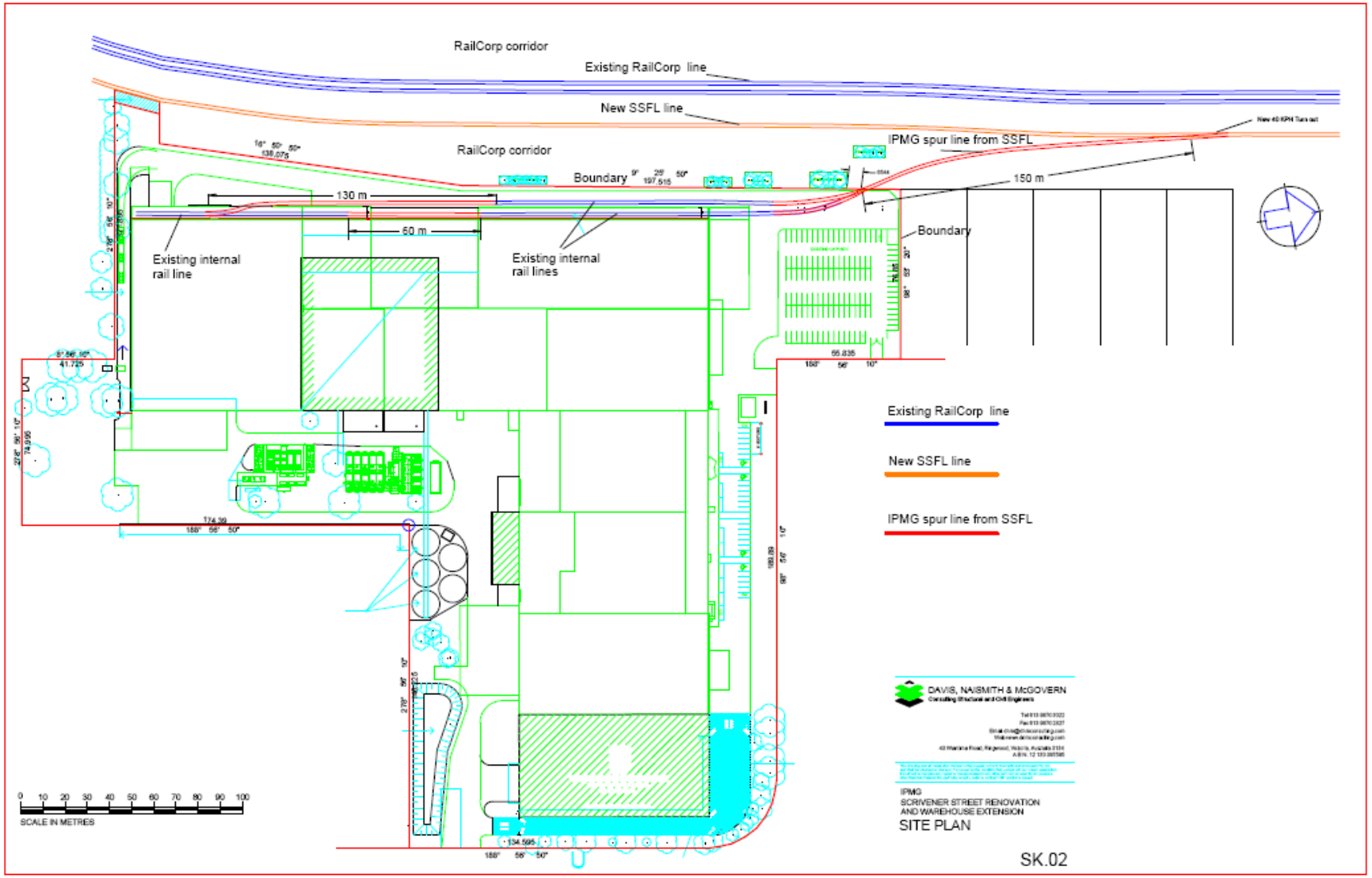


**Figure 2: Site plan**

# 2 Legislative Requirements

Commonwealth and State legislation and policies apply to the assessment, planning and management of ecological issues within the study area. A brief outline of the relevant Commonwealth and State Acts and Policies, and Local Policies, are provided below.

## 2.1 COMMONWEALTH LEGISLATION

### 2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) establishes a process for assessing the environmental impact of activities and developments where 'matters of national environmental significance' (NES) may be affected. NES matters relevant to this study include threatened species, ecological communities and migratory species (JAMBA/CAMBA/ ROKAMBA/Bonn Convention) that are listed under the Act.

Under the Act, any action which "has, will have, or is likely to have a significant impact on a matter of national environmental significance" is defined as a "controlled action", and requires approval from the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) which is responsible for administering the EPBC Act.

Actions that may have a significant impact on one or more matters of NES need to be referred to the Department under the EPBC Act. The EPBC Act referrals process can produce one of three outcomes:

i. Non-controlled action (NCA): Assessment and approval under the EPBC Act is **not required**. The project may proceed without further approval under the EPBC Act.

ii. Non-controlled action – specified manner (NCA-SM): Assessment and approval under the EPBC Act is **not required** provided the action is undertaken in a specific way (similar to conditions).

iii. Controlled Action (CA): The project will, or is likely, to have a significant impact on one or more matters of national environmental significance. The project **will require** full assessment and approval before it can proceed.

This report highlights any EPBC NES matters and advises if a referral to the federal Department of Environment, Water, Heritage and Arts (DEWHA) is required.

## 2.2 STATE LEGISLATION AND POLICIES

### 2.2.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for the state, providing a framework for the overall environmental planning, and assessment of development proposals. There are a number of pathways for development assessment and determination set out in the Act which are Part 3A, 4 and 5.

Development which is considered significant to the State is assessed and determined pursuant to Part 3A of the Act. Development assessed under Part 3A is defined in SEPP (major projects). Developments under this pathway require the preparation of an Environmental Assessment which may involve specialist reports for specific issues including ecology (flora and fauna). Draft guidelines

have been prepared by the former Department of Environment of Conservation (now DECC) and Department of Primary Industries (DPI) in relation to assessing impacts to threatened species for developments under the Part 3A pathway, including in relation to evaluating impacts to threatened species and the need to avoid, mitigate or offset impacts to threatened species.

### 2.2.2 Threatened Species Conservation Act 1995

The NSW *Threatened Species Conservation Act* (TSC Act), as amended, aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act.

Generally, the interactions between the TSC Act and the EP&A Act requires consideration (in some form) of whether a development or an activity is likely to significantly affect threatened species, populations, ecological communities or their habitats. Under Part 3A the Director-Generals requirements must be addressed in regard to species, communities and populations listed on the schedules of the TSC Act.

# 3 Methods

## 3.1 DATA AUDIT AND LITERATURE REVIEW

A review of relevant data and background literature was undertaken as an initial stage of the project, prior to field surveys. Relevant datasets and information included:

- Existing vegetation, soil and landscape mapping, as well as other available GIS data;
- Previous Environmental Assessments
- Atlas of NSW Wildlife;
- EPBC Protected Matters Search Tool;

Vegetation community descriptions for vegetation communities present within the study area were also reviewed, including vegetation descriptions from the NSW Department of Environment and Climate Change's *Southeast NSW Native Vegetation Classification and Mapping – SCIVI* report (DEC and DNR 2006) and *Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney* (NPWS 2002). Under the SCIVI descriptions, vegetation communities reviewed included Sydney Hinterland Transition Woodland and Hinterland Sandstone Gully Forest as these were the communities mapped in the study area. Using the Western Sydney mapping, vegetation communities reviewed included Upper Georges River Sandstone Woodland, Western Sandstone Gully Forest and Sandstone Ridgetop Woodland (as mapped for the study area).

Additional to the review of vegetation community descriptions and datasets, aerial photography of the study area was reviewed prior to the field survey.

A search of the online EPBC Protected Matters Search Tool and Atlas of NSW Wildlife was performed on 8/07/09. Searches used a radius of 5 km around latitude -33.9166 and longitude 150.9348 (Datum GDA94).

Species from both searches were combined to produce a list of threatened species that may possibly occur within the study area. The likelihood of occurrences for threatened species, endangered populations and communities in the study area were then assessed based on the habitat characteristics of the study area (determined from site assessment) and knowledge of the species' ecology, to limit the list of threatened species to potentially "affected species".

Five terms for the likelihood of occurrence of species are used in this report, as defined below:

- "yes" = the species was or has been observed in the study area.
- "likely" = a medium to high probability that a species uses the study area.
- "potential" = suitable habitat for a species occurs in the study area, but there is insufficient information to categorise the species as likely, or unlikely to occur.
- "unlikely" = a very low to low probability that a species uses the study area.
- "no" = habitat in the study area and in the vicinity is unsuitable for the species.

## 3.2 SITE ASSESSMENT

A site assessment was conducted by Eco Logical Australia ecologists, Luke Geelen, on 8 July 2009 over 2 person hours. During the site assessment, the entire study area was traversed and all flora

species observed were recorded including notes on structure and disturbance. All fauna species encountered during random traverses were recorded, and notes on habitat taken.

### 3.3 SURVEY LIMITATIONS

The field survey component of this flora and fauna assessment was undertaken over a single day and during daylight hours only. As such, some species which utilize the study area may have been absent during the field survey as some species may utilise the study area seasonally, are only detectable during certain seasons, are nocturnal or are only active in warmer weather. Taking into account these limitations, the aim of this field survey is to provide a list of species present and assess the potential habitat for threatened species not detected within the study area.

# 4 Results

## 4.1 VEGETATION COMMUNITIES

The vegetation of the study area is highly modified as a result of previous clearing and ongoing maintenance within the rail corridor, with exotic species dominant and no canopy species present. The majority of the study area consists of areas of exotic groundcover and low shrub species including *Bidens pilosa* (Cobblers Peg), *Rubus fruiticosus* agg. (Blackberry), *Cirsium vulgare* (Spear Thistle), *Pennisetum clandestinum* (Kikuyu) and *Setaria* sp. (Pigeon Grass), with only taller shrubs present within isolated patches close to the boundary between the rail corridor and the site. Native vegetation was restricted to isolated patches of groundcover and shrub species within the rail corridor including *Acacia falcata*, *Acacia pubescens* (Downy Wattle), *Bursaria spinosa* (Blackthorn), *Dillwynia sieberi*, *Melaleuca decora* and *Themeda australis* (Kangaroo Grass).

The isolated patches of native vegetation include species characteristic of the Cumberland Plain Wooldand vegetation community. These isolated patches of shrubs are not considered representative of this community as they are highly disturbed and lack the structure or floristics of this community. The isolated patches of native shrubs have not been mapped as part previous mapping projects or environmental assessments including NPWS (2002), DEC and DNR (2006) and Parsons Brinckerhoff (2006).

## 4.2 FLORA

A total of 36 flora species were identified during field survey, including 8 native and 28 exotic species (Appendix B). One of these flora species, *Acacia pubescens*, is listed as vulnerable on the EPBC Act and TSC Act. Three clumps of Acacia pubescens co-occurring with other native shrub species listed above were recorded outside the direct impact area. The locations of these individuals in relation to the proposed modification are shown in Figure 3. In addition to *Acacia pubescens*, another 14 threatened flora species have been recorded, or potential habitat has been recorded, within a 5 km radius of the study area (Appendix A). Of these 14 species it was considered unlikely that any of these species occur within the study area.

One noxious weed species, Blackberry, which is listed under the *Noxious Weeds Act 1993* in the Liverpool LGA was recorded during the site inspection. This species is a category 4 noxious weed requiring the growth and spread of the plant to be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed.

## 4.3 FAUNA

Eight bird species were recorded during the site inspection, including seven native and one exotic species (Appendix C). None of these species are listed as threatened under the EPBC or TSC Act and are common species able to tolerate disturbance.

A total of 26 threatened fauna species have been recorded, or potential habitat has been recorded, within a 5 km radius of the study area (Appendix A). Of these 26 species it was considered unlikely that any of these species occur within the study area.

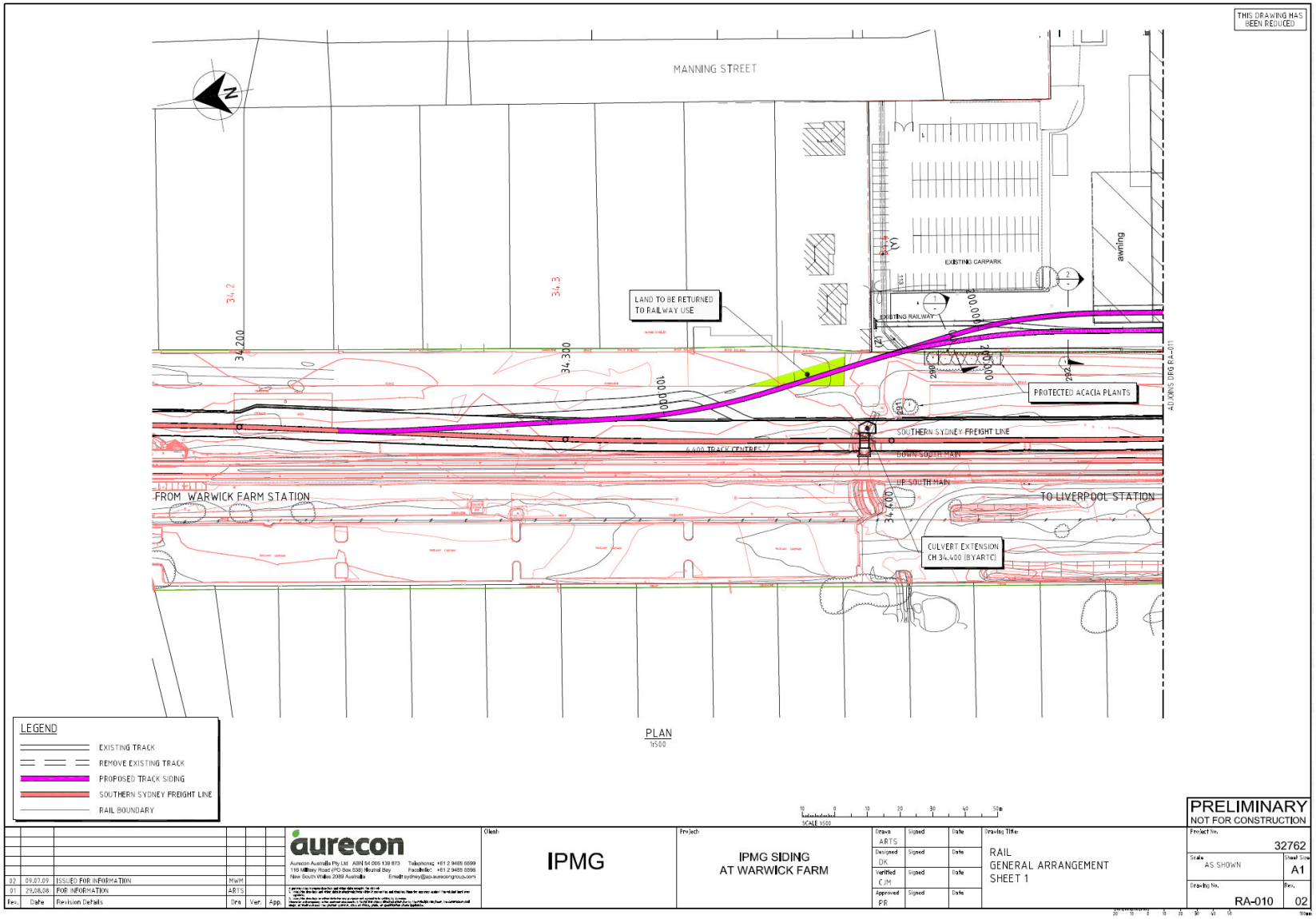


**Figure 3: Indicative locations of clumps of *Acacia pubescens***

## 4.4 HABITAT ELEMENTS

Habitat elements for flora and fauna within the study area were limited to isolated patches of native shrub-layer vegetation and sparse ground-cover vegetation. Other habitat elements which may be utilized by flora and fauna such as an intact canopy layer, hollow-bearing trees, stags, leaf litter, woody debris (fallen logs and braches) or permanent or intermittent drainage depressions were absent from the study area. The absence of these and other habitat elements as well as the ongoing disturbance from trains and other works in the rail corridor were considered to contribute to the reduction in habitat value of the study area. In general, the study area was considered to represent minimal habitat for common species able to tolerate disturbance.

# 5 Evaluation of Impacts

## 5.1 SUMMARY OF IMPACTS

Possible direct and indirect impacts of the proposed modifications were determined to include the following:

- a loss of ground cover and shrub-layer vegetation within the rail corridor
- increased exposure to wind and light for retained vegetation including *Acacia pubescens*
- alteration to surface hydrology for retained vegetation including *Acacia pubescens*
- reduced opportunities for dispersal for retained vegetation
- sedimentation of surrounding water bodies
- spread of weed propagules

The vegetation which would be directly impacted by the proposed works would be limited to exotic groundcover and shrub layer vegetation. No native species, including *Acacia pubescens*, would be removed as part of the proposed works. The clumps of native vegetation within the study area would be retained as part of the proposed modification. The exotic vegetation to be removed is not considered to represent significant habitat for any fauna species.

The proposed modification does not involve major changes to surface levels and hence hydrology in proximity to the clumps of native vegetation including *Acacia pubescens* (Figure 4). It is considered unlikely that any minor changes to surface hydrology that may arise will significantly impact upon the current occurrences of *Acacia pubescens* and other native vegetation as they do not appear to occur in response to increased drainage. Other indirect impacts including light and wind are not considered significant as the current occurrences of native vegetation including *Acacia pubescens* are already subject to increased light and wind exposure and limited opportunities for dispersal as a result of the operation of the Main South Passenger Line. With appropriate controls during construction to avoid damage to the root base or accidental damage, impacts to the clumps of native vegetation including *Acacia pubescens* could be avoided.

There are a number of waterbodies surrounding the study area including the Georges River. The potential for impacts to these waterbodies and the sensitive ecosystems they support is considered minimal due to the relatively flat nature of the rail corridor within the study area and separation of the study area from these waterbodies by a relatively large distance including urban and industrial developments. Furthermore, the controls to be implemented in regard to drainage from the study area (Figure 4) should prevent movement of contaminated soil or water from the study area into surrounding water bodies.

The proposed modification would involve working in areas which are currently infested by a large number of exotic species including the noxious weed Blackberry. The works in these areas of weed infestation may result in the spread of these weed species and controls to avoid the spread of these weeds will be required.

## 5.2 SIGNIFICANCE ASSESSMENTS UNDER THE EPBC ACT

The Significance Assessment for *Acacia pubescens* determined that the species would not be significantly impacted by the proposed modification (Appendix D) for the following reasons, provided that clumps are fenced off and protected from indirect impacts during construction works:

- as all individuals, clumps and stems of this species would be retained as part of the proposed modification;
- the area to be directly impacted is currently highly modified and supports a large number of exotic species; and
- The proposal would not fragment or disrupt the breeding cycle of the population with the study area.

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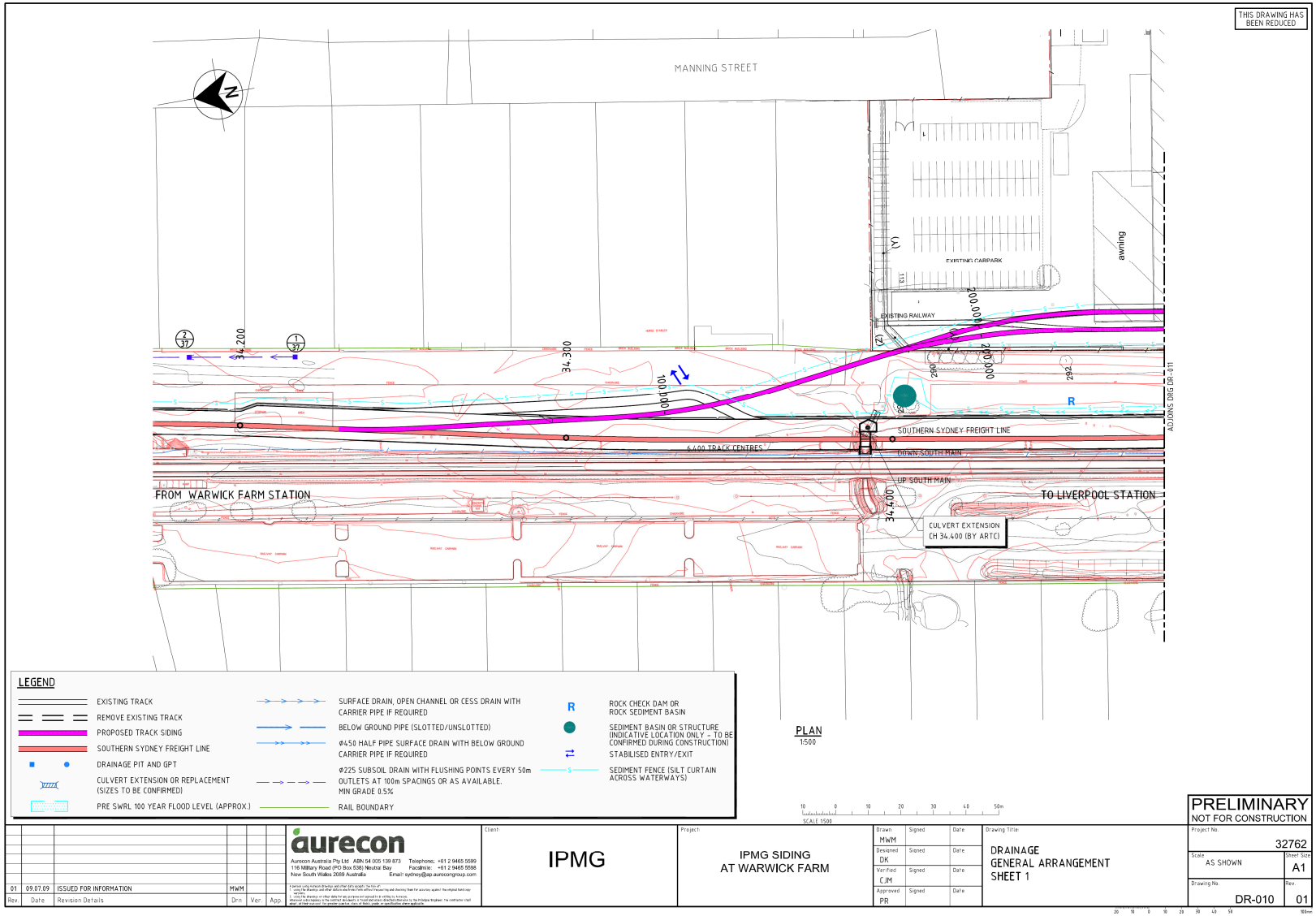


**Figure 4: Drainage control measures**

# 6 Conclusions and Recommendations

The survey conducted for this study demonstrated that the vegetation of study area was highly disturbed and was dominated by exotic species, although one native flora species (*Acacia pubescens*) is listed as vulnerable under both the TSC and EPBC Acts and is present on the site. The highly disturbed study area also contained limited habitat for common and disturbance tolerant fauna species.

The impact of the proposed modification was assessed in relation to *Acacia pubescens* and it was concluded that this species would not be significantly impacted upon by the proposed modification. The following recommendations are made to ensure that impacts to *Acacia pubescens* and other native vegetation and downstream environments are avoided:

- Clumps of native vegetation containing *Acacia pubescens* will be fenced prior to the commencement of any works associated with the proposed modification. Within the fenced location no works will be undertaken so that the following impacts do not occur: soil compaction, alterations to soil moisture and soil inversion.
- Drainage control measures as indicated in Figure 4 will be in place prior to any construction works commencing. Control measures will be regularly inspected to ensure they are working correctly, particularly following any rainfall events. These control measures will be constructed to capture any soil or water leaving the study area.
- Weed control will be undertaken as part of and following construction works to prevent the establishment of exotic species within areas disturbed by the proposed modification. This will include as a minimum removal of existing noxious weeds within the study area, destruction of weed material removed from the construction site, washing down vehicles and equipment working in weed infested areas and measures to prevent establishment of weed species in newly created bare ground including planting of native species.

# References

DEC and DNR (2006). *Southeast NSW Native Vegetation Classification and Mapping – SCIVI*. NSW Department of Environment and Conservation and Department of Natural Resources.

National Parks and Wildlife Service (2002). Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney. Final Edition. NSW National Parks and Wildlife Service, Hurstville.

National Parks and Wildlife Service (2003). *Acacia pubescens* (Downy Wattle) Recovery Plan. National Parks and Wildlife Service, Hurstville.

Parsons Brinckerhoff Australia Pty Limited (2006). Southern Sydney Freight Lone Environmental Assessment. Report prepared for ARTC dated April 2006.

# Appendix A

## ENDANGERED ECOLOGICAL COMMUNITIES AND THREATENED SPECIES IN THE REGION

Searches of the Atlas of NSW Wildlife and EPBC Protected Matters search tool were performed for the study area on 14/07/09. Searches used a radius of 5 km around latitude -33.9166 and longitude 150.9348 (Datum GDA94)

The results from both searches were compiled into a list of potentially occurring species, populations and communities that may possibly occur within the study area.

The likelihood of occurrence was considered for all listed species, populations and communities, and is provided for each under the 'likely' column. The terms for likelihood of occurrence are defined below:

Y = yes: the species was observed in the study area during survey or has been previously observed (NSW Atlas data)
L = likely: a medium to high probability that a species uses the study area
P = potential: suitable habitat for a species occurs in the study area, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
U = unlikely: a very low to low probability that a species uses the study area
N = no: habitat in the study area and in the vicinity is unsuitable for the species.

Species, populations and communities considered to have the potential to occur, are likely to occur, or do occur are highlighted in yellow.

TSC Status = Listing under the Threatened Species Conservation Act 1995
EPBC Status = Listing under the Environment Protection and Biodiversity Conservation Act 1999
CE = Critically Endangered
E = Endangered
V = Vulnerable
M = Migratory

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| **ENDANGERED ECOLOGICAL COMMUNITIES** | | | | | |
| Cumberland Plain Woodland | | E | E | Occurs on soils derived from shale on the Cumberland Plain | U |
| **DIURNAL BIRDS** | | | | | |
| *Rostratula australis* | Australian Painted Snipe | E | V, M | Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. Breeding is often in response to local conditions; generally occurs from September to December. Roosts during the day in dense vegetation. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter. | U |
| *Melithreptus gularis gularis* | Black-chinned Honeyeater (eastern subspecies) | V | – | Predominantly associated with box-ironbark association woodlands and River Red Gum (NSW Scientific Committee, 2001c). Also associated with drier coastal woodlands of the Cumberland Plain and the Hunter, Richmond and Clarence Valleys (NSW Scientific Committee, 2001c). | U |
| *Ephippiorhynchus asiaticus* | Black-necked Stork | E | – | Associated with tropical and warm temperate terrestrial wetlands, estuarine and littoral habitats, and occasionally woodlands and grasslands floodplains (Marchant & Higgins 1993). Forages in fresh or saline waters up to 0.5m deep, mainly in open fresh waters, extensive sheets of shallow water over grasslands or sedgeland, mangroves, mudflats, shallow swamps with short emergent vegetation and permanent billabongs and pools on floodplains (Marchant & Higgins 1993; NPWS 2005g). | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Ninox connivens* | Barking Owl | V | – | Associated with a variety of habitats such as savanna woodland, open eucalypt forests, wetland and riverine forest. The habitat is typically dominated by Eucalypts (often Redgum species), however often dominated by Melaleuca species in the tropics (NPWS 2003). It usually roosts in dense foliage in large trees such as River She-oak (Allocasuarina cunninghamiana), other Casuarina and Allocasuarina, eucalypts, Angophora, Acacia and rainforest species from streamside gallery forests (NPWS 2003). It usually nests near watercourses or wetlands (NPWS 2003) in large tree hollows with entrances averaging 2-29 metres above ground, depending on the forest or woodland structure and the canopy height (Debus 1997). | U |
| *Ninox strenua* | Powerful Owl | V | – | Powerful Owls are associated with a wide range of wet and dry forest types with a high density of prey, such as arboreal mammals, large birds and flying foxes. Large trees with hollows at least 0.5m deep are required for shelter and breeding. | U |
| *Xanthomyza phrygia* | Regent Honeyeater | E | E, M | Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of River Oak (*Casuarina cunninghamiana*). Areas containing Swamp Mahogany (*Eucalyptus robusta*) in coastal areas have been observed to be utilised. The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes. As such it is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar. | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Lathamus discolour* | Swift Parrot | E | E | Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts during autumn and winter. Favoured feed trees include species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*), and White Box (*E. albens*). | U |
| **FROGS** | | | | | |
| *Heleioporus australiacus* | Giant Burrowing Frog | V | V | Forages in woodlands, wet heath, dry and wet sclerophyll forest. Associated with semi-permanent to ephemeral sand or rock based streams, where the soil is soft and sandy so that burrows can be constructed. | N |
| *Litoria aurea* | Green and Golden Bell Frog | E | V | This species has been observed utilising a variety of natural and man-made waterbodies such as coastal swamps, marshes, dune swales, lagoons, lakes, other estuary wetlands, riverine floodplain wetlands and billabongs, stormwater detention basins, farm dams, bunded areas, drains, ditches and any other structure capable of storing water. Fast flowing streams are not utilised for breeding purposes by this species. Preferable habitat for this species includes attributes such as shallow, still or slow flowing, permanent and/or widely fluctuating water bodies that are unpolluted and without heavy shading. Large permanent swamps and ponds exhibiting well-established fringing vegetation (especially bulrushes–Typha sp. and spikerushes–Eleocharis sp.) adjacent to open grassland areas for foraging are preferable. Ponds that are typically inhabited tend to be free from predatory fish such as Mosquito Fish (*Gambusia holbrooki*). | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Litoria raniformis* | Southern Bell Frog | E | V | Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys | N |
| **REPTILES** | | | | | |
| *Hoplocephalus bungaroides* | Broad-headed Snake | E | V | Typical sites consist of exposed sandstone outcrops and benching where the vegetation is predominantly woodland, open woodland and/or heath on Triassic sandstone of the Sydney Basin. They utilise rock crevices and exfoliating sheets of weathered sandstone during the cooler months and tree hollows during summer. Some of the canopy tree species found to regularly co-occur at known sites include *Corymbia eximia, C. gummifera, Eucalyptus sieberi, E. punctata* and *E. piperita*. | N |
| **MAMMALS (EXCLUDING BATS)** | | | | | |
| *Phascolarctos cinereus* | Koala | V | – | Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% (Reed et al. 1990), with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: *Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis* | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Dasyurus maculatus* | Spotted-tailed Quoll | V | E | The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests, more frequently recorded near the ecotones of closed and open forest. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in. Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows. | N |
| *Potorous tridactylus tridactylus* | Long-nosed Potoroo | V | V | Known from coastal heathy woodland but also occurs in rainforest, wet sclerophyll and coastal wallum. Dense cover for shelter adjacent to open areas for foraging | N |
| *Petrogale penicillata* | Brush-tailed Rock-wallaby | E | V | Rocky areas in a variety of habitats, typically north facing sites with numerous ledges, caves and crevices. | N |
| **MAMMALS (BATS)** | | | | | |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | The Large-eared Pied Bat has been recorded in a variety of habitats, including dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests. This species roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces. | U |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | | V | Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. | U |
| **MIGRATORY TERRESTRIAL SPECIES LISTED UNDER EPBC ACT** | | | | | |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | — | M | Forages over large open fresh or saline waterbodies, coastal seas and open terrestrial areas. Breeding habitat consists of tall trees, mangroves, cliffs, rocky outcrops, silts, caves and crevices and is located along the coast or major rivers. Breeding habitat is usually in or close to water, but may occur up to a kilometre away. | N |
| *Hirundapus caudacutus* | White-throated Needletail | — | M | Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas. Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather. | U |
| *Merops ornatus* | Rainbow Bee-eater | — | M | Resident in coastal and subcoastal northern Australia; regular breeding migrant in southern Australia, arriving September to October, departing February to March, some occasionally present April to May. Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs. Nest is a chamber a the end of a burrow, up to 1.6 m long, tunnelled in flat or sloping ground, sandy back or cutting. | U |
| *Monarcha melanopsis* | Black-faced Monarch | — | M | Rainforest and eucalypt forests, feeding in tangled understorey. | U |
| *Myiagra cyanoleuca* | Satin Flycatcher | — | M | Heavily vegetated gullies in forests, and taller woodlands of coastal south-east Australia. Also occurs in various sites during migration including farms and parks | U |
| *Rhipidura rufifrons* | Rufous Fantail | — | M | The Rufous Fantail is a summer breeding migrant to southeastern Australia. The Rufous Fantail is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation. Open country may be used by the Rufous Fantail during migration. | U |
| **MIGRATORY WETLAND SPECIES LISTED UNDER EPBC ACT** | | | | | |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Ardea alba* | Great Egret | — | M | The Great Egret is common and widespread in Australia. It forages in a wide range of wet and dry habitats including permanent and ephemeral freshwaters, wet pasture and estuarine mangroves and mudflats. | U |
| *Ardea ibis* | Cattle Egret | — | M | Cattle Egrets forage on pasture, marsh, grassy road verges, rain puddles and croplands, but not usually in the open water of streams or lakes and they avoid marine environments. Some individuals stay close to the natal heronry from one nesting season to the next, but the majority leave the district in autumn and return the next spring. Cattle Egrets are likely to spend the winter dispersed along the coastal plain and only a small number have been recovered west of the Great Dividing Range. | N |
| *Gallinago hardwickii* | Latham's Snipe | — | M | A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover. Occupies a variety of vegetation around wetlands including wetland grasses and open wooded swamps. | N |
| **PLANTS** | | | | | |
| *Acacia pubescens* | Downy Wattle | V | V | Associated with on Cumberland Plains Woodlands, Shale / Gravel Forest and Shale / Sandstone Transition Forest. Clay soils, often with ironstone gravel (NPWS 1997, Benson and McDougall 1996). | Y |
| *Caladenia tessellata* | Thick Lip Spider Orchid | E | V | Occurs in grassy sclerophyll woodland, often growing in well-structured clay loams or sandy soils south from Swansea. Usually in sheltered moist places, in areas of increased sunlight. | U |
| *Callistemon linearifolius* | Netted Bottlebrush | V | — | Grows in dry sclerophyll forest on the coast and adjacent ranges. *C. linearifolius* has been recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Diuris aequalis* | Buttercup Doubletail | E | V | Montane eucalypt forest with a grassy-heathy understorey, growing in gravelly clay loam, often on gentle slopes (Bishop 1996). Recorded in forest, low open woodland with grassy understorey and secondary grassland on the higher parts of the Southern and Central Tablelands (DEC 2005bb). Always grows with small-flowered wedge-pea (Gompholobium sp) (ibid). Flowers between mid-Oct and mid-Nov in the southern part of its range, between mid-Nov and early Dec north of Abercrombie. | U |
| *Eucalyptus nicholii* | Narrow-leaved Black Peppermint | V | V | Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite (DEC 2005aq). This species is widely planted as an urban street tree and in gardens but is quite rare in the wild (DEC 2005aq). It is confined to the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield (DEC 2005aq). | U |
| *Grevillea parviflora* subsp. *parviflora* | Small flower Grevillea | V | V | Sporadically distributed throughout the Sydney Basin with the main occurrence centred around Picton, Appin and Bargo (and possibly further south to the Moss Vale area). Separate populations are also known further north from Putty to Wyong and Lake Macquarie on the Central Coast and Cessnock and Kurri Kurri in the Lower Hunter. Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests | U |
| *Hibbertia* sp. Bankstown (R.T.Miller & C.P.Gibson s.n. 18/10/06) | | — | CE | Only known from Bankstown Airport within the Bankstown Local Government Area (LGA) south-west of Sydney, NSW. Since 1986, comprehensive vegetation surveys have occurred throughout remnant vegetation in the Bankstown Local Government Area and no further sites of this species have been located. | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Leucopogon exolasius* | Woronora Beard Heath | V | V | Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park. The plant occurs in woodland on sandstone | N |
| *Marsdenia viridiflora* subsp. *viridiflora* | *M. viridiflora* subsp. *viridiflora* in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpol and Penrith LGAs. | E | — | Grows in vine thickets and open shale woodland. | U |
| *Melaleuca deanei* | Deane's Paperbark | V | V | Found in heath on sandstone, and also associated with woodland on broad ridge tops and slopes on sandy loam and lateritic soils. | N |
| *Persoonia hirsuta* | Hairy Geebung | E | E | This species occurs in dry sclerophyll eucalypt woodland/forest, and in shrub-woodland. It grows in sandy to stony soils derived from sandstone or very rarely on shale, from near sea level to 600 m altitude. | U |
| *Persoonia nutans* | | E | E | Associated with dry woodland, Castlereagh Scribbly Gum Woodland, Agnes Banks Woodland and sandy soils associated with tertiary alluvium, occasionally poorly drained (Benson and McDougall 2000). Endemic to the Western Sydney (Benson and McDougall 2000). | U |
| *Pimelea spicata* | | E | E | In western Sydney, it occurs on an undulating topography of well structured clay soils, derived from Wianamatta shale (DEC 2004). It is associated with Cumberland Plains Woodland (CPW), in open woodland and grassland often in moist depressions or near creek lines. Has been located in disturbed areas that would have previously supported CPW. | U |

| Scientific Name | Common Name | Conservation Significance | | Habitat Associations | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | TSC Act | EPBC Act | | |
| *Pultenaea pedunculata* | | E | | Widespread in other states. In NSW grows in dry sclerophyll forest and disturbed sites on a variety of soils on the South Coast and edge of the Southern Tableland, but with disjunct restricted populations on Wianamatta Shale on the Cumberland Plain. | U |
| *Thelymitra sp. Kangaloon (D.L.Jones 18108)* | Kangaloon Sun-orchid | | CE | Restricted distribution in the Fitzroy Falls – Kangaloon area (600-700m). Found among tall sedges and rushes in grey silty soils in open swamps that are seasonally wet | U |
| Disclaimer: Data extracted from the Atlas of NSW Wildlife and DEW Protected Matters Report are only indicative and cannot be considered a comprehensive inventory. 'Migratory marine species' and 'listed marine species' listed on the EPBC Act (and listed on the DEW protected matters report) have not been included in this table, since they are considered unlikely to occur within the study area due to the absence of marine habitat. | | | | | |

# Appendix B

## FLORA RECORDED DURING FIELD SURVEY

Key:

- * preceding the scientific names indicates an exotic species;
- Vulnerable indicates a species listed as Vulnerable under Schedule 2 of the TSC Act and under the Commonwealth EPBC Act;

| Family | *Scientific name* | Scientific Name | Status | Inside direct impact area | Outside direct impact area |
|---|---|---|---|---|---|
| Apiaceae | **Foeniculum vulgare* | Fennel | | X | |
| Apocynaceae | **Araujia sericifera* | Moth Vine | | | X |
| Asteraceae | **Bidens pilosa* | Cobblers Peg | | X | |
| | **Cirsium vulgare* | Spear Thistle | | X | |
| | **Conyza bonariensis* | | | | X |
| | **Senecio madagascariensis* | Fireweed | | X | X |
| | **Tagetes minuta* | Stinking Roger | | X | |
| Fabaceae - Faboideae | *Dillwynia sieberi* | Parrot Pea | | | X |
| | **Medicago polymorpha* | Burr Medic | | X | |
| | **Vicia sativa* | Vetch | | X | |
| Fabaceae - Mimosoideae | *Acacia falcata* | | | | X |
| | *Acacia pubescens* | Downy Wattle | Vulnerable | | X |
| | **Acacia saligna* | Golden Wreath Wattle | | | X |
| Lauraceae | **Cinnamomum camphora?* | Camphor Laurel | | | X |

| Family | *Scientific name* | Scientific Name | Status | Inside direct impact area | Outside direct impact area |
|---|---|---|---|---|---|
| Malaceae | **Pyracantha angustifolia* | Firethorn | | | X |
| Malvaceae | **Malva parviflora* | Small-flowered Mallow | | X | |
| | **Modiola caroliniana* | Red mallow | | X | |
| | **Sida rhombifolia* | Paddy's Lucerne | | | X |
| Myrtaceae | *Callistemon salignus* | Bottlebrush | | | X |
| | *Kunzea capitata* | | | | X |
| | *Melaleuca decora* | Snow in Summer | | | X |
| Pittosporaceae | *Bursaria spinosa* | Blackthorn | | | X |
| Plantaginaceae | **Plantago lanceolata* | Plantain | | X | X |
| Poaceae | **Andropogon virginicus* | Whiskey Grass | | | X |
| | **Pennisetum clandestinum* | Kikuyu | | X | X |
| | **Setaria sp.* | Pigeon Grass | | X | X |
| | *Themeda australis* | Kangaraoo Grass | | | X |
| Rosaceae | **Rubus fruiticosus agg.* | Blackberry | | X | |
| Rubiaceae | **Galium aparine* | Cleavers | | X | |
| Solanaceae | **Solanum nigrum* | Blackberry Nightshade | | X | X |
| Verbenaceae | **Verbena bonariensis* | Purpletop | | X | |

# Appendix C

## FAUNA RECORDED DURING FIELD SURVEY

| Species Name | Common Name | Status |
|---|---|---|
| *Grallina cyanoleuca* | Magpie-lark | |
| *Malurus cyaneus* | Superb Fairy-wren | |
| *Anthochaera carunculata* | Red Wattlebird | |
| *Corvus mellori* | Little Raven | |
| **Acridotheres tristis* | Indian Myna | |
| **Passer domesticus* | House Sparrow | |
| **Streptopelia chinensis* | Spotted Turtle-Dove | |
| *Trichoglossus haematodus* | Rainbow Lorikeet | |

Note: * indicates an exotic species

# Appendix D

## EPBC ACT ASSESSMENT OF SIGNIFICANCE

The EPBC Act Administrative Guidelines on Significance set out 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World heritage properties
- National heritage places
- Nuclear actions

Specific 'Significant Impact Criteria' are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as endangered and vulnerable under the EPBC Act.

### *ACACIA PUBESCENS* (DOWNY WATTLE)

*Acacia pubescens* (Downy Wattle) is a vulnerable species listed under the TSC and EPBC Acts. It is a spreading to slightly weeping shrub 1-5 m high with bipinnate leaves and conspicuously hairy branchlets and is chiefly restricted to the Cumberland Plain. It occurs in open woodland and forest, in a variety of plant communities, typically on alluviums, shales and at the intergrades between shales and sandstones (NPWS 2003).

*Acacia pubescens* is a clonal species and appears to sucker at many sites resulting in dense patches of the species, several metres wide, although consisting of one or few individuals. The extent to which *Acacia pubescens* is self pollinating or outbreeding is unknown, although hybridization with *Acacia baileyana* suggests at least some level of outbreeding (NPWS 2003). Flowering occurs from August to October with pods mature from October to December, although this species has been observed to rarely produce pods, suggesting resources are directed towards vegetative spread and growth. Seeds of this species are thought to be long lived and persist in dormant seed banks for long periods of time. As with other Acacia species seed germination is though to be linked to fire, although this has not been investigated for this species (NPWS 2003)

There are many threats to the species, including loss of habitat, degradation of habitat (through weed invasion, mechanical damage, rubbish dumping, track creation, inappropriate fire regimes), disease and hybridisation. Furthermore, this species is considered to be vulnerable as its distribution is highly fragmented and it largely occurs on land where the future use is likely to change and threaten its continued survival.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will lead to any of the following:

**Criterion 1: lead to a long-term decrease in the size of an important population of a species;**

An important population is defined as '*a population that is necessary for a species' long term survival and recovery*.' This may include populations identified in recovery plans, key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity and populations near the limit of the species range. NPWS (2003) states that seed dispersal for this species is limited, although considers individuals within 300m as part of the same population. While not all areas within 300m of the clumps within the study area have been surveyed, for the purpose of this assessment it has been assumed that the local population includes the three clumps within the study area. It is considered that the population within the study are may be important for maintaining genetic diversity for this species, especially given the clonal nature of the species.

The proposed modification will not remove any of the clumps of *Acacia pubescens* within the study area and would only impact upon currently disturbed areas surrounding these clumps. As such, the proposed modification is unlikely to lead to any decrease in the long-term survival of a population of this species.

**Criterion 2: reduce the area of occupancy of an important population;**

The proposed modification will not remove any of the clumps of *Acacia pubescens* within the study area and would only impact upon currently disturbed areas surrounding these clumps. As such, the proposed modification would not reduce the area of occupancy for a population of this species.

**Criterion 3: fragment an existing important population into two or more populations;**

The proposed modification would not fragment the existing clumps of *Acacia pubescens*. The population of Acacia pubescens within the study area is currently isolated by the disturbed nature of the existing rail corridor and surrounding industrial development. The existing disturbance to areas within the rail corridor means that the population within the study area currently has limited opportunities for dispersal and recruitment. The proposed modification would further reduce opportunities for spread to the north, although it is considered unlikely this would have occurred due to the dominance of exotic species within the disturbed area to the north. Opportunities for dispersal to the south would remain unaffected.

**Criterion 4: adversely affect habitat critical to the survival of a species;**

No critical habitat has been declared for this species

**Criterion 5: disrupt the breeding cycle of an important population;**

Disruption to the breeding cycle of *Acacia pubescens* may arise from impacts to pollinators, seed dispersal agents and impacts to mature affecting flowering or seed production. The proposed modification does not involve impacts to mature individuals and would thereby not affect flowering or seed production. It is also considered unlikely the proposed modification would significantly impact upon pollinators given the current level of disturbance to the rail corridor.

**Criterion 6: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;**

The areas which would be directly impact by the proposed modification are highly degraded and as such are not considered habitat for this species. The loss of these degardaded areas is considered unlikely to cause the local population or the species as a whole to decline.

**Criterion 7: result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;**

Degradation of habitat, including weed invasive, is a recognised threat for *Acacia pubescens*. The potential for weed species to become established surrounding and within the clumps of Acacia pubescens and other native vegetation is high given the current levels of exotic species and the disturbance associated with the proposed modification to areas adjacent to these clumps of *Acacia pubescens*. As such measures to prevent further establishment of exotic species should be undertaken as part of the proposed modification including removal of existing noxious weeds and measures to prevent establishment of weed species in newly created bare ground including planting of native species.

**Criterion 8: introduce disease that may cause the species to decline; or**

*Acacia pubescens* is known to be affected by an unknown disease which affects the leaves of plants (T. James *pers comm*. in NPWS 2003). The fencing off of *Acacia pubescens* clumps during construction and the exclusion of people and machinery from these areas should prevent the spread of disease.

**Criterion 9: interfere substantially with the recovery of the species.**

The proposed modification is not in conflict with the aims and objectives of the Recovery Plan for this species. The proposed modification is not considered to substantially interfere with the recovery of this species as no individuals will be removed and provided that clumps of *Acacia pubescens* are fenced and protected from indirect impacts during construction works.

**Conclusions**

As no clumps, individuals, or stems of *Acacia pubescens* will be removed as part of the proposed modification, and provided clumps are fenced off and protected from indirect impacts, there is unlikely to be a significant impact upon *Acacia pubescnes*. No referral to the DEWHA for assessment and approval by the Minister for the Environment, Heritage and the Arts is necessary.

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