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North West Rail Link
Tallawong Road, Schofields

Tallawong Road Rapid Transit Rail Facility

Flora & Fauna Assessment Report

28 June 2013

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NORTH WEST RAIL LINK
TALLAWONG ROAD, SCHOFIELDS

TALLAWONG ROAD RAPID TRANSIT RAIL FACILITY

FLORA & FAUNA ASSESSMENT REPORT

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PART A INTRODUCTION & INFORMATION BASE

1 INTRODUCTION

1.1 The Tallawong Road Site

The land which is the subject of this *Flora & Fauna Assessment Report* (FFAR) is the proposed site of the Tallawong Road Rapid Transit Rail Facility (RTRF), which is a component of the North West Rail Link (NWRL). The *Concept Plan Approval* for the NWRL project was granted by the then Minister for Planning on 6 May 2008 as a *Staged Infrastructure Approval* - pursuant to Part 5.1 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

The major civil construction works (Stage 1) for the NWRL project have since been approved, and an application for Stage 2 (Stations, Rail Infrastructure and Systems) was lodged with the Department of Planning & Infrastructure (on 30 October 2012).

The Tallawong Road RTRF site is located to the west of the Rouse Hill Regional Centre, in the northwestern suburbs of Sydney (Figure 1), and occupies a total area of approximately 52 hectares. It is located between:

- Tallawong Road – to the east;
- Schofields Road – to the south;
- First Ponds Creek – to the west; and
- existing agricultural lands – to the north.

1.2 Background

Much of the subject site for the Tallawong Road RTRF had been the subject of investigations and studies for the two *Environmental Impact Statements* (EISs) which had previously been prepared for the North West Rail Link (NWRL) project. However, not all of the subject site for the Tallawong Road RTRF was surveyed in detail for the original EISs.

The original Tallawong Road RTRF occupied a considerable smaller area than the current proposal, with the new design expanded to take into account the requirements for greater capacity and to provide more extensive maintenance for the broader rail network. The RTRF is now to occupy an area approximately twice size of the original RTRF, and this *Report* provides the ecological considerations to support the '*State Significant Infrastructure*' application for the project.

In addition, the subject site is located within the North West Growth Centre of Sydney, which has been identified and approved for urban development to accommodate the required urban expansion. In that regard, it is of particular relevance to note that the North West Growth Centre (along with the South West Growth Centre) is the subject of the *Growth Centres State Environmental Planning Policy* (SEPP) 2005. The *Growth Centres* SEPP has received '*Biodiversity Certification*' pursuant to Part 7AA of the *Threatened Species Conservation Act 1995* (TSC Act), as discussed in some detail below.

1.3 Proposed Tallawong Road RTRF

The NWRL planning approvals envisage a train stabling and maintenance facility – the Rapid Transit Rail Facility (RTRF) at Tallawong Road:

- Stage 1 - Major Civil Construction Works, which describe basic operations, the proposed area of a train stabling facility at the Tallawong Road site, and the proposed construction methods and measures; and
- Stage 2 - Stations, Rail Infrastructure and Systems, which describes the activities associated with operating the stabling and maintenance and includes an indicative site layout.

Expansion of the Tallawong Road Depot beyond that originally envisaged is required to support the future operational requirements of Sydney's rail network. A separate planning approval is required because the expanded RTRF would have a larger capacity than envisaged by the existing NWRL planning approvals (including the Stage 2 EIS) in order to serve the future broader network requirements. The new proposed RTRF would also occupy a larger land area.

The '*State Significant Infrastructure*' application is provided in Attachment 1 as an information supplement. This document includes an indicative site layout figure, details of the proposal, a preliminary environmental assessment and other supporting information to enable the DGRs to be issued.

1.4 Scope and Aims of this Report

The aims of this *Flora & Fauna Assessment Report* with respect to the RTRF site at Schofields are:

- to review and subsequently incorporate data and information from previous investigations on the subject land and in the locality;
- to undertake a survey to identify the biota present and/or likely to occur;
- to assess the likely impacts of the proposed future development of the land on the natural environment in general and on threatened biota in particular;
- to determine any likely ecological constraints to future industrial development of the site;
- to recommend any restrictions to development activities and/or areas of vegetation to be retained; and
- to consider the requirement for, and extent of, any biodiversity offsets that may be required.

The *Flora & Fauna Assessment Report* has taken into account *inter alia* relevant statutory and planning policies, and agency *Guidelines*, including *inter alia*:

- the *Environmental Planning & Assessment Act 1979* (EP&A Act);
- the *Threatened Species Conservation Act 1995* (TSC Act);
- the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act);
- the *State Environmental Planning Policy (Sydney Growth Centres) 2006* (the 'Growth Centres SEPP');
- the OEH *Principles for the Use of Biodiversity Offsets in NSW* (2011);
- the OEH *Threatened Species Survey & Assessment Guidelines* (dated 2004);
- OEH documents regarding the Cumberland Plain, including *inter alia*:
  - *Cumberland Plain Vegetation Mapping* (NPWS 2002);
  - the *Cumberland Plain Recovery Plan* (DECCW 2011); and
  - *Recovering Bushland on the Cumberland Plain: Best Practice Guidelines for the Management and Restoration of Bushland* (DEC 2005).

In addition, this *Flora & Fauna Assessment Report* (FFAR) has addressed the relevant matters raised in the *Director-General's Requirements* (DGRs) provided by the Department of Planning & Infrastructure (DP&I) for the project (dated 03 June 2013). Relevantly, the DGRs raise issues including ("*but not limited to*"):

- an "*assessment of the potential impacts of the project on terrestrial, riparian and aquatic areas including critical habitats, threatened species, populations or ecological communities and groundwater dependent ecosystems*";
- "*consideration of the relevant biodiversity measures of the Biodiversity Certification conferred on the Environmental Planning Policy (Sydney Region Growth Centres) 2006*";
- a "*description of the measures that would be implemented to avoid, mitigate, manage and offset the ecological impacts with the project, noting that any clearing of existing native vegetation proposed within the non-certified areas of the Growth Centre should be offset in accordance with the relevant biodiversity measures of the Biodiversity Certification*"; and
- "*taking into account the Guidelines for Threatened Species Assessment (DPI, 2008) and the NSW State Groundwater Dependent Ecosystems Policy (DLWC, 2002*)".

The Office of Environment & Heritage (OEH) also raises the "*Growth Centres Biodiversity Certification*", and requires the EIS "*to include an assessment of the consistency of the proposal with the relevant biodiversity measures of the biodiversity certification conferred on the State Environmental Planning Policy (Sydney Region Growth Centres) 2006 pursuant to the Threatened Species Conservation Act 1995*".

Additional considerations identified in the submissions to the DP&I regarding the DGRs from the Department of Primary Industries (DPI) include *inter alia*:

- "*the ways in which it is intended to manage issues of weeds, particularly noxious weeds*"; and

- matters relating to the *Fisheries Management Act 1994* (and associated regulations), including:
    - "*an assessment of impacts on the biodiversity values of the site and adjoining areas, including terrestrial, riparian and aquatic areas, particularly on areas identified as Key Fish Habitat by Fisheries NSW*"; and
    - "*impact assessment relating to waterway crossings*".

The submission from the NSW Office of Water (NOW) includes references to:

- groundwater dependent ecosystems and the GDE Policy (2002);
- assessment with regard to riparian habitats and ecosystems, and corridors; and
- issues relating to the *Water Management Act 2000*, riparian corridors and riparian vegetation.

2 INFORMATION BASE

2.1 Growth Centres SEPP

Extensive investigations were undertaken for the *Growth Centres* SEPP in order to justify the '*Biodiversity Certification'* of the North West and South West Growth Centres, pursuant to the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (the 'Growth Centres SEPP'). The basic survey data for those investigations are not available to the authors of this *Report*.

As discussed elsewhere in this *Report*, the *Growth Centres* SEPP *inter alia* enabled the '*Biodiversity Certification'* of the North West and South West Growth Centres. The result of '*Biodiversity Certification'* is that development activities to be undertaken within areas which have been 'certified' (*ie* portions of land that are designated for development activities, pursuant to the process) do not require further consideration with respect to "*threatened species, populations or ecological communities, or their habitats*" (see Chapters 7 and 8.1).

In particular, the '*Biodiversity Certification*' process assumes that vegetation within the 'certified land' is to be removed, and has been offset as part of the process (see Chapter 8.1).

2.2 EIS Investigations

An array of investigations were undertaken for the *Environmental Impact Statements* (EISs) for the North West Rail Link (NWRL). Those investigations included inspections and studies on parts of the subject site at Tallawong Road, but were conducted in respect of a smaller development footprint than that which is currently proposed.

Nevertheless, the ecological investigations undertaken for those EISs do provide a substantial and valid database with which to consider the likely presence of native biota, including *inter alia* "*threatened species, populations and ecological communities*", on the subject site at Tallawong Road.

Information from those EISs has been taken into account in the preparation of this *Report* by SLR Ecology.

2.3 Current Investigations on the Subject Land

A number of ecological consultants are currently, or have recently, undertaken flora and fauna investigations on the Tallawong Road RTRF site and/or in its immediate vicinity.

As noted above, investigations were undertaken by EcoLogical Australia for the EISs for the NWRL, including *inter alia* on the Tallawong Road RTRF site. Those investigations provide some information regarding the vegetation types and threatened biota recorded in the immediate vicinity and on the subject land, although not all of the RTRF site was surveyed during those investigations.

Investigations undertaken by SLR Ecology at Tallawong Road for the purposes of this *Report* include:

- walked meanders and surveys over 21 properties within the Tallawong Road RTRF site and to the east – Figure 3 (to which access had been granted), in order:
    - to identify the vegetation types present;

    - to undertake quadrats and transects to identify the floristics and condition of vegetation present;
    - to search for fauna habitats and resources of potential relevance; and
    - to undertake dedicated searches for threatened flora and fauna species;
- nocturnal surveys for native fauna (including microchiropteran bats, terrestrial mammals and arboreal species), including the use of Anabat detectors, infra-red cameras, call playback and spotlighting, and
- review of accurate and detailed aerial photography.

The field investigations undertaken specifically for this *Report* were conducted in early May 2013, and involved two ecologists over a total period of two days (the 7th and 8th of May 2013).

3 EXISTING ENVIRONMENT

3.1 The Locality

Lands in the general vicinity of the Tallawong Road RTRF, and in the general locality, have long been substantially modified for a variety of small-scale rural and agricultural activities.

On a broad scale, most of the relatively flat lands in the northwestern Sydney have long been substantially cleared of native vegetation, and used for a variety of rural and agricultural purposes including grazing, cropping, vegetation and orchards. These activities have resulted in extensive clearing of the original native vegetation of the area, and most of the native forest and woodland currently present is regrowth vegetation in various (generally poor) condition.

Lands to the south and west are rapidly being developed for urban purposes (Figure 1), with:

- the Rouse Hill Regional Centre - located approximately 2km to the west of the Tallawong Road RTRF;
- extensive areas of new residential development - to the south and west of the Rouse Hill Regional Centre; and
- substantial residential development of lands to the south of Schofields Road - to the south of Tallawong Road RTRF.

There are two moderate-sized watercourses in the vicinity of the Tallawong RTRF (Figures 1 and 2):

- Second Ponds Creek – which is located approximately 800m to the east of the Tallawong Road RTRF site; and
- First Ponds Creek – which is located on the western boundary of the Tallawong Road RTRF site.

Both watercourses support bands of modified and disturbed native vegetation, much of which is weed-infested and/or substantially modified from its original conditions. Nevertheless, both watercourses support vegetation which has been identified as the River Flat Eucalypt Forest on Coastal Floodplains (REFCF) - an "*endangered ecological community*" (EEC) listed in the TSC Act.

As discussed above, the Tallawong Road RTRF site is located on the southern boundary of the North West Growth Centre, which has received 'Biodiversity Certification', pursuant to Part 7AA of the TSC Act. Both First Ponds Creek and Second Ponds Creek are identified as 'non-certified' land (any development of which would require further offsets), whereas the whole of the area proposed for the Tallawong Road RTRF has been 'biocertified' (see Chapter 8.1).

As a consequence, the Tallawong Road RTRF site does not require detailed consideration with respect to "*threatened species, populations or ecological communities, or their habitats*". Nor does the project require consideration of Section 5A of the EP&A Act with respect to the potential for a "*significant effect*" to be imposed upon any such biota or their habitat (see Chapters 7 and 8.1).

3.2 The Subject Land

As is the case with the surrounding landscape, the Tallawong Road RTRF site is highly modified from its original condition (Figures 1 and 2), and consists predominantly of areas of cleared semi-rural and/or agricultural land. The site consists of small rural lots which have been utilised for activities such as low intensity grazing, horses and ponies, small amounts of cropping and other associated semi-rural activities.

Most of the land is cleared of native vegetation (Figure 5). However, there are small to moderate areas with a native tree canopy, in some instances with a native or partly native groundcover, and in others with predominantly introduced weeds and other species (see Chapter 4; Figures 1 and 2; Appendix A).

As also noted above, the vegetation along First Ponds Creek (on the western boundary of the Tallawong Road RTRF site) is to be retained and protected from any disturbances associated with the RTRF project.

Much of the vegetation along First Ponds Creek (on the western side of the RTRF site) has been identified in the Growth Centres SEPP as 'non-certified' land. It is intended, therefore, to retain that vegetation as part of the RTRF project, and to avoid the imposition of any impacts upon the 'non-certified' land along First Ponds Creek. However, it is noted that there is a proposed road to be located to the immediate west of the RTRF land, which may impose impacts upon First Ponds Creek and its riparian vegetation, possibly including the 'non-certified' land along the watercourse.

It is noted there is no contiguous substantial or significant riparian vegetation to the south of Schofields Road (*ie* in the upper parts of the First Ponds Creek catchment). That area has been essentially entirely cleared of native vegetation, and is very highly modified and degraded.

4 FLORA and VEGETATION

4.1 Existing vegetation

4.1.1 General Considerations

Given the nature and history of land uses on and in the vicinity of the subject land at Tallawong Road, there is little intact native vegetation present on the RTRF site. Vegetation which is present includes:

- scatters and patches of Forest Red Gum – Ironbark Woodland on the more elevated parts of the land; and
- Cabbage Gum – Swamp Oak – Paperbark Forest along the lower drainage lines and flats adjacent to watercourses.

With respect to the native vegetation present on the subject land, a total of 21 lots were surveyed for this *Report*, on the basis of access provided (Table 1). Those 21 lots displayed an array of vegetation types and characteristics (Table 1; Appendix A; Figures 1 and 5).

Table 1

Properties	**Characteristics**
71, 77, 79, 81, 97, 34, 53, 31, 75, 51 and 69 Schofields Road	• contain 'notable' areas of native vegetation (*ie* more than just a few scattered native specimens);
53 and 31 Schofields Road	• only contain an area of native canopy, and lack any native understory or groundcover;
71, 77, 79, 81, 97, 34, 53 and 31 Schofields Road	• include notable areas of native canopy (*ie* more than just a few scattered trees) on part of the sites;
75 and 51 Schofields Road	• containing a scattered native canopy over most of the site;
77, 79, 81 and 34 Schofields Road	• have a native understorey (*ie* more than a few scattered individual specimens) on part of the sites;
75 Schofields Road	• contains a scattered native understorey over most of the site;
71, 97 and 51 Schofields Road	• have an equally mixed native and exotic grassland on parts of the site;
69 Schofields Road	• contains an equally mixed native and exotic grassland over most of the site;
77, 79 and 81 Schofields Road	• have a mostly native grassland on part of the sites;
75 Schofields Road	• contains a mostly native grassland over most of the site.

4.1.2 Forest Red Gum – Ironbark Woodland

This vegetation is present as:

- 'derived native grassland' of native and exotic grasses (such as the native Love Grasses, Wallaby Grass, Wire Grass, Windmill Grass and Weeping Grass, and the exotic African

Love Grass and Pigeon Grass), with limited to no trees or shrubs (on property No. 69 Schofields Road);

- Forest Red Gum – Grey Box – Ironbark Woodland with a highly disturbed understorey and groundcover - on the southern portion of property No. 71 Schofields Road, and in the northeastern corner of property No. 97 Schofields Road;
- Forest Red Gum – Grey Box – Ironbark Woodland with a moderately good condition native understorey and groundcover - on the northern portion of property No. 71 Schofields Road; and
- Forest Red Gum – Stringybark – Ironbark Woodland with a moderately good condition native understorey and groundcover within property No. 75 Schofields Road, and in the northern portions of properties Nos. 71, 77, 79 and 81 Schofields Road.

Quadrat 1 was located within the Forest Red Gum – Grey Box – Ironbark vegetation in the northern portion of property No. 71 Schofields Road. The vegetation includes a moderately dense canopy of Grey Box (to 25%), with a few scattered Narrow-leaved Ironbark and Broad-leaved Ironbark (<5% but common). The shrublayer is largely absent, and includes one small regrowth sample of Blackthorn.

The groundcover within Quadrat 1 is dominated by a diverse cover of native grasses (Plump Windmill Grass, Shorthair Plume Grass, Paddock Love Grass, Weeping Grass and Wallaby Grass), each with a 5 to 25% cover. There is also a 5 to 25% cover of exotic Pale Pigeon Grass. Other occasional species which scored a <5% (but common) rating include the exotic Common Sowthistle, Dandelion, Mother of Millions and native Three-awn Spear Grass, Blue Trumpet, Kidney Weed, Common Fringe-sedge, Whiteroot and *Glycine tabacina*.

There were also a few individual specimens (<5% uncommon) of exotic Spear Thistle and other native grasses and herbs (Red Grass, Western Rat-tail Grass, Forest Nightshade, Berry Saltbush, *Einadia nutans* and *Oxalis perennans*).

Quadrat 3 was located within the Forest Red Gum – Stringybark – Ironbark Woodland in the northern portion of property No. 75 Schofields Road. The vegetation includes a moderately dense canopy of Forest Red Gum (to 25%), with a few scattered Narrow-leaved Ironbark (<5% common). The shrublayer includes a <5% (but common) cover of native Blackthorn and regrowth eucalypts, which were present in scatters and patches. There was also an individual specimen of African Olive.

The groundcover in Quadrat 3 is dominated by exotic Paddy's Lucerne (25-50%), with a 5 to 25% cover of native Weeping Grass and exotic Fireweed. Other occasional species which scored a <5% but common rating, include the exotic Pale Pigeon Grass, Spear Thistle, Mouse-ear Chickweed and native Geranium and *Oxalis perennans*. There were also a few individual specimens (<5% uncommon) of other natives (Trailing Speedwell, Whiteroot and Wandering Jew) and exotics (Paspalum, Blackberry Nightshade, Wandering Jew and Scarlet Pimpernel).

Quadrat 4 was located within the Forest Red Gum – Stringybark – Ironbark Woodland in the northern portion of property No. 79 Schofields Road. The vegetation includes a moderately dense canopy of Forest Red Gum and Narrow-leaved Ironbark (to 25%), with a few scattered Thin-leaved Stringybark (<5% common). The shrublayer includes a dense (50-75%) cover of native Blackthorn. There was also an individual specimen of Prickly Pear.

The groundcover within Quadrat 4 is dominated by exotic Paddy's Lucerne and native Weeping Grass (5-25%). Other occasional species (which scored a <5% but common rating) include the exotic Fireweed and native Basket Grass, Blue Trumpet and Forest Nightshade. There were also a few individual specimens (<5% uncommon) of other natives (Kidney Weed, Whiteroot, Poison Rock Fern, *Oxalis perennans* and *Cyperus gracilis*) and exotics (Panic Veldt Grass and Scarlet Pimpernel).

With respect to the Forest Red Gum – Ironbark Woodland on the subject land at Schofields:

- the vegetation across property No. 75, and in the northern portions of properties Nos. 71, 77, 79 and 81 (which are all adjoining), contains a native canopy, understory and groundcover of Cumberland Plain Woodland (CPW) species (and constitutes the CEEC);
- the vegetation in the southern portion of property No. 71, as well as the small area of vegetation in the northeastern corner of property No. 97, contains a native canopy of CPW species, with a highly disturbed native groundcover of native CPW species (and MIGHT constitute the CEEC); and
- the vegetation on property No. 69 has a highly disturbed native groundcover of native CPW species (and MIGHT constitute the CEEC).

4.1.3 Cabbage Gum – Swamp Oak - Paperbark

This community is present along First Ponds Creek and/or in artificial drainage swales on the following properties within the subject land at Schofields:

- along the western boundary, and the southeastern corner of property No. 51; and
- within a small area on vegetation along the eastern boundary of property No. 34.

The vegetation is dominated by either:

- a canopy of Cabbage Gum, with scattered Rough-barked Apple and a mid-canopy of scattered Paperbarks; and/or
- a canopy of Swamp Oak, with scattered Paperbarks.

Property 51 contains an area of Cabbage Gum in the southeastern corner, with Swamp Oak along the western boundary. There is a mainly exotic understorey of Privet, Green Cestrum, Wild Tobacco and Japanese Honeysuckle across property No. 51. The groundcover is sparse within the area of Swamp Oak along the western boundary, and has a more dense cover of native Weeping Grass within the Cabbage Gum in the southeastern corner.

Property No. 34 contains a scattered understorey of native Paperbarks, Wattle, Blackthorn and regrowth eucalypts, with some exotic weeds (such as Large-leaved Privet). The groundcover is mainly exotic with Wandering Jew dominating close to the creek, and Paddy's Lucerne and Panic Veldt Grass dominating areas further from the creek.

Quadrat 2 was located within the Cabbage Gum – Swamp Oak – Paperbark within the eastern portion of property No. 34. The vegetation included a moderately dense canopy of Cabbage Gum (25-50%) to 18m in height, with an approximate average DBH of 30cm. The quadrat was located at the western edge of the patch of vegetation, and included one specimen of Grey Box and a few Large-leaved Privet, African Olive and *Melaleuca decora*.

The groundcover was dominated by exotic Panic Veldt Grass (25-50%), with a 5 to 25% cover of exotic Wandering Jew, Paddy's Lucerne and Lamb's Tongue. Other occasional species (which scored a <5% but common rating), include the exotics (Bridal Creeper, Couch, Paspalum and Pigeon Grass), as well as the natives (Whiteroot, Weeping Grass and Basket Grass).

There were also a few individual specimens (<5% uncommon) of other natives (Lesser Joyweed, Sprawling Bluebell, Berry Saltbush, False Sarsaparilla and *Glycine clandestina*) and exotics (Moth Vine, Sowthistle, Prairie Grass, Whitetip Nightshade and Purpletop).

The vegetation on the majority of property No. 51 has a native canopy of species typical of the River-flat Eucalypt Forest on Coastal Floodplain Forest (REFCF) community, with a highly disturbed native groundcover of native REFCF species. The vegetation along the eastern boundary of property No. 34 has a native canopy and on understorey of REFCF species. Both areas of vegetation are considered to constitute the REFCF community, which is listed as an "*endangered ecological community*" (EEC) in the *Threatened Species Conservation Act* (TSC Act).

4.2 Flora Species

Random Meander and systematic botanical surveys conducted as part of this investigation have recorded a total of 96 plant species from within the subject land (Appendix D). Of these, a total of 54 native species were recorded, along with 42 exotic species. A few of the exotic species (including African Olive and Privet) are also listed as noxious species in NSW.

4.3 Threatened Species

No "*threatened species*" of flora were recorded on the subject land during the recent site inspection, or during any of the previous studies (see Chapter 2).

Given the highly disturbed nature and artificial condition of the vegetation across the subject site and in its vicinity, and the long history of management (doubtless using fertilisers, irrigation and weed control), it is not likely that any of the subject land constitutes suitable habitat for any of the additional threatened plant species known in the locality.

4.4 Threatened Populations

No "*endangered populations*" of any flora species listed in the TSC Act have been recorded from the subject land, and there are none that have been detected in the vicinity (Appendix B).

4.5 Endangered Ecological Communities

As noted above, the vegetation communities mapped by NPWS (2002) as present on the subject site (Figure 4) would (in part at least) constitute the CEEC known as Cumberland Plain Woodland (CPW) and/or the EEC known as River-flat Eucalypt Forest on Coastal Floodplains (REFCF). The REFCF vegetation along First Ponds Creek is located substantially to the immediate west of the RTRF site (Figure 3), as also depicted in the NPWS 2002 vegetation mapping at this location (Figure 4).

As discussed elsewhere in this *Report*, that vegetation along First Ponds Creek is, in many areas, highly weed-infested, and has been degraded and modified over a long period as a result of the surrounding agricultural activities. Nevertheless, this vegetation has biodiversity conservation value, and would be protected from any construction works or ongoing activities within the RTRF project site.

The native plants surveyed during the recent site inspection include:

- 38 species which are listed as 'characteristic' of the CPW community; and
- 29 species which are listed as 'characteristic' of the REFCF community (Appendix D).

The CPW community (as listed in the TSC Act) is considered to be present in areas of vegetation within properties Nos. 71, 75, 77, 79 and 81, and possibly within properties Nos. 69 and 79 and on the southern portion of property No. 71.

The REFCF community is considered to be present along First Ponds Creek (on the western boundary) and in the southeastern corner of property No. 51, as well as along the eastern boundary of property No. 34.

5 FAUNA and FAUNA HABITATS

5.1 Fauna Habitats

The site for the proposed Tallawong Road Rapid Transit Rail Facility (RTRF) at Schofields is located in a part of northwestern Sydney currently characterised by small rural lots, which have had a long history of agricultural activity. The surrounding landscape (particularly Rouse Hill to the east and the Second Ponds Creek land to the south) are rapidly becoming urbanised (Figure 1), and the subject land is located at the southern edge of the North West Growth Centre, which has been approved for substantial urban development. This is one of the areas in Sydney which has been identified to accommodate the substantial growth in dwellings required for Sydney's ongoing development.

The subject land has been largely cleared of native vegetation through previous long-term agricultural activities, but contains small patches of native vegetation (in variously degraded conditions) scattered amongst paddocks and houses, with areas of scattered pasture trees. The vegetation present on the subject land is also generally highly fragmented, and is not linked to any other large areas of native vegetation. The only bands of native vegetation present are the riparian and mesic vegetation communities along First Ponds Creek (to the immediate west of the RTRF) and Second Ponds Creek (to the east).

Most of the canopy trees present on the subject land are small to moderate in size, and are clearly regrowth specimens. There are, however, some scattered mature eucalypts (predominantly Ironbarks) throughout the subject land, although these are generally quite isolated, and in most instances are surrounded by paddocks. The understorey throughout most of the subject land has long been cleared and modified as a result of agricultural and/or landscaping activities (Figure 2; Appendix A), and most of the groundcover is characterised by introduced species.

The subject land generally provides only limited habitat opportunities for native fauna, threatened or otherwise, because of the generally high levels of modification and degradation, and the intensity of historical and ongoing human disturbance. Most of the land is unlikely to be utilised by native fauna

other than highly mobile species and/or habitat generalists (such as some bats and birds), or species tolerant of modified rural landscape and preri-urban environments.

There are no hollow-bearing trees on the subject land at Schofields. Habitat features such as hollow logs or notable woodland debris are also very limited, and are generally of low quality. There is a high occurrence of dumping and storing of building materials on a number of the properties, which in some instances could provide habitat and shelter for a range of mammals (mostly introduced) and reptiles.

The many farm dams which are scattered around the subject land provide potential habitat for an array of amphibian, reptile and waterbird species. These dams are, however, mostly disturbed and are surrounded by exotic pasture, and their value for threatened or significant native fauna is consequently limited.

The Plague Minnow *Gambusia holbrooki* is also fairly widespread which would limit amphibian diversity and severely limit any likelihood of the Green & Golden Bell Frog being present.

There are no other habitat features or resources present which are of any significance for any native fauna, threatened or otherwise. The nature, condition and context of the subject land render it of value predominantly only for abundant, widespread, cosmopolitan and/or adaptable species of native fauna, and of only very limited potential relevance for any threatened species.
The only threatened fauna species which have been recorded on the subject land at Schofields (the Tallawong Road RTRF site) are three species of threatened microchiropteran bats (the Common Bent-wing Bat, Greater Broad-nose Bat and Eastern Free-tail Bat).

There is doubtless potential for individuals of a number of other wide-ranging threatened fauna species and highly mobile species utilised elements of the Tallawong Road RTRF site, on occasions or on a seasonal basis at least. There are a number of mobile and/or wide-ranging threatened bird species present in the locality (Appendix B) and additional threatened microchiropteran bat species as well as the Grey-headed Flying Fox could readily occur on the subject site, on occasions at least.

No Green & Golden Bell Frogs have been recorded from the Tallawong Road RTRF site, and there are no recent records within the immediate vicinity. Whilst a few of the farm dams could theoretically at least constitute suitable habitat for the species, the subject land is not regarded as of relevance for the Green & Golden Bell Frog.

With respect to the threatened microchiropteran bats known to occur on the site, and with regard to those additional threatened fauna species which could potentially utilise the subject land, the Tallawong Road RTRF site is not regarded as providing habitat or resources of particular importance or relevance for any such biota. It is not considered likely that the site would be essential or important for the survival of even individuals of any such species in this locality.

5.2 Fauna Species

Field investigations within the subject land during 2013 identified a fauna assemblage of 35 native species (29 birds, 2 reptiles and 3 amphibians) and 6 introduced and/or domestic species (Appendix E).

There is no doubt that additional urban-tolerant and peri-urban fauna species would be likely to utilise the subject land, on occasions at least. In particular, an array of native bird species would be likely to utilise plants on the subject land when flowering, and it is also likely that some microchiropteran bats

would fly over the land for foraging purposes. There are, however, no significant natural features on the subject land which would contribute in any relevant or significant manner to the survival of local populations of native biota.

Three common amphibian species were recorded during the survey period at Schofields. The subject land does not provide any relevant habitat for the threatened Giant Burrowing Frog or Red-crowned Toadlet. Whilst it is possible that a few of the farm dams contain characteristics which (theoretically at least) could be favourable for the Green & Golden Bell Frog, no individuals of this species have been recorded during any surveys of the subject lands or other sites in the immediate vicinity spotted or heard during this survey.

Only two reptiles (the Eastern Long-necked Turtle and the Garden Sun-skink) were observed on the subject land, and only common urban and peri-urban reptile species (such as the Common Blue-tongue Lizard or Red-bellied Black Snake) are likely to occur. There are no threatened reptile species known to occur in the locality (Appendix B).

Twenty nine native bird species were recorded on the subject land (Appendix E), all of which occur commonly in semi-rural and peri-urban environments. Whilst the subject land could theoretically be utilised on a temporary basis by individuals of some of the more wide-ranging threatened bird species known to occur in the locality, the modified and disturbed nature of the vegetation present indicates that the subject land would not be important for any of these species.

Only three native mammal species were recorded on the subject land at Schofields (being three microchiropteran bats), with the remaining four species being introduced (Appendix E). This circumstance is reflective of the highly disturbed and modified nature of the subject land and surrounding environment, and the moderately intensive agricultural activities which have historically and are currently operating. As noted below, two of the three microchiropteran bat species are threatened (the Common Bent-wing Bat and Little Bent-wing Bat). These species are highly cosmopolitan throughout eastern NSW, and are regularly recorded in the greater Sydney metropolitan area.

Given the large area of the subject land, it is theoretically possible that individuals of the more mobile wide-ranging and habitat generalist species (such as the Grey-headed Flying Fox) could utilise the subject land on an infrequent or seasonal basis. Notwithstanding this possibility, however, the disturbed nature, small size and lack of high quality habitat on and/or within the general vicinity of the land indicates that it is highly unlikely to be significant or important for any of these species.

Targeted searches for the Cumberland Plain Land Snail in May 2013 were unsuccessful in locating any individuals or shells on the subject land. The survey was conducted after a brief rainfall event, although, conditions on the ground and beneath leaf-litter remained dry. Snail searches uncovered significant numbers of the introduced Garden Snail *Helix aspersa* and also a high occurrence of the native predatory Common Southern Carnivorous Snail *Austrorhytida capillacea*. The subject land does contain small pockets of vegetation which could provide habitat for the Cumberland Plain Land Snail. However, in most instances, these patches are disturbed, and remain isolated from any intact remnant bushland.

5.3 Threatened Species

Only two threatened fauna species have been recorded on the RTRF site at Schofields – the Common Bent-wing Bat and the Little Bent-wing Bat. Whilst it is doubtless possible that a number of other

(generally widespread, cosmopolitan and highly mobile species) would occur on the site on occasions, the nature and condition of the habitats and features present does not indicate that significant numbers of other threatened species are likely to be present, even on occasions.

Further, as discussed elsewhere, the habitats and resources present on the subject site are not of likely significance or particular conservation value, with respect to the survival of even individuals of threatened fauna species. None of the habitats or resources present are in good condition, and nor are restricted to the RTRF site.

As noted elsewhere in this *Report*, specific consideration of threatened species and their habitats, and potential impacts upon them, is not specifically a requirement for this project. There is no statutory requirement for consideration of Section 5A of the EP&A Act, because:

- the North West Growth Centre has been 'Biodiversity Certified'; and
- none of the land on which activities for the RTRF project are proposed is 'non-certified' land (Figure 6).

6 GENERAL IMPACT ASSESSMENT and DEVELOPMENT CONSTRAINTS

The vegetation present on the Tallawong Road RTRF site at Schofields is not considered to represent a constraint to development of the site as currently proposed.

There are two main reasons for this conclusion:

- the vegetation present within the proposed development area is already highly modified and degraded, and consists predominantly of patches of regrowth open woodland vegetation with a variably (generally highly) disturbed and weed-infested understorey; and
- the whole of the Tallawong Road RTRF site (excluding First Ponds Creek along its western boundary) has been 'bio-certified', pursuant to the Growth Centre SEPP (see discussion in Chapter 8). This land is identified as "*certified*" land, and the loss of all vegetation from the RTRF site has therefore been taken into account in the 'Biodiversity Certification' process for the North West Growth Centre.

As noted above, in the first instance, vegetation present on the subject land at Schofields, identified for development of the Tallawong Road RTRF site, is generally highly modified and degraded. Where there is native vegetation present, it mostly consists of modified and degraded regrowth variants of the Cumberland Plain Woodland (CPW) community. Only 3.89ha of highly modified and fragmented CPW vegetation is to be removed for the Tallawong Road RTRF project.

Notwithstanding that the CPW community is listed as a "*critically endangered ecological community*" (CEEC) in the TSC Act, and as part of a CEEC in the EPBC Act, those degraded patches of CPW present on the subject land at Schofields have been identified as being appropriate for removal, pursuant to the Growth Centres SEPP.

Two small areas of vegetation in the southwestern part of the subject at at Schofields and along the central parts of the western boundary, constitute the "*endangered ecological community*" (EEC) known as River-flat Eucalypt Forest on Coastal Floodplains (REFCF). As a consequence of historical disturbances, however, that vegetation is in relatively poor condition, and a total of just 0.61 hectares of that vegetation is to be removed.

As is the case for the CPW community, the vegetation to be removed from Tallawong Road RTRF site has already been addressed with respect to offsets by virtue of the BioCertification of the North West Growth Centre. As a consequence, no further provision of offsets or compensatory measures for the removal of either the CPW or the RTRF community is required.

The relevance of the CPW vegetation on the Tallawong Road RTRF site, or otherwise, with respect to the EPBC Act is discussed in detail below (in Chapter 9).

In addition to its poor condition, the vegetation on the subject land at Schofields has been identified as appropriate for removal on the basis of the strategic assessment undertaken for the Growth Centre SEPP. That environmental planning instrument identifies the Tallawong Road RTRF site as 'certified' land (Figure 6). Consequently, the removal of vegetation within that land has been taken into account in determining the overall approach to biodiversity conservation and development within the North West Growth Centre.

On the basis of all of the foregoing, the modified vegetation on the subject land identified for the Tallawong Road RTRF site does not constitute a constraint to development activities as proposed. The vegetation to be removed is of poor quality, and has (in any case) been taken into account in the offset strategy for the North West Growth Centre.

There is no requirement for the retention of any of the vegetation on the subject land, nor is there any further requirement for offsets for the vegetation which is to be removed for the Tallawong Road RTRF.

7 EP&A ACT CONSIDERATIONS

As discussed in detail elsewhere in this *Report*, the Tallawong Road RTRF site is located on land which has received 'Biodiversity Certification'.

As the land is identified as 'certified' land, there is no requirement taken into account in Section 5A of the EP&A Act with respect to a determination regarding threatened biota or their habitat. Biodiversity Certification specifically *inter alia* 'turns off' any requirement to determine whether or not a "*significant effect*" is "*likely*" to be imposed upon any "*threatened species, populations or ecological community, or their habitats*" pursuant to Section 5A of the EP&A Act.

Nevertheless, there is a requirement to consider:

- the "*objects*" of the EP&A Act - in determining the acceptability (or otherwise) of a development proposal; and
- the acceptability (or otherwise) of impacts upon the "*natural environment*" - pursuant to Section 79C of the EP&A Act.

As discussed elsewhere in this *Report*, the vegetation present within the Tallawong Road RTRF site is already highly modified and is predominantly highly degraded, as a result of previous and ongoing rural and agricultural activities. Most of the vegetation present is regrowth, and all of it has been substantially modified and degraded as a result of the long-term semi-rural and agricultural activities which have been undertaken in this location.

None of the regrowth CPW or REFCF woodland on the Tallawong Road RTRF site is regarded as of such biodiversity conservation value as to warrant its retention or rehabilitation. Even were it not for Biodiversity Certification of the subject land, it would not be an appropriate outcome for the Tallawong Road RTRF proposal to be amended or refused on the basis of the vegetation present on the subject land.

As also discussed above, the "*potential impacts of the project on terrestrial, riparian and aquatic areas*" is extremely limited, because of the degraded nature of most of the vegetation present. The "*terrestrial*" habitats and vegetation, in particular, are extremely highly modified and degraded, and have (in any case) been addressed within the Biodiversity Certification of the North West Growth Centre.

Similarly, as discussed above and elsewhere in this *Report*, the "*riparian*" vegetation along First Ponds Creek (to the immediate west of the RTRF site) is modified and degraded. The proposed RTRF project at Tallawong Road will require the removal of only very small areas of disturbed riparian vegetation along First Ponds Creek. The project will incorporate appropriate environmental management and impact amelioration measures to minimise or avoid impacts upon riparian vegetation along First Ponds Creek.

As noted elsewhere, there is also a proposal to construct a road to the immediate west of the RTRF site, and that infrastructure will have a far greater impact upon vegetation along First Ponds Creek than the Tallawong Road RTRF project itself.

There is no "*critical habitat*" present on or adjoining the RTRF site at Tallawong Road, Schofields. In any case, matters relating to "*critical habitat*" are dealt with pursuant to the Biodiversity Certification process, and even if present, "*critical habitat*" would not constrain development of the RTRF project.

The only "*aquatic habitat*" present is contained within the channel of First Ponds Creek (which would not be affected by the proposal in any case) and several farm dams on properties within the RTRF site. The farm dams, whilst providing the habitat for native biota (amphibians and wading birds), do not constitute significant habitat or resources for any such species. Further, given the clear intention for the residential development of the North West Growth Centre, the removal of such artificial "*aquatic*" habitat is of no consequence or significance.

The DGRs for the project also require an "*assessment of the potential impacts of the project on terrestrial, riparian and aquatic areas including critical habitats, threatened species, populations or ecological communities and Groundwater Dependent Ecosystems*". The Groundwater Dependent Ecosystems (GDEs) are addressed below (in Chapter 8.3), and some consideration of "*threatened species, populations and ecological communities, and their habitats*" is provided above and elsewhere in this *Report*.

8 OTHER STATUTORY & POLICY CONSIDERATIONS

8.1 Biodiversity Certification

As discussed above, the Tallawong Road RTRF site is located on the southern boundary of the North West Growth Centre, which has received 'Biodiversity Certification', pursuant to Part 7AA of the TSC Act. Extensive investigations were undertaken for the *Growth Centres* SEPP in order to justify the '*Biodiversity Certification'* of the North West and South West Growth Centres, pursuant to the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (the 'Growth Centres SEPP').

The result of '*Biodiversity Certification'* is that development activities to be undertaken within areas which have been 'certified' (*ie* portions of land that are designated for development activities, pursuant to the process) do not require further consideration with respect to "*threatened species, populations or ecological communities, or their habitats*".

Both First Ponds Creek and Second Ponds Creek are identified as 'non-certified' land (any development of which would require further offsets), whereas the whole of the area proposed for the Tallawong Road RTRF has been 'biocertified' (Figure 6). There is no 'non-certified' land within the RTRF site (Figure 6).

As noted elsewhere in this *Report*, however, a road is proposed to be constructed along the western side of the RTRF site. That feature will affect some of the 'non-certified' land, and vegetation along First Ponds Creek.

As a consequence, the Tallawong Road RTRF site does not require detailed consideration with respect to "*threatened species, populations or ecological communities, or their habitats*". Nor does the project require consideration of Section 5A of the EP&A Act with respect to the potential for a "*significant effect*" to be imposed upon any such biota or their habitat.

8.2 Water Management Act 2000

The *Water Management Act 2000* (WM Act), in relevant terms, deals with the protection of watercourses and riparian lands.

The WM Act, *inter alia*, identifies and defines "*waterfront land*", and determines that certain activities on "*waterfront land*" would require a *Controlled Activity Approval* (CAA) from the NSW Office of Water (NOW).

For the purposes of the Tallawong Road RTRF, the only watercourse of relevance to the WM Act is First Ponds Creek, which flows in a northerly direction to the immediate west of the RTRF site, from a piped discharge beneath Schofields Road. In this instance, "*waterfront land*" would constitute land within 40m of the "*top of the bank*" (being the eastern bank) of First Ponds Creek.

It appears likely that the Tallawong Road RTRF project will involve works on "*waterfront land*", near Schofields Road. However, as also discussed above, there is a road proposed to be constructed to the immediate west of the RTRF site (*ie* between the RTRF site and First Ponds Creek) as part of the development concept for this part of the North West Growth Centre. That road would impinge upon the "*waterfront land*" along First Ponds Creek, and would render any impacts from the RTRF project on First Ponds Creek irrelevant.

Given those circumstances, it is possible that a *Controlled Activity Approval* (CAA) will be required from the NOW.

8.3 Groundwater Dependent Ecosystems

It is not likely that any of the ecosystems present on the RTRF site at Schofields are, in fact, "*groundwater dependent ecosystems*". Whilst there are, doubtless, areas of low-lying vegetation in parts of the subject site, many of those are artificial. Any native vegetation associated with those low-lying areas would be a consequence of moderately long-term drainage into swales and depressions, and is dependent on incipient rainfall and overland flow, rather than groundwater recharge.

The riparian vegetation along First Ponds Creek, similarly, is more dependent upon incipient rainfall and localised overland flow than on any groundwater that may be present at this location. Lateral groundwater flows are not likely to be significant in this location, and the riparian and swamp forest communities would be reliant almost entirely upon incipient rainfall and localised overland flow, rather than any groundwater which may be present.

In addition, there is likely to be increased stormwater flows along First Ponds Creek following urban development, as is currently contemplated pursuant to the North West Growth Centre strategy and plans. Consequently, swamp forest and other mesic or riparian ecosystems will not be subjected to a reduction in stormwater over time, and the RTRF project would not adversely affect any GDEs, even if any such ecosystems are present.

8.4 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) addresses *inter alia* the protection and management of fish habitats, fish resources and populations, and fish movement capabilities in the freshwater and marine aquatic systems in NSW.

The FM Act has little application to the Tallawong Road RTRF site at Schofields, because there are no notable watercourses, streams or rivers through the subject site itself. The only aquatic habitat present within the RTRF site itself is confined to farm dams, as the drainage swales which are present in parts of the site are both highly modified and artificial in nature, and are entirely ephemeral in their characteristics.

The only habitat of relevance or potential relevance to the FM Act in the immediate vicinity is First Ponds Creek, which is located to the immediate west of the RTRF site at Schofields. However, as discussed elsewhere in this *Report*, the RTRF project will not impose any impacts upon any element of any fish habitat or aquatic resources along First Ponds Creek, and the FM Act does not therefore impose any pediment upon the RTRF project itself.

Implementation of the FM Act is facilitated *inter alia* through the application of the *Policy and Guidelines for Fish Habitat Conservation and Management* (2013 Update) which provide advice and guidelines for:

- the maintenance of habitat for native fish; and
- measures to facilitate fish passage along watercourses.

As indicated above, the proposed development of the RTRF site at Schofields will have no impact upon any watercourses of any relevance for the movement of any fish species. The RTRF project will impose no impediment to the movement of any fish along any watercourse, to any relevant extent (noting that species such as the Australian Long-finned Eel can traverse open paddocks in suitable-rainy-weather conditions).

The FM Act places no impediments upon the Tallawong Road RTRF project, as currently designed and proposed.

8.5 Planning for Bushfire Protection 2006

The Rural Fire Service (RFS) has promulgated the *Planning for Bushfire Protection 2006 Guidelines* (PBP 2006), pursuant to the *Rural Fires Act 1997*. PBP 2006 provides guidelines and standards for an array of development activities and land uses, which are intended to ensure the protection of persons and property in the event of bushfire.

Relevantly, PBP 2006 notes that a development activity such as the Tallawong Road RTRF (being an industrial development) does not require the provision of *Asset Protection Zones* (APZs). It is assumed that water hydrants, to be used to fight a bushfire along First Ponds Creek, would be provided along the western side of the RTRF, at least until the adjoining road to the immediate west is constructed.

The only potential for bushfire to affect the Tallawong Road RTRF project would be the generation of a bushfire within the riparian vegetation along First Ponds Creek. With regard to the RTRF site:

- the site is bound by Schofields Road (to the south), with current residential development located to the immediate south of Schofields Road. In any case, the southern part of the Tallawong Road RTRF site will contain a major detention basin and associated facilities, and there is no potential for bushfire to approach the Tallawong Road RTRF site from the south;
- lands to the north and east are currently rural in nature, but are identified for intense residential development, as part of the North West Growth Centre development. There is currently no bushfire threat from these directions (because of the open and cleared nature of vegetation in this area), and there would be no future potential for bushfire threat (as these areas will be residential in nature); and
- the only potential bushfire risk is from vegetation along First Ponds Creek, and that risk is low (being both of a mesic variety and of relatively small extent).

Furthermore, as discussed elsewhere in this *Report*, it is relevant to note that:

- the proposal is an industrial (railway depot and maintenance facility), and will not involve the location of equipment, machinery or buildings which are susceptible to bushfire adjacent to the vegetation along First Ponds Creek; and
- there is no requirement in PBP 2006 for the provision of an APZ for such facility, in any case.

In addition, the Tallawong Road RTRF facility will involve significant areas of open industrial land along the western boundary, and will provide more than adequate areas of "*defendable space*" on the western

side of the proposal. As noted above, water hydrants for firefighting purposes should be provided along the western side of the development.

Given the nature of the RTRF project and the structure of the development, there will be more than adequate opportunity for staff at the facility to avoid any potential for exposure to bushfire.

9 APPLICATION of the EPBC ACT

9.1 Introduction

The *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) requires consideration of the potential for a "*significant impact*" to be imposed by an activity on a *Matter of National Environmental Significance* (MNES).

In the event that such an "*impact*" is "*likely*" to be imposed, the activity proposed must be referred to the Commonwealth for determination as to whether it constitutes a "*controlled action*". Where a development activity does constitute a "*controlled action*", an approval from the Commonwealth Minister for the Environment is required.

The MNES listed in the EPBC Act include:

- world heritage properties;
- national heritage places;
- wetlands of international importance (listed under the Ramsar Convention);
- listed threatened species and ecological communities;
- migratory species protected under international agreements;
- Commonwealth marine areas;
- the Greater Barrier Reef Marine Park;
- nuclear actions (including uranium mines); and
- "*The environment, where actions proposed are on, or will affect, Commonwealth land and environment*".

9.2 Relevant MNES

The proposed business development of the subject land at Schofields has no potential to affect any MNES other than (theoretically at least):

- some listed threatened species and ecological communities; and/or
- individuals of a few migratory species.

With respect to "*migratory species protected under international agreements*", the subject land at Schofields is not regarded as of any potential significance or relevance, given:

- its current disturbed and modified state;
- its small size with respect to the home ranges of any such species;
- the lack of particular resources of even potential relevance for any "*migratory species*"; and
- its context and location on the southern outskirts of Schofields.

The only (allegedly) "*migratory species*" known or likely to occur at this location are highly mobile cosmopolitan species, such as the Cattle Egret and Masked Lapwing. The Tallawong Road RTRF site is not of particular or special value for any such species. There is no likelihood of a "*significant impact*",

nor indeed any impact at all, being imposed upon even individuals of any possible "*migratory species*" (Appendix C).

No "*threatened species*" listed in the EPBC Act (Appendix C) have been recorded on the subject land at Schofields, and it is extremely unlikely that even individuals of any such species would occur other than on occasional and/or fleeting basis. There are no resources or habitat features of any particular value or relevance for any of the "*threatened species*" listed in the EPBC Act, and it is not likely that even individuals of any such species (Appendix C) would be dependent or reliant on the subject for their survival at this location.

There is no likelihood of a "*significance impact*" being imposed upon any such species. Indeed, there is little likelihood of a "*significant impact*" being imposed upon even individuals of any such species.

The Cumberland Plain Woodland (CPW) vegetation is part of a "*critically endangered ecological* community" listed in the EPBC Act. Importantly (and most valuably), the EPBC Act listing also provides *Threshold Criteria* for CPW vegetation which require *inter alia* that:

- the area of the patch of vegetation be larger than one hectare; and
- at least 30% of the groundcover species be native plants typical of the CPW community.

Little of the vegetation present on the subject land at Schofields, or on adjoining lands, would appear to constitute CPW as defined in the EPBC Act. Most of the scattered patches of vegetation do not have a groundcover that is 30% or more native, and the patches are small, degraded and scattered. Given the circumstances, the loss of these patches of vegetation is not regarded as likely to significantly affect the CPW community, or to involve the imposition of a "*significant impact*" upon that community.

9.3 Conclusions

There are no "*threatened species*" or "*migratory species*" which are likely to be adversely affected to any relevant (if any) extent by the proposed residential development of the subject land at Schofields. There is no potential for a "*significant impact*" (or indeed any adverse impact at all) to be imposed upon any such biota as a consequence of the proposed development of the land.

The removal of the degraded and modified vegetation from the subject land at Schofields is not considered by the authors of this *Flora & Fauna Assessment Report* to constitute a "*significant impact*" upon the CPW community given *inter alia* the nature of the vegetation present and the extent of that vegetation type in this general locality.

10 IMPACT AMELIORATION and ENVIRONMENTAL MANAGEMENT MEASURES

As discussed in detail above in this *Report*, the vegetation present on the subject land at Schofields for the Tallawong Road RTRF project is not regarded as of such biodiversity conservation value or significance as to warranty its retention.

Nevertheless, the undertaking of the Tallawong Road RTRF project will entail *inter alia*:

- the removal of all vegetation from the development site;
- substantial earthworks, with the associated exposure of soils to erosion possibilities; and
- the potential for the discharge of contaminant laden or sediment laden stormwater from the project site.

Given the circumstances identified above, the Tallawong Road RTRF project should implement an array of 'best practice' (or indeed 'beyond best practice') environmental management and impact amelioration measures as part of the development. Such measure should include, but are not limited to:

- the protection of all vegetation adjacent to the Tallawong Road RTRF project by protection fencing and sediment fencing to prevent indirect impacts on or incursions into such retained vegetation;
- the placement of sediment fences around all works and exposed soils throughout the project;
- the management of all stormwater discharges to avoid either contaminants or sediment leaving the site and impacting upon adjoining vegetation and habitats (particularly along First Ponds Creek);
- pre-clearing surveys by a qualified ecologist and/or wildlife rescue team to ensure that there are minimal adverse impacts on, particularly the potential demise of, native fauna within the development process;
- the salvage of any tree-hollows identified within the subject land and their re-use in bushland restoration projects in the locality and vicinity;
- the collection of plant propagules (seeds, seedlings *etc*) and their maintenance by a qualified bush regenerator or commercial garden for use in bush regeneration projects in the locality;
- the collection of any plant material for use as brush matting or mulch in bush regeneration projects in the vicinity and locality; and
- the provision of hydrants along the western boundary of the site for firefighting purposes.

GLOSSARY

DA	A *Development Application* prepared pursuant to the EP&A Act.
DEC	Department of Environment & Conservation.
DECC	Department of Environment & Climate Change.
DECCW	Department of Environment, Climate Change & Water.
Endangered Ecological Community	"*an ecological community specified in Part 3 of Schedule 1*" of the TSC Act.
Endangered Population	"*a population specified in Part 2 of Schedule 1*" of the TSC Act.
EP&A Act	*Environmental Planning & Assessment Act 1979*.
EPBC Act	Environment Protection & Biodiversity Conservation Act 1999.
Key Threatening Process	"*a threatening process specified in Schedule 3*" of the TSC Act.
NPWS	NSW National Parks & Wildlife Service.
OEH	Office of the Environment & Heritage, which is part of the Department of Premier & Cabinet, and which incorporates most of the DECCW.
Proposal	"*the development, activity or action proposed*" (DGRs).
Recovery Plan	"*a plan prepared and approved under Part 4*" of the TSC Act.
Region	"*a bioregion defined in a national system of bioregionalisation that is determined (by the Director-General by order published in the Gazette) to be appropriate for those purposes*" (TSC Act).
SIS	*Species Impact Statement* prepared pursuant to Sections 109, 110 and 111 of the TSC Act.
Threatened Species	"*a species specified in Part 1 or 4 of Schedule 1, Part 1 of Schedule 1A or Part 1 of Schedule 2*" of the TSC Act.
Threatened Ecological Community	"*an ecological community specified in Part 3 of Schedule 1, Part 2 of Schedule 1A or Part 2 of Schedule 2*"
Threatening Process	"*a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*" (TSC Act).
TSC Act	*Threatened Species Conservation Act 1995*.

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Figure 1 Location of the proposed RTRF site at Tallawong Road, Schofields

LEGEND

Proposed RTRF site

0 50100 200 300 400 500
Metres

N

NOTES

1. Digital cadastral database (DCDB) © 2012 NSW Dept of lands.
2. Aerial imagery courtesy of Nearmap 2013
3. Subject site boundaries based on DCDB 2012
4. Map locator courtesy of Bing, ESRI "Streets" basemap
5. All features are approximate only and subject to detailed survey

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Schofields

Prepared for:
JBA Planning

Project No: **610.12637**

Scale	Date
1:15,000 @ A3	24/06/2013

Drafted	Approved
Brett Sinclair	Fiona Iolini

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Figure 2 Details of the proposed RTRF site at Tallawong Road, Schofields

LEGEND

- Proposed RTRF site
- Cadastre

0 50 100 200 300 400
Metres

N

NOTES

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Figure 3 Ownership of the Proposed RTRF site at Tallawong Road, Schofields

LEGEND

- Subject Land
- Flora quadrats

Owner

- Baulderstone
- Knight Frank
- RMS
- TfNSW

N

0 50 100 200 300 400

Metres

NOTES

1. Digital cadastral database (DCDB) © 2012 NSW Dept of lands.
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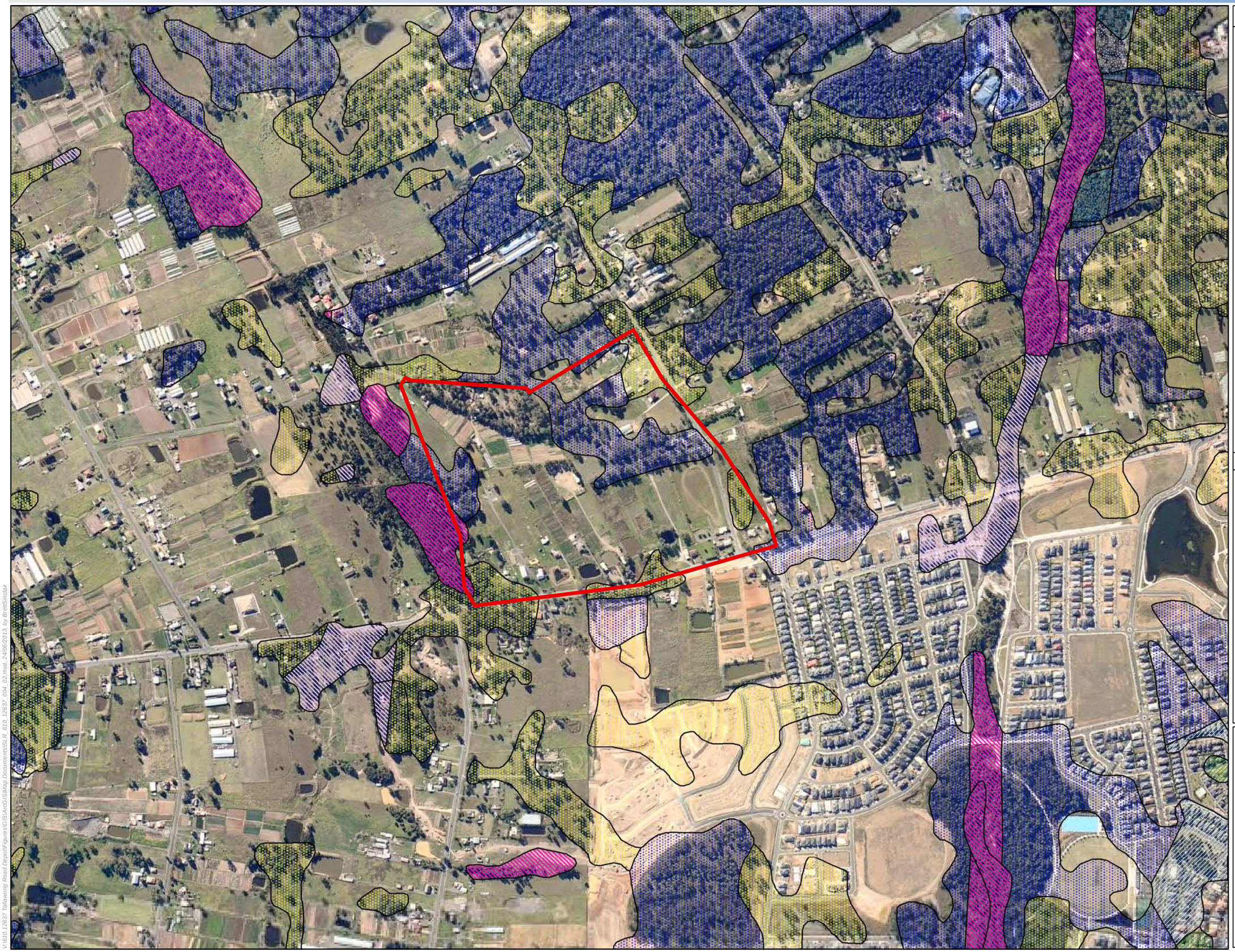
Figure 4

Vegetation mapping at Schofields (NPWS2002)



LEGEND

- Subject Site
- Shale Plains Woodland
- 103 - Shale/Gravel Transition Forest
- Shale Sandstone Transition Forest (Low Sandstone Influence)
- Shale Sandstone Transition Forest (High Sandstone Influence)
- Alluvial Woodland
- Shale Hills Woodland
- Shale Plains Woodland
- 103 - Shale/Gravel Transition Forest
- Shale Sandstone Transition Forest (High Sandstone Influence)
- Shale Sandstone Transition Forest (Low Sandstone Influence)
- Alluvial Woodland
- Shale Hills Woodland
- Shale Plains Woodland

N

0 50 100 200 300 400

Metres

NOTES

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Figure 5 Vegetation on the proposed RTRF site at Tallawong Road, Schofields

LEGEND

- Proposed RTRF site
- Cumberland Plain Woodland
- River-Flat Eucalypt Forest

0 50 100
Metres

N

NOTES

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3. Subject site boundaries based on DCDB 2012
4. Map locator courtesy of Bing, ESRI "Streets" basemap
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Figure 6

The proposed RTRF site at Tallawong Road and BioCertification

LEGEND

- Proposed RTRF site
- Cadastre

Biodiversity Certification

- NW Growth Centre Boundary
- Certified Area
- Non - Certified Area

N

0 50 100 200

Metres

NOTES

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Drafted	Approved
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Appendix A
Photographs of the subject land at Rouse Hill

28 June 2013

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 1 Facing northwest across property 97 Schofields Rd, from its southeastern corner.

Photo 2 Facing southeast across property 97 Schofields Rd, from its northwestern corner.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 3 Facing southwest across property 34 Cudgegong Rd, from its northeastern corner.

Photo 4 Facing into the northeastern corner of Quadrat 2 on property 34 Cudgegong Rd.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 5 Facing east across property 34 Cudgegong Rd, from its southwestern boundary.

Photo 6 Facing southwest across property 35 Cudgegong Rd, from its northeastern boundary.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 7 Facing east across property 35 Cudgegong Rd, from its northwestern boundary.

Photo 8 Facing northwest across property 81 Schofields Rd, from its southeastern boundary.

Photo 9 Facing southeast across property 81 Schofields Rd, from its northwestern boundary.

Photo 10 Facing northwest across property 79 Schofields Rd, from its southeastern boundary.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 11 Facing southeast across property 79 Schofields Rd, from its northwestern boundary.

Photo 12 Facing into the northeastern corner of Quadrat 4 on property 79 Schofields Rd.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 13 Facing northwest across property 77 Schofields Rd, from its southeastern boundary.

Photo 14 Facing north into the area of vegetation along the northern boundary of property 77 Schofields Rd.

Photo 15 Facing northwest across property 75 Schofields Rd, from its southeastern boundary.

Photo 16 Facing southwest across property 75 Schofields Rd, from its northeastern boundary.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 17 Facing into the northeastern corner of Quadrat 3 on property 75 Schofields Rd.

Photo 18 Facing northwest across property 73 Schofields Rd, from its southeastern boundary.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 19 Facing southeast across property 73 Schofields Rd, from its northwestern boundary.

Photo 20 Facing northwest across property 71 Schofields Rd, from its southeastern boundary.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 21 Facing southeast across property 71 Schofields Rd, from its northwestern boundary.

Photo 22 Facing into the northeastern corner of Quadrat 1 on property 71 Schofields Rd.

Photo 23 Facing northwest across property 69 Schofields Rd, from its southeastern boundary.

Photo 24 Facing southeast across property 69 Schofields Rd, from its northwestern boundary.

Photo 25 Facing northwest across property 28 Tallawong Rd, from its southeastern boundary.

Photo 26 Facing southeast across property 28 Tallawong Rd, from its northwestern boundary.

Photo 27 Facing southwest across property 31 Tallawong Rd, from its northeastern boundary.

Photo 28 Facing southeast across property 31 Tallawong Rd, from its northwestern boundary.

Photo 29 Facing northwest across property 67 Schofields Rd, from its southeastern boundary.

Photo 30 Facing northeast across property 67 Schofields Rd, from its southwestern boundary.

Photo 31 Facing northeast across property 65 Schofields Rd, from its southwestern boundary.

Photo 32 Facing northeast across property 63 Schofields Rd, from its southwestern boundary.

Appendix A Photographs taken of the subject site on the 07 and 08 of May 2013

Photo 33 Facing northwest across property 61 Schofields Rd, from its southwestern boundary.

Photo 33 Facing northwest across property 59 Schofields Rd, from its southeastern boundary.

Photo 33 Facing southeast across property 59 Schofields Rd, from its northwestern boundary.

Photo 34 Facing northwest across property 57 Schofields Rd, from its southeastern boundary.

Photo 35 Facing southeast across property 57 Schofields Rd, from its northwestern boundary.

Photo 36 Facing northwest across property 55 Schofields Rd, from its southeastern boundary.

Photo 37 Facing northwest across property 53 Schofields Rd, from its southeastern boundary.

Photo 38 Facing southeast across property 53 Schofields Rd, from its northwestern boundary.

Photo 39 Facing northwest across property 51 Schofields Rd, from its southeastern boundary.

Photo 40 Facing southeast across property 51 Schofields Rd, from its northwestern boundary.

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Appendix B
OEH Wildlife Atlas Search

28 June 2013

KEY

Status	The "*threatened species*" listing in the *Threatened Species Conservation Act 1995*
V	Species listed as "*Vulnerable*"
E1	Species listed as "*Endangered*"
E4A	Species listed as "*Critically Endangered*"
E2	An "*endangered population*"
Records	The number of records of the relevant "*threatened species*" listed in the search area
Relevance	The potential relevance of the subject site to the "*threatened species*"
P	Present on the subject land
H	"*High*" potential relevance
M	"*Moderate*" potential relevance
L	"*Low*" potential relevance
VL	"*Very Low*" potential relevance
N	"*No*" potential relevance

NOTES

- The table below is based on data obtained from the recently reformed Atlas of NSW Wildlife website http://www.bionet.nsw.gov.au/, and the following notes accompany this dataset.
- Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions.
- Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°).
- Copyright the State of NSW through the Office of Environment and Heritage.
- Search criteria: Public Report of all Valid Records of Threatened (listed on TSC Act 1995) Entities in selected area [North: -34.14 West: 150.48 East: 150.69 South: -34.31] returned a total of 964 records of 190 species.
- Report generated on 10/05/2013 8:55 AM
- Note – the species listed in the table below have been modified to include only those species with actual known records in the vicinity.

Status	Scientific Name	Common Name	Records	Relevance
	PLANTS			
	Apocynaceae			
E2	*Marsdenia viridiflora* subsp. *viridiflora*	-	4	N
	Dilleniaceae			
E1	*Hibbertia superans*	-	120	N
	Ericaceae			
V	*Epacris purpurascens* var. *purpurascens*		4	VL-N
E1	*Leucopogon fletcheri* subsp. *fletcheri*		3	N
	Fabaceae – Faboideae			
V	*Dillwynia tenuifolia*	-	185	VL
E1	*Pultenaea parviflora*	-	269	VL
	Fabaceae – Mimosoideae			
E1	*Acacia bynoeana*	Bynoe's Wattle	18	N
	Marsileaceae			
E1^^	^^*Pilularia novae-hollandiae*	Austral Pillwort	1	N
	Myrtaceae			
V	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	2	N
V	*Melaleuca deanei*	Deane's Paperbark	3	N
E1	*Eucalyptus sp. Cattai*	-	43	N
V	*Syzygium paniculatum*	Magenta Lilly Pilly	2	N
	Proteaceae			
V	*Grevillea juniperina* subsp. *juniperina*	Juniper-leaved Grevillea	327	L
E1^^	*Persoonia hirsuta*	Hairy Geebung	26	N
E1	*Persoonia nutans*	Nodding Geebung	6	N
	Sterculiaceae			
V	*Lasiopetalum joyceae*	-	1	N
	Thymelaeaceae			
V	*Pimelea curviflora* var. *curviflora*	-	76	N
E1	*Pimelea spicata*	Spiked Rice-flower	21	VL
	AMPHIBIANS			
	Myobatrachidae			
V	*Heleioporus australiacus*	Giant Burrowing Frog	1	N
V	*Pseudophryne australis*	Red-crowned Toadlet	18	N
	Hylidae			
E1	*Litoria aurea*	Green & Golden Bell Frog	12	VL-N
	AVES			
	Anatidae			
V	*Oxyura australis*	Blue-billed Duck	2	N
V	*Stictonetta naevosa*	Freckled Duck	2	N
	Ciconiidae			
E1	*Ephippiorhynchus asiaticus*	Black-necked Stork	4	N
	Ardeidae			
E1	*Botaurus poiciloptilus*	Australasian Bittern	2	N
V	*Ixobrychus flavicollis*	Black Bittern	2	N
	Accipitridae			
V	*Circus assimilis*	Spotted Harrier	1	N
V^^	*Lophoictinia isura*	Square-tailed Kite	5	N
V	*Hieraaetus morphnoides*	Little Eagle	8	VL-N
	Falconidae			
V	*Falco subniger*	Black Falcon	1	L

Status	Scientific Name	Common Name	Records	Relevance
	Scolopacidae			
V	*Calidris ferruginea*	Curlew Sandpiper	1	N
	Cacatuidae			
V^^	*Callocephalon fimbriatum*	Gang-gang Cockatoo	4	N
V^	*Calyptorhynchus lathami*	Glossy Black Cockatoo	8	N
	Psittacidae			
V	*Glossopsitta pusilla*	Little Lorikeet	7	VL-N
E1^^	*Lathamus discolour*	Swift Parrot	11	VL-N
V^^	*Neophema pulchella*	Turquoise Parrot	1	N
	Strigidae			
V^^	*Ninox connivens*	Barking Owl	3	VL-N
V^^	*Ninox strenua*	Powerful Owl	25	VL-N
	Tytonidae			
V^^	*Tyto novaehollandiae*	Masked Owl	2	VL-N
V^^	*Tyto tenebricosa*	Sooty Owl	3	VL-N
	Acanthizidae			
V	*Pyrrholaemus saggitatus*	Speckled Warbler	10	N
	Meliphagidae			
E4A	*Anthochaera Phrygia*	Regent Honeyeater	14	VL-N
V	*Grantiella picta*	Painted Honeyeater	1	N
V	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	6	N
	Neosittidae			
V	*Daphoenositta chrysoptera*	Varied Sittella	33	VL-N
	Petroicidae			
V	*Melanodryas cucullata cucullata*	Hooded Robin	1	VL-N
V	*Petroica boodang*	Scarlet Robin	11	VL-N
V	*Petroica phoenicea*	Flame Robin	1	VL-N
	MAMMALS			
	Dasyuridae			
V	*Dasyurus maculatus*	Tiger Quoll	8	N
	Phascolarctidae			
V	*Phascolarctos cinereus*	Koala	4	N
	Petauridae			
V	*Petaurus Australis*	Yellow-bellied Glider	48	N
	Pteropodidae			
V	*Pteropus poliocephalus*	Grey-headed Flying Fox	37	VL-N
	Molossidae			
V	*Mormopterus norfolkensis*	Eastern Freetail Bat	32	L-M
	Vespertilionidae			
V	*Chalinolobus dwyeri*	Large-eared Pied Bat	4	L-M
V	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	1	L-M
V	*Miniopterus australis*	Little Bent-wing-Bat	5	L-M
V	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	46	L-M
V	*Myotis macropus*	Southern Myotis	14	VL-L
V	*Scoteanax rueppellii*	Greater Broad-nosed Bat	4	L-M
	GASTROPODS			
	Camaenidae			
E1	*Meridolum corneovirens*	Cumberland Plain Snail	152	M

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Appendix C
EPBC Act Protected Matters Search

28 June 2013

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

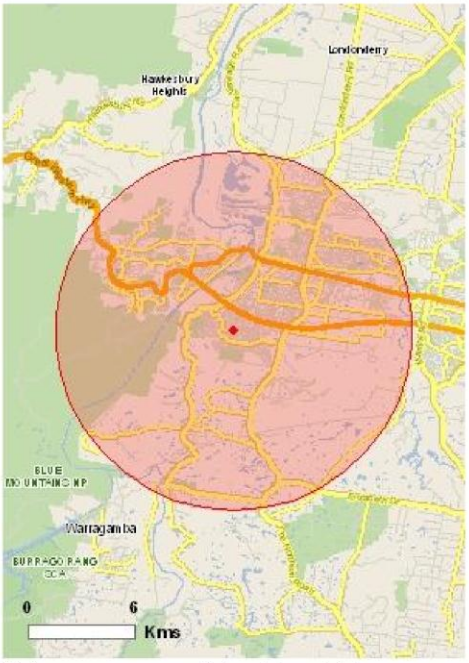
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

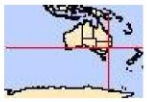
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 10/04/13 09:25:58



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	44
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	14
Commonwealth Heritage Places:	1
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	30
State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	52
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Status
The Greater Blue Mountains Area	NSW	Declared property

National Heritage Properties [Resource Information]

Name	State	Status
Natural		
The Greater Blue Mountains Area	NSW	Listed place

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale/Sandstone Transition Forest	Endangered	Community likely to occur within area
Temperate Highland Peat Swamps on Sandstone	Endangered	Community known to occur within area
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Litoria littlejohni		
Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area
Acacia gordonii		
[5031]	Endangered	Species or species habitat likely to occur within area

Appendix C EPBC Act website search within 10km of the subject land at Schofields

Name	Status	Type of Presence
Allocasuarina glareicola [21932]	Endangered	Species or species habitat likely to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum [2821]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus nicholii Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Micromyrtus minutiflora [11485]	Vulnerable	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Persoonia hirsuta [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pomaderris brunnea Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pultenaea glabra Smooth Bush-pea, Swamp Bush-pea [11887]	Vulnerable	Species or species habitat likely to occur within area
Pultenaea parviflora [19380]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rhizanthella slateri		
Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Streblus pendulinus		
Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Tetratheca glandulosa		
Glandular Pink-bell [2350]	Vulnerable	Species or species habitat may occur within area
Thelymitra sp. Kangaloon (D.L.Jones 18108)		
Kangaloon Sun-orchid [81971]	Critically Endangered	Species or species habitat may occur within area
Reptiles		
Hoplocephalus bungaroides		
Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Xanthomyza phrygia		
Regent Honeyeater [430]	Endangered*	Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Airservices Australia
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - 1CAD ORCHARD HILLS KINGSWOOD
Defence - AIR HEADQUARTERS AUSTRALIA - GLENBROOK
Defence - PENRITH DEPOT (Army Stores)
Defence - RANMME (DEOH)
Defence - SIGNAL STRS DEPOT-KINGSWOOD

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Orchard Hills Cumberland Plain Woodland	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Appendix C EPBC Act website search within 10km of the subject land at Schofields

Name	Threatened	Type of Presence
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area

Extra Information

Places on the RNE		[Resource Information]
Note that not all Indigenous sites may be listed.		
Name	State	Status
Natural		
The Blue Mountains	NSW	Indicative Place
Blue Mountains National Park (1980 boundary)	NSW	Registered
Mulgoa Natural Area	NSW	Registered
Orchard Hills Cumberland Plain Woodland	NSW	Registered
Western Sydney Shale Woodland St Marys	NSW	Registered
Indigenous		
Lapstone Area	NSW	Registered
Historic		
Briarcliffe	NSW	Indicative Place
Castlereagh Area	NSW	Indicative Place
Homestead Site & Windbreak	NSW	Indicative Place
House	NSW	Indicative Place
The Lewers Bequest & Penrith Regional Art Gallery & Garden	NSW	Indicative Place
Upper Room Chapel, Hall and Cemetery	NSW	Indicative Place
Combewood, Outbuildings and Garden	NSW	Registered
Emu Plains Community Arts Centre	NSW	Registered
Fernhill	NSW	Registered

Name	State	Status
Fernhill Setting	NSW	Registered
Glen Leigh and Outbuildings	NSW	Registered
Glenmore	NSW	Registered
King Family Farm Sites and Trees	NSW	Registered
Knapsack Viaduct	NSW	Registered
Lapstone Hill Railway and Landscape Area	NSW	Registered
Mulgoa Group and Landscape	NSW	Registered
Museum of Fire	NSW	Registered
St Stephens Anglican Church & Graveyard	NSW	Registered
St Thomas Anglican Church & Cemetery	NSW	Registered
The Cottage	NSW	Registered
The Horseshoe Bridge	NSW	Registered
Thornton Hall & Surrounds	NSW	Registered
Victoria Bridge	NSW	Registered
Werrington House	NSW	Registered

State and Territory Reserves [Resource Information]

Name	State
Blue Mountains	NSW
Mulgoa	NSW
Penrith Lakes	NSW
Yellomundee	NSW

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area

Appendix C EPBC Act website search within 10km of the subject land at Schofields

Name	Status	Type of Presence
Pycnonotus jocosus		
Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula		
Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Bufo marinus		
Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina		
Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus		
Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis		
Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus		
Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides		
Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine,		Species or species

Appendix C EPBC Act website search within 10km of the subject land at Schofields

Name	Status	Type of Presence
Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus		Species or species

Appendix C EPBC Act website search within 10km of the subject land at Schofields

Name	Status	Type of Presence
[11747]		habitat likely to occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Coordinates

-33.7874 150.6749

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix C EPBC Act website search within 10km of the subject land at Schofields

global environmental solutions

North West Rail Link
Tallawong Road, Schofields

Tallawong Road Rapid Transit Rail Facility

Flora & Fauna Assessment Report

Appendix D
Flora species list and vegetation notes

28 June 2013

Appendix D Flora Species List and Vegetation Notes for the subject land at Schofields

Table 1 Flora Species List surveyed from the subject site on the 8th and 9th of May 2013

KEY	
Symbol	**Description**
Status	
*	Exotic species ** Noxious Species
CPW	Species is listed as "*characteristic*" in the *Final Determination* for the Cumberland Plain Woodland (CPW) community, which is listed as a CEEC in the TSC Act and EPBC Act.
REFCF	Species is listed as "*characteristic*" within the *Final Determination* for the River Flat Eucalypt Forest on Coastal Floodplains (REFCF) community, which is listed as an EEC in the TSC Act.
Quadrat (Q)	
Q1	Quadrat 1 – quadrat within No. 71 Schofields Road (Figure 2)
Q2	Quadrat 2 – quadrat within No. 34 Cudgegong Road (Figure 2)
Q3	Quadrat 3 – quadrat within No. 75 Schofields Road (Figure 2)
Q4	Quadrat 4 – quadrat within No. 79 Schofields Road (Figure 2)
	Quadrat of Braun-Blanquet Cover Abundance from the subject land; 1 (<5% uncommon), 2 (<5% common), 3 (5-25% common), 4 (25-50%), 5 (50-75%), 6 (75-100%)

Status	Species name	Common name	Q1	Q2	Q3	Q4
	Acanthaceae					
CPW	*Brunoniella australis*	Blue Trumpet	2			2
	Agavaceae					
*	*Yucca* sp.	Yucca				
	Amaranthaceae					
	Alternanthera denticulate	Lesser Joyweed		1		
	Apocynaceae					
*	*Araujia sericifera*	Moth Vine		1		2
	Asparagaceae					
*	*Asparagus asparagoides*	Bridal Creeper		2		
	Asteraceae					
*	*Bidens pilosa*	Cobblers Peg				
*	*Cirsium vulgare*	Spear Thistle	1		2	
*	*Dimorphotheca ecklonis*	Cape Daisy				
REFCF	*Ozothamnus diosmifolius*	White Dogwood				
*	*Senecio madagascariensis*	Fireweed			3	2
*	*Sonchus oleraceus*	Common Sowthistle	2	1		
*	*Taraxacum officinale*	Dandelion	2			
	Basellaceae					
*	*Anredera cordifolia*	Potato Vine				
	Bignoniaceae					
*	*Jacaranda mimosifolia*	Jacaranda				
	Cactaceae					
**	*Opuntia stricta*	Common Prickly Pear				1
	Campanulaceae					
CPW, REFCF	*Wahlenbergia gracilis*	Sprawling Bluebell		1		
	Caprifoliaceae					
*	*Lonicera japonica*	Japanese Honeysuckle				

Appendix D Flora Species List and Vegetation Notes for the subject land at Schofields

Status	Species name	Common name	Q1	Q2	Q3	Q4
	Caryophyllaceae					
*	*Cerastium glomeratum*	Mouse-ear Chickweed			2	
	Casuarinaceae					
REFCF	*Casuarina glauca*	Swamp Oak				
	Chenopodiaceae					
CPW, REFCF	*Einadia hastata*	Berry Saltbush	1	1		
CPW	*Einadia nutans* subsp. *linifolia*	-	1			
CPW, REFCF	*Einadia trigonos*	Fishweed				
	Commelinaceae					
CPW, REFCF	*Commelina cyanea*	Native Wandering Jew			1	
**	*Tradescantia fluminensis*	Wandering Jew		3	1	
	Convolvulaceae					
CPW, REFCF	*Dichondra repens*	Kidney Weed	2			1
	Crassulaceae					
*	*Bryophyllum delagoense*	Mother-of-millions	2			
	Cyperaceae					
CPW	*Cyperus gracilis*	-				1
	Eleocharis sp.	A Spike Sedge				
CPW	*Fimbristylis dichotoma*	Common Fringe-sedge	2			
	Fabaceae – Faboideae					
CPW, REFCF	*Glycine clandestina*	-		1		
CPW, REFCF	*Glycine tabacina*	-	2			
CPW, REFCF	*Hardenbergia violaceae*	False Sarsaparilla		1		
*	*Trifolium repens*	White Clover				
	Fabaceae - Mimosoideae					
	Acacia falcata	-				
	Acacia decurrens	Black Wattle				
	Acacia longifolia	Sydney Golden Wattle				
REF	*Acacia parramattensis*	Parramatta Wattle				
	Geraniaceae					
CPW, REFCF	*Geranium solanderi*	Native Geranium			2	
	Lobeliaceae					
CPW, REFCF	*Pratia purpurascens*	Whiteroot	2	2	1	1
	Malvaceae					
*	*Modiola caroliniana*	Red-flowered Mallow				
*	*Sida rhombifolia*	Paddy's Lucerne		3	4	3
	Myrsinaceae					
*	*Anagallis arvensis*	Scarlet Pimpernel			1	1
	Myrtaceae					
CPW, REFCF	*Angophora floribunda*	Rough-barked Apple				
CPW, REFCF	*Eucalyptus amplifolia*	Cabbage Gum		4		
CPW	*Eucalyptus crebra*	Narrow-leaved Ironbark	2		2	3
CPW	*Eucalyptus eugenoides*	Thin-leaved Stringybark				2
CPW	*Eucalyptus fibrosa*	Broad-leaved Ironbark	2			
CPW, REFCF	*Eucalyptus mollucana*	Grey Box	3	1		
CPW, REFCF	*Eucalyptus tereticornis*	Forest Red Gum			3	3
REF	*Melaleuca decora*	-		2		
REF	*Melaleuca linariifolia*	Flax-leaved Paperbark				
REF	*Melaleuca styphelioides*	Prickly-leaved Paperbark				

Appendix D Flora Species List and Vegetation Notes for the subject land at Schofields

Status	Species name	Common name	Q1	Q2	Q3	Q4
	Myrtaceae cont'd					
	Melaleuca quinquenervia	Broad-leaved Paperbark				
	Oleaceae					
**	*Ligustrum lucidum*	Large-leaved Privet		2		
**	*Ligustrum sinense*	Small-leaved Privet				
**	*Olea europaea subsp. cuspidata*	African Olive		2	1	
	Oxalidaceae					
CPW	*Oxalis perennans*	-	1		2	1
	Phormiaceae					
CPW	*Dianella longifolia*	Blueberry Lily				
	Phytolaccaceae					
*	*Phytolacca octandra*	Inkweed				
	Pinaceae					
*	*Pinus radiata*	Radiata Pine				
	Pittosporaceae					
CPW, REFCF	*Bursaria spinosa*	Blackthorn	1		2	5
	Plantaginaceae					
*	*Plantago lanceolata*	Lamb's Tongue		3		
CPW, REFCF	*Veronica plebeia*	Trailing Speedwell			1	
	Poaceae					
CPW	*Aristida ramosa*	Purple Wire Grass				
CPW	*Aristida vagana*	Threeawn Spear Grass	2			
*	*Axonopus fissifolius*	Narrow-leafed Carpet Grass				
CPW	*Bothriochloa decipiens*	Red Grass	1			
*	*Bromus catharticus*	Prairie Grass		1		
*	*Chloris gayana*	Rhodes Grass				
CPW	*Chloris ventricosa*	Plump Windmill Grass	3			
*	*Cynodon dactylon*	Common Couch		2		
CPW	*Dichelachne micrantha*	Shorthair Plume Grass	3			
*	*Ehrharta erecta*	Panic Veldt Grass		4		1
	Eragrostis brownii	Brown's Love Grass				
*	*Eragrostis curvula*	African Love Grass				
CPW, REFCF	*Eragrostis leptostachya*	Paddock Love Grass	3			
CPW, REFCF	*Microlaena stipoides* var. *stipoides*	Weeping Grass	3	2	3	3
REF	*Oplismenus aemulus*	Basket Grass		2		2
CPW, REFCF	*Paspalidium distans*	-	2			
*	*Paspalum dilatatum*	Paspalum		2	1	
*	*Pennisetum clandestinum*	Kikuyu				
CPW	*Rytidosperma* sp.	A Wallaby Grass	3			
*	*Setaria italic*	Foxtail Millet				
*	*Setaria pumila*	Pale Pigeon Grass	3	2	2	
CPW	*Sporobolus creber*	Western Rat-tail Grass	1			
CPW, REFCF	*Themeda australis*	Kangaroo Grass				
	Polygonaceae					
	Rumex brownie	Swamp Dock				
	Pteridaceae					
CPW, REFCF	*Cheilanthes sieberi* subsp. *sieberi*	Poison Rock Fern				1
	Solanaceae					
*	*Cestrum parqui*	Green Cestrum				
*	*Lycium ferocissimum*	African Boxthorn				

Appendix D Flora Species List and Vegetation Notes for the subject land at Schofields

Status	Species name	Common name	Q1	Q2	Q3	Q4
	Solanaceae cont'd					
*	*Solanum chenopodioides*	Whitetip Nightshade		1		
*	*Solanum mauritianum*	Wild Tobacco				
*	*Solanum nigrum*	Black-berry Nightshade			1	
CPW, REF	*Solanum prinophyllum*	Forest Nightshade	1			2
	Typhaceae					
	Typha domingensis	Narrow-leaved Cumbungi				
	Verbenaceae					
*	*Verbena bonariensis*	Purpletop		1		
	Other					
	Regrowth eucalypts				2	

Appendix D Flora Species List and Vegetation Notes for the subject land at Schofields

Table 2 Vegetation notes surveyed from the subject land on 08 and 09 of May 2013

House No.	General	Canopy	Shrub Layer	Groundcover	EEC
69	• Mostly cleared with some scattered eucalypts and exotic plantings	• Scattered Narrow-leaved Ironbark and Grey Box with a few Forest Red Gum and Broad-leaved Ironbark • A few exotic trees and shrubs around the dwelling in the southern portion of the site	• Absent	• Grassland is a mixed exotic and native species • Dominant exotics include African Love Grass and Pigeon Grass • Dominant natives include Paddock Love Grass, Wallaby Grass, Brown's Love Grass, Purple Wire Grass, Plump Windmill Grass and Weeping Grass	• Arguably not CPW
71	• Northern portion fairly densely vegetated. • Quadrat 1	• Moderately dense Forest Red Gum, Grey Box, Broad-leaved Ironbark and Narrow-leaved Ironbark to 22m	• Absent	• Leafy disturbed native grassland • Mainly native but with scattered weeds including mainly Prickly Pear, Mother of Millions and African Boxthorn	• CPW
	• Southern portion includes buildings, scattered eucalypts and disturbed lawn	• Scattered Forest Red Gum, Grey Box and Ironbarks	• Absent	• Mixed native and exotic, with patches of both	• Arguably not CPW
73	• Cleared exotic grasses with dam	• About two specimens of Ironbark and one Forest Red Gum	• Absent	• Spike Sedge and *Juncus* sp. around dam	• No
75	• Substantially vegetated • Quadrat 3	• Fairly open canopy of Forest Red Gum, Narrow-leaved Stringybark and Narrow-leaved Ironbark to 25m with average DBH of 60cm	• Scatters and patches of Blackthorn, Parramatta Wattle, African Olive and regrowth eucalypts to 6m	• Dense native and exotic grasses and weeds such as Pigeon Grass, Paddy's Lucerne and Weeping Grass	• CPW
77	• Site compound already constructed on southern majority of site • Narrow band of vegetation along northern boundary	• Absent • Moderately dense canopy of Forest Red Gum, Narrow-leaved Ironbark and Thin-leaved	• Absent • Moderately dense to 4m in height	• Scattered weeds • Grassy leafy with dense areas of Paddy's Lucerne • Native grasses patchy and scattered including	• No • CPW

House No.	General	Canopy	Shrub Layer	Groundcover	EEC
77 cont		Stringybark to 24m in height	• Blackthorn, *Acacia falcata*, Moth Vine, African Olive and Large-leaved Privet	Weeping Grass Basket Grass and Forest Nightshade • Weeds include Spear Thistle, Inkweed, Bridal Creeper and Fireweed	
79	• Maintained lawn with dwelling in southern half of site	• Absent	• Absent	• Mown lawn (Couch)	• No
	• Dense maturing native regrowth vegetation in northern half of site	• Dense Narrow-leaved Ironbark, Forest Red Gum and Narrow-leaved Stringybark to 20m in height and around 40cm average DBH	• Dense Blackthorn to 6m • Scattered *Acacia falcata* and regrowth eucalypts	• Patchy natives and exotics • Pockets of native grasses and herbs (mainly Weeping Grass) among thickets of Paddy's Lucerne	• CPW
81	• Southern half and northwestern quadrant are overgrown exotic pasture	• A few scattered eucalypts and exotic trees	• Absent	• Mainly exotic Paspalum, Paddy's Lucern and Narrow-leaved Carpet Grass • Other weeds include Red-flowered Mallow and Spear Thistle	• No
	• Northeastern corner has dam and some native vegetation • Dam water appears polluted (black)	• Scattered Narrow-leaved Ironbark and Forest Red Gum around dam	• Moderately dense cover of Blackthorn, Parramatta Wattle, White Dogwood, False Sarsaparilla, *Acacia falcata* and regrowth eucalypts • Dam with Cumbungi at edges	• Scatters and patches of natives including Western Rat-tail Grass, Weeping Grass, Forest Nightshade, Plume Grass and Kangaroo Grass	• CPW
97	• Southern half and southwestern corner of northern half is abandoned pasture with a few scattered eucalypts	• Two Grey Box, two Forest Red Gum and one Ironbark	• Absent • Some Cumbungi in dam	• Overgrown exotic pasture • Mainly Kikuyu and other weeds	• No

House No.	General	Canopy	Shrub Layer	Groundcover	EEC
97 cont	• Northeastern corner around dam has a patch of eucalypts with disturbed native grassland	• Open canopy of Grey Box, Forest Red Gum and a few Narrow-leaved Ironbarks to 22m	• Virtually absent • A few specimens of *Acacia falcata* and regrowth eucalypts	• Dominated by exotic Kikuyu and Paddy's Lucerne • Occasional natives include Weeping Grass, Wallaby Grass, Lesser Joyweed, Kidney Weed, Saltbush, Sprawling Bluebell, Whiteroot, *Einadia nutans* and *Glycine clandestina* • Occasional exotics include Prickly Pear, Red-flowered Mallow, Moth Vine, Fireweed, Lamb's Tongue, Blackberry Nightshade, Pigeon Grass, Spear Thistle, Couch and Paspalum	• Arguably CPW
34	• Western majority of the site is cleared exotic pasture	• Scattered Forest Red Gum along the northern boundary in the western portion of the site	• Absent	• Dense weeds to 2m including Thistle, Lamb's Tongue, White Clover, Paddy's Lucerne, Purpletop, Prairie Grass, Pigeon Grass, Couch, Inkweed, Kikuyu and Paspalum	• No
	• Native vegetation along creek at the back eastern boundary of the property	• Dense Cabbage Gum and Rough-barked Apple to 18m in height with average DBH of around 30cm along creek at eastern boundary	• Large-leaved Privet, *Melaleuca decora*, Flax-leaved Paperbark, Swamp Oak, Sydney Golden Wattle and regrowth Cabbage Gum to 15m • Scattered Blackthorn to 3m in height	• Mainly exotic Paddy's Lucerne, Panic Veldt Grass and Wandering Jew. Also Blackberry Nightshade, Madeira Winter, Yucca and Cape Daisy • Scatters and patches of natives including Spiny-headed Mat-rush, Blueberry Lily, Whiteroot, Blue Trumpet, Weeping Grass and Saltbush • Some Cumbungi along creek	• REFCF
35	• Around dwelling in eastern quarter of site is mainly exotic with scattered eucalypts	• Scattered Forest Red Gums	• Absent	• Exotic Kikuyu lawn and weeds	• No
	• Back of property is mainly overgrown exotic pasture	• Scattered Narrow-leaved Ironbark and Forest Red Gum	• A few scattered Blackthorn to 3m at	• Mainly exotic pasture and weeds (such as Pigeon Grass and Paspalum)	• No

House No.	General	Canopy	Shrub Layer	Groundcover	EEC
35 cont			the property boundaries		
51	• Central and northeastern portion of site is cleared with overgrown landscaped garden and Pine Plantation	• Radiata Pine plantation in northeastern quarter of site • Some Narrow-leaved Ironbark and Thin-leaved Stringybark at northeastern boundary	• Dense Small-leaved and Large-leaved Privet to 6m, with Green Cestrum and Japanese Honeysuckle	• Cleared area has Kikuyu and Couch • Scatters and patches of Lesser Joyweed, Weeping Grass, Whiteroot, Basket Grass and Fishweed	• No
	• Band of Swamp Oak – Paperbark Forest along most of the western boundary	• Swamp Oak, Broad-leaved Paperbark and Prickly-leaved Paperbark	• Scattered weeds such as Wild Tobacco and Privet	• Mainly Swamp Oak needles with scattered Panic Veldt Grass	• REFCF
	• Dense Cabbage Gum Forest in southeastern corner of site	• Cabbage Gum and a few Broad-leaved Apple to 15m	• Scattered weeds to 6m, including Privet, Green Cestrum, Wild Tobacco and Japanese Honeysuckle	• Dense groundcover of Weeping Grass, Panic Veldt Grass, Pigeon Grass and weeds (Scarlet Pimpernel Thistle)	• REFCF
53	• Exotic pasture with scattered eucalypts across southern portion of site	• Scatters and patches of Cabbage Gum	• Virtually absent	• Exotic pasture	• No
	• Highly disturbed native vegetation at northern quarter of property	• Moderately dense canopy to 25m • Open woodland of Narrow-leaved Ironbark and Thin-leaved Stringybark	• Virtually absent. • A few weeds spreading across from No. 51 (including Green Cestrum and Privet)	• Highly disturbed including Paddy's Lucerne, Pigeon Grass and Panic Veldt Grass	• Arguably CPW
55	• Almost entirely exotic	• Narrow-leaved Ironbarks and Stringybarks in northwestern corner	• Absent	• Exotic	• No

Appendix D Flora Species List and Vegetation Notes for the subject land at Schofields

House No.	General	Canopy	Shrub Layer	Groundcover	EEC
57	• Cleared exotic pasture grass	• None	• Dam with dense fringing of Cumbungi	• Exotic grassland of Paspalum, Kikuyu, White Clover, Narrow-leaved Carpet Grass, Pigeon Grass and Purpletop	• No
28	• Largely cleared with overgrown exotic pasture	• Absent	• Absent • Some Cumbungi in dam	• Exotic	• No
	• Narrow band of native vegetation along the site boundary in the southeastern corner	• Scattered Forest Red Gum, Narrow-leaved Stringybark and Narrow-leaved Ironbark	• Scattered African Olive and *Acacia falcate* •	• Scattered native and exotic • Three-awn Speargrass, False Sarsaparilla, Kangaroo Grass, Einadia nutans	• Arguably not CPW
31	• Scattered canopy of eucalypts with exotic pasture grass and weeds • Lots of rubbish and old agricultural refuse	• Open canopy of Forest Red Gum, grey Box, Narrow-leaved Ironbark and Broad-leaved Ironbark	• Mostly absent • Scattered African Olive, Prickly Pear, Black Wattle and African Boxthorn • A few specimens of Blackthorn, *Acacia falcata* and Black Wattle	• Virtually entirely exotic • Kikuyu, Paddy's Lucerne, Panic Veldt Grass, Cobblers Peg, Prairie Grass, Couch, Paspalum and African Lovegrass • Occasional natives including Plump Windmill Grass, Paddock Lovegrass, Red Grass and Western Rat-tail Grass	• Arguably not CPW

global environmental solutions

North West Rail Link
Tallawong Road, Schofields

Tallawong Road Rapid Transit Rail Facility

Flora & Fauna Assessment Report

Appendix E
Fauna species list on the subject land at Schofields

28 June 2013

Appendix E Fauna species list surveyed from the subject land on 08 and 09 May 2013

KEY	
Symbol	**Description**
*	Exotic species
**	Noxious species
V	Species listed as "*vulnerable*" in the TSC Act
E	Species listed as "*endangered*" in the TSC Act

Status	Species name	Common name
BIRDS		
	Anatidae	
	Chenonetta jubata	Australian Wood Duck
	Aythya australis	Hardhead
	Accipitridae	
	Haliastur sphenurus	Whistling Kite (deceased)
	Elanus axillaris	Black-shouldered Kite
	Ardeidae	
	Mesophoyx intermedia	Intermediate Egret
	Egretta novaehollandiae	White-faced Heron
	Artamidae	
	Cracticus torquatus	Grey Butcherbird
	Gymnorhina tibicen	Magpie
	Cacatuidae	
	Cacatua galerita	Sulphur-crested Cockatoo
	Campephagidae	
	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Charadriidae	
	Vanellus miles	Masked Lapwing
	Columbidae	
	Ocyphaps lophotes	Crested Pigeon
	Corvidae	
	Corvus coronoides	Australian Raven
	Dicuridae	
	Grallina cyanoleuca	Magpie-lark
	Estrildidae	
	Taeniopygia bichenovii	Double-barred Finch
	Neochmia temporalis	Red-browed Finch
	Halcyonidae	
	Dacelo novaeguineae	Kookaburra
	Maluridae	
	Malurus cyaneus	Superb Fairy-wren
	Meliphagidae	
	Manorina melanocephala	Noisy Miner
	Pachycephalidae	
	Colluricincla harmonica	Grey Shrike-thrush

Appendix E Fauna species list surveyed from the subject land on 08 and 09 May 2013

Status	Species name	Common name
BIRDS		
	Phalacrocoracidae	
	Phalacrocorax varius	Pied Cormorant
	Podargidae	
	Podargus strigoides	Tawny Frogmouth
	Psittacidae	
	Trichoglossus haematodus	Rainbow Lorikeet
	Glossopsitta concinna	Musk Lorikeet
	Platycercus eximius	Eastern Rosella
	Rallidae	
	Porphyrio porphyrio	Purple Swamp-hen
	Rhipiduridae	
	Rhipidura albiscapa	Grey Fantail
	Sturnidae	
*	*Acridotheres tristis*	Indian Myna
	Threskiornithidae	
	Threskiornis molucca	Australian White Ibis
	Threskiornis spinicollis	Straw-necked Ibis
MAMMALS		
	Canidae	
*	*Canis sp.*	Dog
*	*Vulpes vulpes*	Fox
	Equidae	
*	*Equus sp.*	Horse
	Leporidae	
*	*Oryctolagus cuniculus*	European Rabbit
	Vespertilionidae	
	Chalinolobus gouldii	Gould's Wattled Bat
V	*Miniopterus australis*	Little Bent-wing Bat
V	*Miniopterus (schreibersii) orianae oceansis*	Common (Eastern) Bent-wing Bat
AMPHIBIANS		
	Myobatrachidae	
	Crinia signifera	Common Eastern Froglet
	Uperoleia laevigata	Smooth Toadlet
	Pseudophryne bibronii	Brown toadlet
REPTILES		
	Chelodininae	
	Chelodina longicollis	Eastern Long-necked Turtle
	Scincidae	
	Lampropholis delicata	Garden Sun-skink
FISH		
	Poeciliidae	
**	*Gambusia holbrooki*	Plague Minnow