FINAL

Ecological Assessment

24 Muir Road, Chullora

Ecological Assessment

24 Muir Road, Chullora

Prepared for

CIP

Prepared by

AECOM Australia Pty Ltd

Level 8,

17 York Street

Sydney NSW 2000

T +61 2 8023 9333

F +61 2 8023 9399

www.aecom.com

ABN 20 093 846 925

1 June 2010

60153522

Quality Information

Document	**Ecological Assessment**	
Ref	60153522 60153522_Ecological_Final_1June2010	
Date	1 June 2010	
Prepared by	Andrea Sabella	Author Signature
Reviewed by	David James	Technical Peer Reviewer Signature

Distribution

Copies	**Recipient**
1	**Mr Andrzej Masztak** **General Manager - Infrastructure and Design** **CIP** Level 32 60 Margaret Street Sydney NSW 2000

Contents

List of Tables

List of Figures

List of Appendices

Executive Summary

This ecological assessment has been prepared to support a Development Application to Bankstown City Council that proposes to subdivide the site at 24 Muir Road into two lots and to construct a warehouse and distribution centre for Volkswagen Group Australia on Lot 1.

Two threatened species are addressed in this assessment; Downy Wattle and the Green and Golden Bell Frog. The Downy Wattle occurs on the site but is not within Lot 1. It will not be removed as part of the proposed development and will be supported by erosion and weed control. Green and Golden Bell Frogs are recorded as occurring within the local vicinity and are known to use disturbed areas. Suitable habitat for this species is found within and surrounding the site, including the Wildlife Sanctuary to the east.

Implementation of the mitigation measures recommended in this assessment would decrease the probability of impacting local in particular threatened biodiversity.

1.0 Introduction

1.1 Background

The site of this assessment is vacant land located at Chullora in the Bankstown LGA in Western Sydney (**Figure 1**; hereafter referred to as the subject site). The subject site is known as Lot 38 DP1031735, No. 24 Muir Road Chullora and is part of the Chullora Technology Park. Its southern boundary runs approximately 196 m along Muir Road, in between Dasea Street and Worth Street. The subject site is approximately 6.979 hectares (ha).

Historically, the subject site was owned by State Rail. The majority of the land has been previously cleared, but there is a small section of vegetation in the south western corner. It has a history of asbestos contamination but has since been deemed safe for commercial and industrial use.

The area surrounding the subject site is dominated by medium to large sized industrial land uses. Neighbouring industries include Tip Top, Primo, Chullora Recycling and freight terminals. To the east of the subject site are the Chullora Wetlands and Wildlife Sanctuary (Wildlife Sanctuary) which is managed by Sydney Water.

1.2 Proposed Development

The proposed development includes subdivision of the subject site into two lots (**Figure 2**) and two stages of construction on Lot 1. The initial construction (Stage 1) would consist of subdivision and earthworks, the primary warehouse, office component and external car storage whilst the secondary construction (Stage 2) would involve an expansion of the warehouse. The overall scope of the works includes:

- Earthworks over the entire subject site to create development platforms;
- Subdivision of the subject site into two lots including the Volkswagen Group Australia (VGA) lot and a residual site for future development;
- Erection of a warehouse and distribution centre with attached ancillary offices for VGA including offices and 15 785 m^2 of warehouse space on Lot 1;
- Provision of external car storage (with hail netting) for 441 vehicles initially, to be later reduced to 87 vehicles, in Stage 2; and
- A 7 000 m^2 warehouse expansion in Stage 2.

1.3 Scope

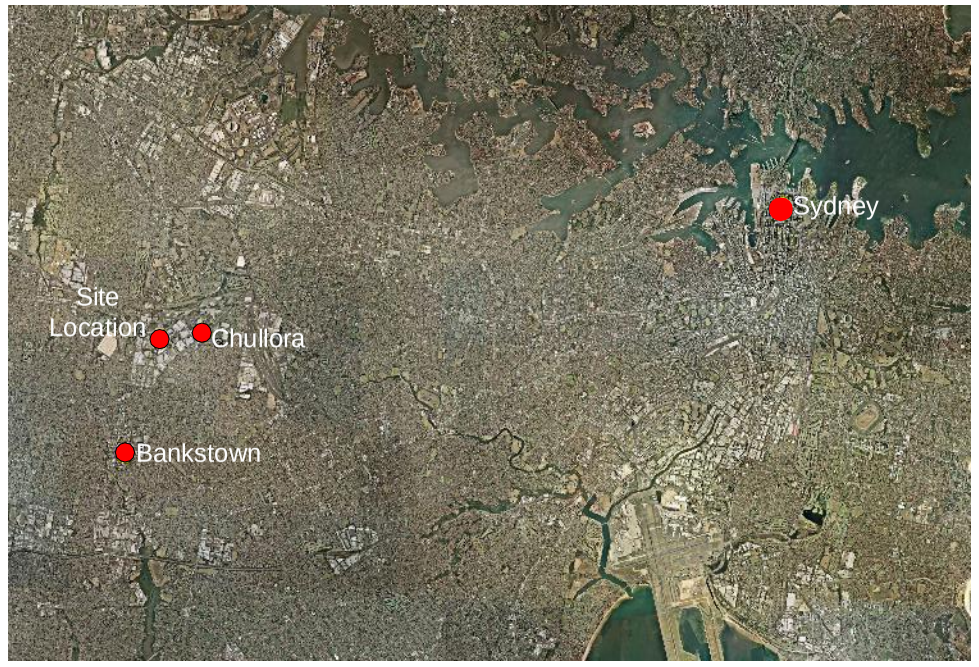
This ecological assessment has been prepared to support a Development Application (in the form of a Statement of Environmental Effects) to Bankstown City Council (BCC) for this proposed development for VGA. The earthworks and creation of development platforms would result in removal of existing vegetation, potentially impacting local and threatened biodiversity (species, populations and ecological communities). This assessment addresses the local and threatened flora and fauna that would be impacted or potentially impacted by the proposed development.

1.4 Objectives

The objectives of the assessment are to:

- Determine if any species, population or ecological community would be significantly impacted by the proposed development;
- Recommend measures to minimise impacts on flora and fauna; and
- Recommend any additional assessment that may be required.

AECOM



01 Jun 10 - 09:11

60153522_FIGURE_1.dwg

60153522

Figure 1 - Site location

60153522

Figure 2 - Lot boundaries and location of Acacia pubescens

"This page has been left blank intentionally"

2.0 Relevant Legislation

This section provides a brief overview of legislation relevant to this ecological assessment.

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) governs the Commonwealth Environmental Assessment process and provides protection for matters of National Environmental Significance (NES), which include:

- Nationally threatened species and ecological communities;
- Australia's World Heritage Areas;
- Ramsar wetlands of international importance;
- Migratory species listed under the EPBC Act (species protected under international agreements);
- Commonwealth Marine Areas;
- Nuclear actions, including uranium mining; and
- National Heritage.

Approval under the EPBC Act is required where the Department of Environment, Water, Heritage and the Arts (DEWHA) determines that there will be or is likely to be a significant impact on a matter of NES.

2.2 NSW State Legislation

2.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act* 1979 (EP&A Act) and the *Environmental Planning and Assessment Regulation* 2000 (EP&A Regulation) provide the statutory framework for the assessment of the proposal. The proposed development is subject to approval under Part 4 of the EP&A Act.

Under sections 5A and 79C, consideration must be made to the potential impacts of the proposed development on biodiversity (flora and fauna), focusing on threatened species, populations, communities and their required habitats. If threatened biodiversity is found to be potentially impacted by the proposed development, an Assessment of Significance (Seven-Part Test) addressing the factors listed in section 5A (2) is required.

Under Section 75F of the EP&A Act, the Department is required to issue Director General's Requirements (DGRs) in response to an application for a development approval. The DGRs are prepared in consultation with relevant government agencies and set the requirements for Environmental Assessment under the EP&A Act.

The EP&A Act is supplemented by a number of Environmental Planning Instrument's including:

- State Environmental Planning Policies (SEPPs);
- Local Environmental Plans (LEPs); and
- Other planning instruments such as Development Control Plans.

2.2.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act* 1995 (TSC Act) outlines the protection of threatened species, communities and critical habitat in NSW. The Act is administered by the Department of Environment Climate Change and Water (DECCW). Section 91 of the TSC Act requires that a licence be obtained should a development result in one or more of the following:

- Harm to any animal that is of, or is part of, a threatened species, population or ecological community;
- The picking of any plant that is of, or is part of, a threatened species, population or ecological community;
- Damage to critical habitat; and / or
- Damage to habitat of a threatened species, population or ecological community.

Under section 5A of the EP&A Act, Seven-Part Tests may be required to determine the likely significance of impacts on threatened biodiversity.

2.2.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act* 1974 (NPW Act) provides a framework to conserve native terrestrial flora and fauna species and manage areas of conservation value such as Nature Reserves and National Parks. In addition, the purpose of the NPW Act is to provide the primary basis for protection and unwarranted destruction of relics of high cultural significance – both Indigenous and non-Indigenous value. The Act is administered by the Department of Environment Climate Change and Water (DECCW).

Under the NPW Act, it is an offence to harm, trade, possess or damage critical habitat or the habitat of any threatened species without obtaining a Section 120 licence.

2.2.4 Noxious Weeds Act 1993

The *Noxious Weeds Act* 1993 (NW Act) establishes a system for the identification and control of noxious weeds in NSW. The Act divides noxious weeds into five categories which determine the level of control required. Responsibility for the control of noxious weeds lies with the owner and/or occupier of private land and Crown land, local councils and other public authorities. Under the NW Act, the Minister may declare a plant to be a noxious weed. Control notices can be issued by the Minister and local control authorities to ensure that obligations are met.

2.2.5 Native Vegetation Act 2003

The *Native Vegetation Act* 2003 (NV Act) regulates the clearing of all native vegetation in NSW except on land listed under Schedule 1 of the Act.

2.3 Local Government

2.3.1 Local Environmental Planning Policy

A Local Environmental Plan (LEP) is the legal guide for development and planning decisions for local government areas, through zoning and development controls. The Bankstown LEP 2001 has been prepared in line with the State Government's Standard Instrument (LEP) Order 2006. The LEP is supported by the Bankstown Development Control Plan 2005 (DCP) which provides more detailed controls and requirements for different land uses to achieve the purposes of the LEP.

Amongst other issues, the LEP addresses the regulation of development to protect threatened species. Specifically, it addresses the potential impacts on flora and fauna of "clearing of vegetation, alteration of the natural land form or the potential for air, water or ground pollution." The LEP also addresses ecologically sustainable development and requires the "avoidance of significant adverse impact on the natural environment, particularly...native flora and fauna".

The LEP also addresses Tree Preservation Orders (TPO) in schedule 20, which is further discussed in the Bankstown DCP Part E2 TPO. The TPO protects and preserves existing trees by prohibiting actions such as removal or injury to trees, without written consent of BCC. This action is necessary for the removal of trees outlined in the Tree Report (Treescan 2010).

3.0 Methodology

3.1 Study Area

The subject site is Lot 38 DP1031735, No. 24 Muir Road Chullora NSW, in the Bankstown LGA. Its southern boundary runs approximately 196 m along Muir Road, in between Dasea Street and Worth Street. The subject site is approximately 6.979 hectares (ha).

The study area for the flora and fauna assessment includes the subject site (**Figure 1**) and a 10 km radius which may be indirectly affected by the proposal due to the potential interaction of flora and fauna throughout these areas.

3.2 Desktop Survey

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any threatened flora or fauna species listed under the TSC Act or EPBC Act have been recorded or predicted to occur within a 10 km radius of the subject site. These searches were conducted on 25 May 2010.

The DECCW and / or DEWHA threatened species profile of each of these species was reviewed and compared to the habitat attributes noted in the field study in order to determine which of these species have the potential to occur on the subject site, based on their habitat requirements.

DECCW vegetation mapping of the Cumberland Plain was used to assess the location of surrounding vegetation communities, including endangered and critically endangered ecological communities (EECs and CEECs).

The BCC Species of Regional Significance of Western Sydney list was assessed to add any other species not already listed under the TSC Act or EPBC Act.

3.3 Field Survey

A two hour ecological site survey was conducted on Wednesday 26 May 2010 by two AECOM ecologists, Caliope Adamos and Andrea Sabella.

The site survey addressed flora and fauna, targeting threatened biodiversity. The flora survey involved recording the presence and abundance of native and non-native flora. It also confirmed the presence and location of Downy Wattle (*Acacia pubescens).* The fauna survey covered a general assessment of the area including species observed, signs of fauna presence (i.e. diggings, nests etc) and habitat attributes.

Plant species were identified with reference to the Harden (2007). Fauna species were identified with reference to Slater *et al.* (2003) and Robinson (1998).

3.4 Limitations

The limited natural habitat present on the subject site leads to a decision to conduct a preliminary ecological site survey. This method did not include detailed fauna trapping and did not cover the time necessary to record nocturnal or migratory species. Furthermore, due to the time of year, the majority of flora species were not flowering and fauna species were less active. This limited the chances of identifying all species that utilise the site.

A conservative approach was taken in the assessment of the likelihood of occurrence of threatened biodiversity in order to account for the limited extent of the field survey.

"This page has been left blank intentionally"

4.0 Existing Environment

The habitat on the subject site has previously been cleared for industrial use and is currently highly disturbed. Potential habitat for local and threatened species occurs in disturbed areas within and around the site.

4.1 Protected Areas

The subject site is not within a Protected Area (PA) (which includes National Parks, State Parks, Reserves, Conservation Areas, World Heritage Areas and Indigenous Protected Areas).

Bankstown LGA contains 524.2 ha of bushland. This includes 276.2 ha in Council reserves, 174 ha in the Georges River National Park and 74 ha on private or State Government land.

Within a 10 km radius of the site, the following EPBC Act protected natural items occur:

- Brays Bay Wetland;
- Enfield Brickpits NSW;
- Ermington Bay Wetlands NSW;
- Haslams Creek Wetlands NSW;
- Homebush Bay Wetlands NSW;
- Lower Duck River Wetlands NSW;
- Majors Bay Wetlands NSW;
- Mason Park Wetlands NSW;
- Meadowbank Park Foreshore Wetland NSW;
- Silverwater Saltmarsh NSW;
- Voyager Point NSW; and
- Yaralla Bay Wetlands NSW.

The Chullora Wetlands and Wildlife Sanctuary is located on the adjacent lot to the east of the subject site. It is managed by Sydney Water.

4.2 Flora

4.2.1 Ecological Communities

No ecological communities are present on the subject site (**Figure 3**). Within a 10 km radius of the site, one endangered ecological community (EEC) and two critically endangered ecological communities (CEEC) are present:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CEEC);
- Shale/Sandstone Transition Forest (EEC); and
- Turpentine-Ironbark Forest in the Sydney Basin Bioregion (CEEC).

These ecological communities are not present on the subject site. None of these ecological communities are likely to be impacted by the proposed development. Hence, Assessments of Significance were not undertaken.

AECOM

N

Parramatta

Great Western Highway

Silverwater Road

Western Motorway

Fairfield

Cumberland Highway

Hume Highway

Site Location

Bankstown

King Georges Road

Princes Highway

South Western Motorway

Cad ref: T:\Brown. Thomas\Bankstown Figure design - Andrea Sabella\CAD\60153522_FIGURE_3.dwg Last modified: 28 May 10 - 11:57

Community description

- Shale Sandstone Transition Forest (Low Sandstone Influence)
- Shale Plains Woodland
- Shale/Gravel Transition Forest
- Alluvial Woodland
- Riparian Forest
- Turpentine-Ironbark Forest
- Shale Sandstone Transition Forest (High Sandstone Influence)
- Cooks River Castlereagh Ironbark Forest
- Sandstone Ridgetop Woodland
- Upper Georges River Sandstone Woodland
- Western Sandstone Gully Forest
- Mangrove/Saltmarsh Complex
- Freshwater Wetlands
- Castlereagh Swamp Woodland
- Turpentine-Ironbark Margin Forest
- Castlereagh Scribbly Gum Woodland
- Vegetation Of Volcanic Substrates
- Shale Hills Woodland
- Unclassified Vegetation

City

Highway

0 1 2 3 4km

A3 FULL SIZE

DECCW (2002)

60153522

Figure 3 - Vegetation Maps

4.2.2 Endangered Flora Populations

No endangered flora populations were observed on the subject site during the field study. Four endangered flora populations listed under the TSC Act are recorded to exist within 10 km of the subject site:

- Gosford Wattle, Hurstville and Kogarah Local Government Areas;
- *Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas;
- *Pomaderris prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas; and
- Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield.

These populations are not likely to be present on the subject site (see **Appendix A**) or to be affected by the proposed development and hence Assessments of Significance were not undertaken for these populations.

4.2.3 Threatened Flora Species

Forty threatened flora species (including Downy Wattle*)* have been previously recorded within 10 km of the subject site (**Appendix A**). Of these, 35 are listed under the TSC Act (17 vulnerable, 16 endangered and two critically endangered) and 15 under the EPBC Act (eight vulnerable, five endangered and two critically endangered). The habitat assessments indicated that no threatened flora species would be likely to occur on the subject site other than Downy Wattle.

The Downy Wattle population in the southwest corner consists of 52 adult and six juvenile individuals that cover an area of approximately 50 m^2. The individuals are healthy but currently competing with non-native species and isolated from other native vegetation.

4.2.4 Flora Species

The flora species listed in **Table 1** were identified during the field survey.

Table 1: Flora species identified during field survey.

Genus	Species	Common Name	Comments	NW Act 1993 Class[1]
Native species				
Acacia	*pubescens*	Downy Wattle	Western boundary of subject site	-
Eucalyptus	*sideroxylon*	Mugga Ironbark	Planted on the side of Muir Road.	-
Persicaria	*decipiens*	Slender Knotweed	Eastern boundary. Fairly common native. Widespread along streams, swamps, floodplains and winter-wet depressions.	-
Noxious Weeds (under NW Act)				
Asparagus	*asparagoides*	Bridal Creeper	Western section, under and near *Acacia pubescens.*	5

[1] Class 3 = Regionally Controlled Weeds.

Class 4 = Locally Controlled Weeds.

Class 5 = Restricted Plants.

Genus	Species	Common Name	Comments	NW Act 1993 Class[1]
Chrysanthemoides	*monilifera*	Boneseed	Isolated occurrences of it in middle of subject site and more dense patches near eastern boundary.	3
Lantana	*camara*	Lantana	Western end near *Acacia pubescens.*	5
Rubus	*fruiticosus aggregate*	Blackberry	Chiefly along northern section near rail line	4
Weeds of National Significance (WONS)				
Asparagus	*asparagoides*	Bridal Creeper	Western section, under and near *Acacia pubescens.*	5
Chrysanthemoides	*monilifera*	Boneseed	Isolated occurrences of it in middle of subject site and more dense patches near eastern boundary.	3
Lantana	*camara*	Lantana	Western end near *Acacia pubescens.*	5
Rubus	*fruiticosus aggregate*	Blackberry	Chiefly along northern section near rail line	4
Weeds of Significance - Bankstown				
Cortadiera	*selloana*	Pampass Grass	Western section of site, along southern boundary fence and northern section near rail line.	-
Environmental Weeds - Bankstown				
Foeniculum	*vulgare*	Fennel	-	-
Other non-native species				
Acacia	*saligna*	Golden Wreath Wattle	Native to W.A. Scattered randomly. Couple of specimens in centre of subject site and along southern fence line.	-
Acacia	*baileyana*	Cootumaundra Wattle	Few specimens of this are scattered about near the western end. This is not locally native but native to small region, southern NSW.	-
Alopecurus	*pratensis*	Meadow Foxtail	-	-
Bidens	*pilosa*	Cobbler's Pegs	Western section of site.	-
Brassica	*nigra or rapa*	Black Mustard or Wild Turnip	-	-
Chloris	*gayana*	Rhodes Grass	Common throughout.	-

Genus	Species	Common Name	Comments	NW Act 1993 Class[1]
Cirsium	*vulgare*	Spear Thistle	Common throughout.	-
Conyza	*sp.*	Fleabane	-	-
Cynodon	*dactylon*	Couch Grass	Along southern fence line of site.	-
Eragrostis	*curvula*	African Lovegrass	One of the dominant grass species occurs throughout proposed development site.	-
Genista	*linifolia*	Flax-leaf Broom	Dense thickets of this shrub occur along the western boundary of the site and along the southern fence line.	-
Genista	*monspessulana*	Montpellier Broom	Thickets of this are concentrated towards the western end, near *Acacia pubescens* and southern boundary.	-
Gomphocarpus	*fruiticosus*	Cotton Bush	Scattered about, not as frequent.	-
Melinus	*repens*	Red Natal Grass	Through development site.	-
Oxalis	*sp.*	Wood Sorrels	Groundcover-common throughout.	-
Paspalum	*dilatatum*	Paspalum	Common throughout.	-
Pennisetum	*clandestine*	Kikuyu	Common throughout, especially western section.	-
Phytolacca	*octandra*	Inkweed	Western end.	-
Plantago	*sp.*	Plantain	Groundcover-common throughout.	-
Senecio	*madagascariensis*	Fireweed	Scattered throughout.	-
Setaria	*pumila*	Pale Pigeon Grass	Southern boundary line.	-
Sida	*rhombifolia*	Paddy's Lucerne	Scattered.	-
Verbena	*bonariensis*	Purpletop	Scattered.	-
Vicia	*sp.*	Vetch	Ground cover.	-

Downy Wattle was the only threatened flora species recorded on the subject site (**Figure 2**). It is growing in the southwest corner in a clump of vegetation that also includes other non-native species. As it is listed as vulnerable under the TSC Act and the EPBC Act, an Assessment of Significance and an EPBC Act Significant Impact Assessment was carried out (see **Appendix C** and **Appendix D**).

No flora species listed as protected under the NPW Act were observed on the site.

4.3 Fauna

4.3.1 Endangered Fauna Populations

No fauna populations were observed on the subject site during the field study.

Three endangered fauna populations are recorded to exist within 10 km of the site:

- White-fronted Chat in the Sydney Metropolitan area (TSC Act);
- Spotted-tail Quoll, Tiger Quoll (south-eastern mainland population) (EPBC Act); and
- Long-nosed Bandicoot population in inner western Sydney (TSC Act).

These populations are not likely to be present on the subject site (see **Appendix B**) or to be affected by the proposed development and hence an Assessment of Significance was not undertaken.

4.3.2 Threatened Fauna Species

Sixty five threatened fauna species have been previously recorded within 10 km of the subject site (**Appendix B**). Of these, 53 are listed under the TSC Act (42 vulnerable and 11 endangered) and 16 under the EPBC Act (12 vulnerable, three endangered and one critically endangered). The habitat assessments indicated that the Green and Golden Bell Frog is the only fauna species that would be likely to occur on the subject site. An Assessment of Significance and an EPBC Act Significant Impact Assessment were carried out on this species (**Appendix C** and **Appendix D**).

4.3.3 Fauna Species

Two frog species and four bird species were recorded on the subject site during the field study:

- Striped Marsh Frog (*Limnodynastes peronii*) – In a flooded depression in the south of the site;
- *Crinia signifera* (Common Eastern Froglet) – In a flooded area to the west of the site;
- Welcome Swallow (*Hirundo neoxena*) – Flying overhead;
- Australian Magpie (*Gymnorhina tibicen*) – Flying overhead;
- Magpie-lark (*Grallina cyanoleuca*) – Flying overhead; and
- Australian Raven (*Corvus coronoides*) – Flying overhead.

No flora species listed as protected under the NPW Act were observed on the site.

5.0 Assessment of Potential Impacts

5.1 Proposed Actions

The proposed development outlined in **Section 1.2** includes the removal of 5.07 ha of weed-dominated grassland within Lot 1 and six Mugga Ironbark (*Eucalyptus sideroxylon)* that have been planted along Muir Road. It also includes the modification of the current ecological community which surrounds the threatened species, Downy Wattle. The Mugga Ironbarks are the subject of the Tree Report (Treescan 2010) which recommends replacement planting within the landscape design.

Lot 1 borders the Wildlife Sanctuary to the east, a main area for addressing potential impacts. The potential impacts of the removal of the grassland and the construction of the proposed development are described below.

5.2 Protected Areas

The proposed development does not lie within a PA, so no direct impacts on a PA are predicted. Furthermore, there are no secondary impacts predicted on PAs within the localised area due to the proposed development.

5.3 Flora

As described in **Section 4.2**, there are no native ecological communities or flora populations on the site. There were three native flora species identified on the subject site as listed in **Table 1**; Slender Knotweed, Mugga Ironbark and Downy Wattle.

Slender Knotweed is a common aquatic native found along streams, swamps, floodplains and winter-wet depressions. Only one individual was identified on the subject site and it is not predicted that the proposed development will impact an established local population.

Mugga Ironbarks have been planted on the side of Muir Road, and six have been marked for removal in the Tree Report (Treescan 2010). The replacement planting recommended as part of the landscaping will restore the habitat loss otherwise caused by removal of these trees.

The Downy Wattle is restricted to the Sydney area and has been reduced to small, fragmented populations throughout the Bankstown-Fairfield-Rookwood area and the Pitt Town Area, in Western Sydney. It is listed as vulnerable under the TSC Act and EPBC Act. It is naturally found in open woodlands and forest, but the extant populations are most common in developed areas.

Reproduction of Downy Wattles is via vegetative and sexual reproduction, but it relies more on vegetative reproduction using suckers. The seeds have high dormancy and a persistent seed bank, which allows them to wait for many years until suitable environmental conditions encourage germination. They first flower at around three to five years of age and are known to survive up to 50 years. Including the use of vegetative reproduction increases their expected lifespan beyond 50 years.

The proposed development does not include construction near the remnant Downy Wattle population. With the mitigation measures implemented, this population should remain or increase in health over time. The Assessments of Significance run for the Downy Wattle both found that the proposed development would not significantly impact the long term survival of the species (see **Appendix C** and **Appendix D**).

The threatened flora assessment of the area within 10 km of the subject site did not find any other threatened flora communities or populations that would be potentially impacted by the proposed development.

5.4 Fauna

The Green and Golden Bell Frog was the only threatened fauna species that was assessed to potentially utilise the subject site and therefore be impacted by the proposed development.

The Green and Golden Bell Frog was once distributed along the coastal lowlands in NSW from approximately 50 kilometres south of the Queensland border to north-east Victoria. Populations were also reported from the southern tablelands and central slopes of NSW. Since the 1970's the species has undergone a decline in its population and distribution, particularly in inland areas.

Extant key populations in the Sydney region include populations in the following locations (DEC 2005):

- Kurnell,
- Homebush Bay,
- Greenacre,
- Clyde/Rosehill,
- Merrylands,
- Arncliffe,
- St Marys,
- Hammonville.

Green and Golden Bell Frog habitat typically consists of four functional types:

- Breeding habitat: shallow, sunlit water bodies either, permanent or temporary, natural or artificial, particularly those with emergent vegetation (typically *Typha* and *Eleocharis* spp.), which lack predatory fish such as the Plague Minnow *Gambusia holbrooki*.
- Foraging habitat: areas of low vegetation, typically dominated by grasses and other grass-like plants usually within one kilometre of breeding habitat.
- Overwintering habitat: features such as rocks, logs and other debris, including non-natural materials that provide moist conditions and a relatively stable temperature range during winter when the frogs are inactive.
- Corridor habitat: areas with appropriate environmental conditions (e.g. moisture, temperature) that act as movement corridors between breeding, foraging and overwintering habitat where these are not adjacent to one another – typically streams, ditches and drainage depressions (DEC 2005).

The Assessment of Significance and EPBC Act Significant Impact Assessment conducted for the Green and Golden Bell Frog both found that the proposed development would remove an area of low vegetation, dominated by grasses which could be used as a foraging habitat for the Green and Golden Bell Frog. It could also fragment the Wildlife Sanctuary from possible foraging habitat to the west of Lot 1 (see **Appendix C** and **Appendix D**). Clearing of vegetation is covered in the Bankstown LEP as a potential impact on fauna and hence, this issue has been addressed with BCC. BCC has previously surveyed the Wildlife Sanctuary in its current state and found no records of the Green and Golden Bell Frog. From this, the chance of the species occurring on the subject site is very low.

6.0 Mitigation Measures

Implementing mitigation measures during the construction and operation of the proposed development would decrease the chances of potential impacts on native and in particular threatened biodiversity. The recommended mitigation measures are listed below.

6.1 Flora

- All staff involved in both construction and operational activities should be made aware of the presence of Downy Wattle on the site. Any observable changes to the health of these individuals should prompt notifying environmental staff and an investigation into the cause of the decline in health.
- Barrier fencing should be installed around the Downy Wattles to prevent the increased human presence causing unintended harm to the species as described in the recommendations for the Tree Management Plan (TMP).
- Earthworks projected for the entire site should avoid the Downy Wattle habitat.
- Weeds present on the subject site are dealt with according to the NW Act and BCC guidelines. This includes:
    - Class 3: Plants must be fully and continuously suppressed and destroyed;
    - Class 4: The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority (BCC); and
    - Class 5: There are no requirements to control existing plants of Class 5 weeds. However, the weeds are “notifiable” and a range of restrictions on their sale and movements exists.
- Earth-working equipment would be cleaned of excess soil by brushing or hosing prior to arrival and departure from the site in order to minimise the likelihood of the spread of weed seeds and plant pathogens.
- Suitable control measures should be implemented to prevent erosion and sediment deposition.
- If any soil is to be removed from weed-infested areas on subject site it should be covered in transit to prevent weed dispersal.
- It is recommended that cleared trees be mulched and stockpiled for use in soil stabilisation and landscaping. If the re-use of this material is not readily practicable, it is recommended that it is transported to a green waste recycling facility.
- A minimum of six replacement trees should be planted and maintained within the landscaped gardens to compensate for the six trees being removed on Muir Road. The trees should comprise local native species. Additional native trees, shrubs and understorey should also be planted in correlation with the Planting Palette of the Landscape Concept Plan to provide green corridors for native species.
- Native landscaping should be maintained to prevent weed growth and to sustain flora health on the site.
- The implementation of the TMP and the replacement of non-native flora species by native flora species would increase the integrity of the environment.

6.2 Fauna

- All staff involved in construction activities should be made aware of the potential presence of the Green and Golden Bell Frog and should any frogs be discovered while works are being undertaken, the contractor should be instructed to stop work and seek advice from DECCW prior to recommencing works.
- If any wildlife is inadvertently injured during the construction activities, WIRES or an accredited veterinarian should be contacted.
- The planting of native groundcover, shrubs and trees within the landscaping would increase suitable habitat for native fauna species. It would also encourage prey populations to utilise the site, strengthening the local food web.

6.3 Management Plan for Downy Wattle

The TMP should include the following issues:

- All staff involved in both construction and operational activities should be made aware of the presence of Downy Wattle on the site. Any observable changes to the health of these individuals should prompt notifying environmental staff and an investigation into the cause of the decline in health.
- Barrier fencing should be installed around the Downy Wattles to prevent the increased human presence causing unintended harm to the species. This fencing should allow:
    - Adequate space for reproduction by the species;
    - Adequate space to prevent damage to the Critical Root Zone (CRZ);
    - Erosion measures; and
    - Signage indicating the purpose of the fencing.
- Earthworks should adequately avoid the fenced area containing the Downy Wattles.
- Any changes to the project description as outlined in the Statement of Environmental Effects (SEE) would require a reassessment of the potential impacts on the Downy Wattle population.
- Any future development outlined for Lot 2 should consider the impacts on the Downy Wattle population.

7.0 Conclusion

The potential ecological impacts of proposed development have been assessed within this report. Two threatened species have been identified as occurring or potentially occurring on the subject site.

The Downy Wattle occurs in the southwest corner, outside of the development footprint for Lot 1. With implementation of the recommended mitigation measures, the Downy Wattle would remain stable or increase in population size over time.

Green and Golden Bell Frogs are known to exist in the area and have been recorded in similar disturbed areas within Western Sydney. The subject site is directly accessible to the Wildlife Sanctuary to the east of the site and hence could impact the water quality in the Wildlife Sanctuary via runoff. It could also fragment potential foraging habitat that exists to the east of Lot 1. BCC has undertaken targeted searches for the Green and Golden Bell Frog within the Wildlife Sanctuary and did not find any evidence of the species.

The use of native species in the landscaping and the implementation of the recommended mitigation measures would increase the integrity of the site and provide green corridors within the Chullora Technology Park.

"This page has been left blank intentionally"

8.0 References

Department of the Environment, Climate Change (2005) *Threatened species. Species, populations & ecological communities of NSW*. Available: http://www.threatenedspecies.environment.nsw.gov.au. Accessed 25 May 2010.

Department of Environment and Conservation (2005) *Draft Recovery Plan for the Green and Golden Bell Frog (Litoria aurea). DECCW NSW, Hurstville, NSW.*

Department of Environment and Conservation (2003) *Acacia pubescens (Downy Wattle) Recovery Plan.* NSW National Parks and Wildlife Service, Hurstville, NSW.

Department of Environment and Conservation (2002) *Vegetation Maps: Cumberland Plain*.

Department of Environment and Heritage (2006).*Threat Abatement Plan: Infection of Amphibians with Chytrid Fungus Resulting in Chytridiomycosis*. DEWHA, Canberra, ACT.

Department of the Environment, Water, Heritage and the Arts (2010). *Species Profile and Threats Database*, Department of the Environment, Water, Heritage and the Arts, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed 25 May 2010.

Harden (2007) *Flora of New South Wales (Volumes 1-4).* University of New South Wales Press, Sydney.

Robinson M (1998) *A Field Guide to Frogs of Australia: from Port Augusta to Fraser Island including Tasmania*. New Holland Publishers (Australia) Pty Ltd, Sydney.

Slater Peter, Slater Pat & Slater R (2003) *The Slater Field Guide to Australian Birds*. New Holland Publishers (Australia) Pty Ltd, Sydney.

Treescan: Urban Forest Management (May 2010) *Tree Report: Volkswagen Group Australia Site*, Linden, NSW.

"This page has been left blank intentionally"

Appendix A

Results of Database Searches: Flora

"This page has been left blank intentionally"

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Acacia bynoeana	Bynoe's Wattle	E1	-	The species occurs in heath or dry sclerophyll forest on sandy soils. It prefers open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. (DECC, 2005).	N	N
Acacia prominens	Gosford Wattle, Hurstville and Kogarah Local Government Areas	E2	-	Occurs at a few sites along the railway line at Penshurst, at Carss Bush Park, Carss Park and there is an unconfirmed sighting at Oatley Park, Oatley. Grows in open situations on clayey or sandy soils (DECC, 2005).	N	N
Acacia pubescens	Downy Wattle	V	V	Occurs on ridges, hillsides and flat areas, at altitudes up to 650 m asl. It grows in gravelly clay or sandy soils on alluviums, shales and at the interface between shales and sandstones. These soils contain ironstone, are usually low in nutrients and are well drained. Average annual rainfall is 700-1200 mm (DEWHA 2010).	Y	Y
Acacia terminalis subsp. terminalis	Sunshine Wattle	E1	-	The species occurs in heath or dry sclerophyll forest on sandy soils. It prefers open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches (DECC, 2005).	N	N

[1] *Threatened Species Conservation Act 1995* Status: V = Vulnerable; E1 = Endangered; E2 = Endangered Population; E4A = Critically Endangered.

[2] *Environment Protection and Biodiversity Conservation Act 1999* Status: V = Vulnerable; E = Endangered; CE = Critically Endangered.

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Allocasuarina glareicola	-	E1	-	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows in Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla* and *Melaleuca decora* (DECC, 2005).	N	N
Apatophyllum constablei	-	-	E	Occurs in dry sclerophyll forest on slopes with a north to north-westerly aspect. It typically grows near cliffs (i.e. near the base or just above). The soils at sites are sandy and skeletal, mostly on Narrabeen sandstone (DEWHA, 2010).	N	N
Bothriochloa biloba	Lobed Blue-grass	-	V	Lobed Blue-grass grows in cleared eucalypt forests and relict grassland, often dominated by Purple Wiregrass (*Aristida ramosa*), Red-leg Grass (*Bothriochloa macra*), Red Grass (*B. decipiens*), *Queensland* Bluegrass (*Dicanthium sericeum*) or *Austrostipa aristiglumis* (DEWHA, 2010).	N	N
Caesia parviflora var. minor	Small Pale Grass-lily	E1	-	Found in damp places in open forest on sandstone (DECC, 2005).	N	N
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	E1	V	*Caladenia tessellata* is currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. The total population size is estimated to be less than 50 individuals. (DEWHA 2010).	N	N
Callistemon linearifolius	Netted Bottle Brush	V	-	Grows in dry sclerophyll forest on the coast and adjacent ranges. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. (DECC, 2005).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Cryptostylis hunteriana	Leafless Tongue-orchid	-	V	It is known to appear in a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. Sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black-Sheoak (*Allocasuarin littoralis*); appears to prefer open areas in the understorey of this community and appears to depend upon living or dead organic material for its nutritional requirements. (DEWHA 2010).	N	N
Darwinia biflora	-	V	-	This species occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include *Eucalyptus haemastoma, Corymbia gummifera* and/or *E. squamosa*. The vegetation structure is usually woodland, open forest or scrub-heath. Fire is an important factor in the life cycle of this species. Fire kills all plants, but also produces a flush of germination from seed stored in the soil. (DECC, 2005).	N	N
Deyeuxia appressa	-	E1	E	An erect perennial grass to 0.9 m high this species generally grows in heath and woodland communities on sandstone. (DEWHA 2010).	N	N
Dillwynia tenuifolia	-	V	-	This species is abundant within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland and disturbed areas on Narrabeen sandstone. (DECC, 2005).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Epacris purpurascens var. purpurascens	-	V	-	The species is commonly found associated with open eucalypt forest to 20 m tall, with an open subcanopy of sheoaks and wattles. The understorey includes a usually sparse mixed layer of sclerophyllous and mesophyllous shrubs stratum and continuous grassy groundcover. (DECC, 2005).	N	N
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	-	This species is rare and grows in dry grassy woodland, on shallow and infertile soils, mainly on granite. (DECC, 2005).	N	N
Eucalyptus scoparia	Wallangarra White Gum	E1	-	This species is found in open eucalypt forest and woodland on well-drained granite hilltops, slopes and rocky outcrops. (DECC, 2005).	N	N
Genoplesium baueri	Bauer's Midge Orchid	V	-	Grows in sparse sclerophyll forest and moss gardens over sandstone. (DECC, 2005).	N	N
Grammitis stenophylla	Narrow-leaf Finger Fern	E1	-	This species prefers moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest. (DECC, 2005).	N	N
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	V	The species grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. It is found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests and often occurs in open, slightly disturbed sites such as along tracks. (DEWHA 2010).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Hibbertia sp. Bankstown (R.T.Miller & C.P.Gibson s.n. 18/10/06)	-	E4A	CE	The geology of the site where *H.* sp. Bankstown occurs is sandy tertiary alluvium with high silt content. Associated indicative species present on site include understory species such as Sweet Wattle (*Acacia suaveolens*), *Aristida warburgii*, Pale Grass-Lily (*Caesia parviflora*), *Dianella longifolia*, *Goodenia hederacea*, Fan Flower (*G. paniculata*), Mat Guinea-flower (*Hibbertia diffusa*), White Kunzea (*Kunzea ambigua*), *Laxmannia gracilis*, *Leptospermum polygalifolia*, Slender Onion-orchid (*Microtis parviflora*), Kangaroo Grass (*Themeda australis*) and Slender Sun-orchid (*Thelymitra pauciflora*) (DEWHA, 2010).	N	N
Hypsela sessiliflora	-	E1	-	This species is known to grow in damp places, on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone. It may be an early successional species that benefits from some disturbance. (DECC, 2005).	N	N
Leptospermum deanei	-	V	-	This species is found in woodland, on lower hill slopes or near creeks, in sandy alluvial soil or sand over sandstone. It is often found within Riparian Scrub - e.g. Tristaniopsis laurina, Baechea myrtifolia; Woodland - e.g. Eucalyptus haemstoma; and Open Forest - e.g. Angophora costata, Leptospermum trinervium, Banksia ericifolia. (DECC, 2005).	N	N
Leucopogon exolasius	Woronora Beard-heath	V	-	Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park. The plant occurs in woodland on sandstone (DECC, 2005).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Marsdenia viridiflora subsp. viridiflora	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2	-	Recent records are from Prospect, Bankstown, Smithfield, Cabramatta Creek and St Marys. Previously known north from Razorback Range. Grows in vine thickets and open shale woodland. (DECC, 2005).	N	N
Maundia triglochinoides	-	V	-	Restricted to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are now extinct. Grows in swamps, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients. (DECC, 2005).	N	N
Melaleuca biconvexa	Biconvex Paperbark	-	V	Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. It is often found in forested wetlands, coastal floodplains and associated with Forest Red Gum open forest on poorly drained lowlands. (DEWHA 2010).	N	N
Melaleuca deanei	Deane's Melaleuca	V	V	The species grows in marshy-heath on coastal sandstone plateaus. (DEWHA 2010).	N	N
Persoonia hirsuta	Hairy Geebung	E1	-	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. It is usually present as isolated individuals or very small populations. It is probably killed by fire (as other Persoonia species are) but will regenerate from seed. (DECC, 2005).	N	N
Persoonia nutans	Nodding Geebung	E1	E	Confined to aeolian and alluvial sediments and occurs in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland. (DEWHA 2010).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Pimelea curviflora var. *curviflora*	-	V	V	The species occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. It often grows amongst dense grasses and sedges and responds to disturbance such as fire or grazing. (DEWHA 2010).	N	N
Pimelea spicata	Spiked Rice-flower	E1	E	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the inland Cumberland Plain sites it is associated with Grey Box and Ironbark. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a more well developed shrub and grass understorey. (DEWHA 2010).	N	N
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2	-	At Rydalmere it occurs along a road reserve near a creek, among grass species on sandstone. At Rookwood Cemetery it occurs in a small gully of degraded Cooks River / Castlereagh Ironbark Forest on shale soils. (DECC, 2005).	N	N
Prostanthera marifolia	Seaforth Mintbush	E4A	-	Little is known about this species' habitat. It may grow in open woodlands on exposed sandstone ridges and in association with shallow or skeletal sands (as per P.cineolifera). (DECC, 2005).	N	N
Pterostylis saxicola	Sydney Plains Greenhood	E1	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where Pterostylis saxicola occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. (DEWHA 2010).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Pultenaea parviflora	-	E1	-	Occurs in scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. (DECC, 2005).	N	N
Pultenaea pedunculata	Matted Bush-pea	E1	-	The Matted Bush-pea occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area. (DECC, 2005).	N	N
Syzygium paniculatum	Magenta Lilly Pilly	E1	-	The species occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. (DECC, 2005).	N	N
Tetratheca glandulosa	-	V	-	T.glandulosa is associated with a shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. The species if found in association with heaths, scrub to woodlands/open woodlands, and open forest. Common woodland tree species include: Corymbia gummifera, C. Eximia, Eucalyptus haemastoma, E. Punctata, E. Racemosa, and/or E. Sparsifolia, with an understorey dominated by species from the families Proteaceae, Fabaceae, and Epacridaceae. (DECC, 2005).	N	N

Botanical Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Tetratheca juncea	Black-eyed Susan	V	-	*T.juncea* is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. (DECC, 2005).	N	N
Thelymitra sp. Kangaloon (D.L.Jones 18108)	Kangaloon Sun-orchid	-	CE	The Kangaloon Sun-orchid is endemic to the Central Coast/Tablelands of NSW, in the Fitzroy Falls/Robertson/Kangaloon area. The species grows in seasonally swampy sedgeland on grey silty clay loam at 600–700 m above sea level (DEWHA, 2010).	N	N
Triplarina imbricata	Creek Triplarina	E1	-	Along watercourses in low open forest with Water Gum (*Tristaniopsis laurina*). (DECC, 2005).	N	N
Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2	-	In Western Sydney most sites are closely aligned with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone (laterite). However, the sites in Hornsby LGA are on the 'Hawkesbury' soil landscape. Found in disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. (DECC, 2005).	N	N
Wilsonia backhousei	Narrow-leafed Wilsonia	V	-	This is a species of the margins of salt marshes and lakes, both coastal and inland. (DECC, 2005).	N	N

"This page has been left blank intentionally"

Appendix B

Results of Database Searches: Threatened Fauna

"This page has been left blank intentionally"

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Amphibia						
Crinia tinnula	Wallum Froglet	V	-	Wallum Froglets are found only in acid paperbark swamps and sedge swamps of the coastal 'wallum' country (DECC, 2005).	N	N
Heleioporus australiacus	Giant Burrowing Frog	-	V	The Giant Burrowing Frog appears to be dependent on areas with native vegetation as no Giant Burrowing Frogs have been recorded from cleared lands (DEWHA 2010).	N	N
Litoria aurea	Green and Golden Bell Frog	E1	V	The Green and Golden Bell Frogs commonly occupies disturbed habitats, and breeds largely in ephemeral ponds (DEWHA 2010).	Y	N
Litoria littlejohni	Littlejohn's Tree Frog, Heath Frog	-	V	Littlejohn's Tree Frog is known to inhabit forest, coastal woodland and heath from 100 to 950 m above sea level (DEWHA, 2010).	N	N
Litoria raniformis	Growling Grass Frog	-	V	The Growling Grass Frog is found mostly amongst emergent vegetation, including *Typha sp.* (bullrush), *Phragmites sp.* (reeds) and *Eleocharis sp.* (sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams (DEWHA 2010)..	N	N
Mixophyes balbus	Stuttering Frog	-	V	The Stuttering Frog is typically found in association with permanent streams through temperate and sub-tropical rainforest and wet sclerophyll forest, rarely in dry open tableland riparian vegetation (DEWHA, 2010).	N	N

[1] *Threatened Species Conservation Act 1995* Status: V = Vulnerable; E1 = Endangered Species; E2 = Endangered Population.

[2] *Environment Protection and Biodiversity Conservation Act 1999* Status: V = Vulnerable; E = Endangered; CE = Critically Endangered; M = Migratory

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Pseudophryne australis	Red-crowned Toadlet	V	-	The species occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter (DECC, 2005).	N	N
Aves						
Botaurus poiciloptilus	Australasian Bittern	V	-	Permanent freshwater wetlands with tall, dense vegetation, particularly bulrushes (Typha spp.) and spikerushes (Eleoacharis spp.) (DECC, 2005).	N	N
Burhinus grallarius	Bush Stone-curlew	E1	-	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber (DECC, 2005).	N	N
Calidris alba	Sanderling	V	-	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally occurs in small flocks, however may associate freely with other waders. (DECC, 2005).	N	N
Calidris tenuirostris	Great Knot	V	-	Occurs in sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons (DECC, 2005).	N	N
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	In summer, the species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas (DECC, 2005).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Charadrius leschenaultii	Greater Sand-plover	V	-	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks (DECC, 2005).	N	N
Charadrius mongolus	Lesser Sand-plover	V	-	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms (DECC, 2005).	N	N
Daphoenositta chrysoptera	Varied Sittella	V	-	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. (DECC, 2005).	N	N
Diomedea exulans	Wandering Albatross	E1	-	The Wandering Albatross is marine, pelagic and aerial (DECC, 2005).	N	N
Ephippiorhynchus asiaticus	Black-necked Stork	E1	-	Lakes, swamps, freshwater pools and mangroves. Nests in trees or large bushes, often over swamps. (DECC, 2005).	N	N
Epthianura albifrons	White-fronted Chat	V	-	Found mostly in temperate to arid climates and very rarely seen in sub-tropical areas, the White-fronted Chat occupies foothills and lowlands below 1000 m above sea level. In New South Wales the White-fronted Chat occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state. (DECC, 2005).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Epthianura albifrons	White-fronted Chat in the Sydney Metropolitan Catchment area	E2	-	Two isolated sub-populations of White-fronted Chats are currently known from the Sydney Metropolitan Catchment Management Authority area; one at Newington Nature Reserve on the Parramatta River and one at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated from each other by 25 km of urbanised land, across which White-fronted Chats are unlikely to fly (DECC, 2005).	N	N
Glossopsitta pusilla	Little Lorikeet	V	-	Found in open forests and woodlands, particularly where there are large flowering eucalypts. Also a mallee specialist (DECC, 2005)	N	N
Haematopus fuliginosus	Sooty Oystercatcher	V	-	The species occurs on intertidal flats of inlets and bays, open beaches and sandbanks (DECC, 2005)	N	N
Haematopus longirostris	Pied Oystercatcher	E1	-	The species favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries (DECC, 2005).	N	N
Hieraaetus morphnoides	Little Eagle	V	-	The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used (DECC, 2005).	N	N
Ixobrychus flavicollis	Black Bittern	V	-	Terrestrial and estuarine wetlands in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. (DECC, 2005).	N	N
Lathamus discolor	Swift Parrot	E1	E	The Swift Parrot inhabits dry sclerophyll eucalypt forests and woodlands (DEWHA 2010).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Limicola falcinellus	Broad-billed Sandpiper	V	-	Inhabits sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat (DECC, 2005).	N	N
Limosa limosa	Black-tailed Godwit	V	-	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. (DECC, 2005).	N	N
Lophoictinia isura	Square-tailed Kite	V	-	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. (DECC, 2005).	N	N
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. (DECC, 2005).	N	N
Neophema chrysogaster	Orange-bellied Parrot	-	CE	On the mainland, the Orange-bellied Parrot spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland. (DEWHA 2010).	N	N
Neophema pulchella	Turquoise Parrot	V	-	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. (DECC, 2005).	N	N
Nettapus coromandelianus	Cotton Pygmy-Goose	E1	-	Freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. (DECC, 2005).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Ninox connivens	Barking Owl	V	-	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting (DECC, 2005).	N	N
Ninox strenua	Powerful Owl	V	-	Eucalypt forests along the Great Dividing Range, preferring tall wet sclerophyll forests, where 800-1000 ha territories centre on densely vegetated gullies (DECC, 2005).	N	N
Pandion haliaetus	Osprey	V	-	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. (DECC, 2005).	N	N
Petroica boodang	Scarlet Robin	V	-	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. (DECC, 2005).	N	N
Petroica phoenicea	Flame Robin	V	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. (DECC, 2005).	N	N
Petroica rodinogaster	Pink Robin	V	-	Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. (DECC, 2005).	N	N
Ptilinopus superbus	Superb Fruit-Dove	V	-	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees (DECC, 2005).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Rostratula australis	Australian Painted Snipe	-	V	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DEWHA 2010).	N	N
Sterna albifrons	Little Tern	E1	-	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records) (DECC, 2005).	N	N
Stictonetta naevosa	Freckled Duck	V	-	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. (DECC, 2005).	N	N
Tyto capensis	Grass Owl	V	-	Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains (DECC, 2005).	N	N
Tyto novaehollandiae	Masked Owl	V	-	Dry eucalypt forests and woodlands from sea level to 1 100 m. (DECC, 2005).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Xanthomyza phrygia	Regent Honeyeater	E1	E	Regent Honeyeaters mostly occur in dry box-ironbark eucalypt woodland and dry sclerophyll forest associations, wherein they prefer the most fertile sites available, e.g. along creek flats, or in broad river valleys and foothills (DEWHA 2010).	N	N
Xenus cinereus	Terek Sandpiper	V	-	The species inhabits mudbanks and sandbanks located near mangroves, but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools (DECC, 2005).	N	N
Gastropoda						
Meridolum corneovirens	Cumberland Plain Land Snail	E1	-	Primarily inhabits Cumberland Plain Woodland (an endangered ecological community). This community is a grassy, open woodland with occasional dense patches of shrubs (DECC, 2005).	N	N
Mammalia						
Arctocephalus pusillus doriferus	Australian Fur-seal	V	-	Prefers rocky parts of islands with flat, open terrain (DECC, 2005).	N	N
Cercartetus nanus	Eastern Pygmy-possum	V	-	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred (DECC, 2005)	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	-	V	Little is known about the habitat and roosting requirements of the Large-eared Pied Bat, but natural roosts may depend heavily on sandstone outcrops. It has been found roosting in disused mine shafts, caves, overhangs and disused Fairy Martin (*Hirundo ariel*) nests for shelter and to raise young. It also possibly roosts in the hollows of trees (DEWHA 2010).	N	N
Dasyurus maculatus	Spotted-tailed Quoll	V	-	The Spot-tailed Quoll has a preference for mature wet forest habitat, especially in areas with rainfall 600 mm/year. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable (DECC, 2005).	N	N
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, (southeastern mainland population)	-	E	As above	N	N
Dasyurus viverrinus	Eastern Quoll	E1	-	Occurs in dry sclerophyll forest, scrub, heathland and cultivated land (DECC, 2005). Not recorded in NSW for many decades.	N	N
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Occurs in moist habitats, with trees taller than 20 m. Roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings (DECC, 2005).	N	N
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	Roost in caves, derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops (DECC, 2005).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Mormopterus norfolkensis	Eastern Freetail-bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosting occurs mainly in tree hollows but will also roost under bark or in man-made structures (DECC, 2005).	N	N
Myotis macropus	Southern Myotis	V	-	Occurs close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. The species forages over streams and pools (DECC, 2005).	N	N
Perameles nasuta	Long-nosed Bandicoot population in inner western Sydney	E2	-	Shelter mostly under older houses and buildings. Forage in parkland and back-yards. There are apparently no large blocks of suitable habitat, likely to support a large source population, on the Cooks River to the south, or along the southern foreshore of Parramatta River and Sydney Harbour to the north (DECC, 2005).	N	N
Petaurus australis	Yellow-bellied Glider	V	-	The species occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Denning occurs in hollows of large trees (DECC, 2005).	N	N
Petrogale penicillata	Brush-tailed Rock-wallaby	-	V	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks. It also utilises tree limbs (DEWHA 2010).	N	N
Phascolarctos cinereus	Koala	V	-	Restricted to eucalypt forests and woodlands of eastern Australia. Food trees preferred in SE Qld include Blue Gum (*E. tereticornis*), Grey Gum (*E. propinqua*), Tallowwood (*E. microcorys*) and Flooded Gum (*E. grandis*) (DECC, 2005).	N	N
Potorous tridactylus tridactylus	Long-nosed Potoroo (SE mainland)	-	V	Coastal wet heath, dry and wet forests with thick ground cover (DEWHA 2010).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. It also feeds in introduced tree species in urban areas and in commercial fruit crops (DEWHA 2010).	N	N
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Roosts in tree hollows and buildings; and in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees (DECC, 2005).	N	N
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm-water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface (DECC, 2005).	N	N
Reptilia						
Caretta caretta	Loggerhead Turtle	-	E, M	In Australia, Loggerhead Turtles nest on open, sandy beaches. They choose a wide variety of tidal and sub-tidal habitat as feeding areas (DEWHA 2010).	N	N
Chelonia mydas	Green Turtle	-	V, M	Ocean-dwelling species spending most of its life at sea. Eggs laid in holes dug in beaches throughout their range (DEWHA 2010).	N	N

Scientific Name	Common Name	TSC Act Status[1]	EPBC Status[2]	Preferred Habitat	Preferred Habitat Present Within Project Area	Recorded During Field Study
Hoplocephalus bungaroides	Broad-headed Snake	-	V	The Broad-headed Snake is often found in rocky outcrops and adjacent sclerophyll forest and woodland. The most suitable sites occur in sandstone ridgetops (DEWHA 2010).	N	N

Appendix C

Assessment of Significance: Seven-Part Tests

"This page has been left blank intentionally"

Section 5A Assessment of Significance (Seven-Part Test)

Introduction

The Assessment of Significance has been undertaken for two species that either knowingly or potentially exist within an area that would be potentially impacted by the proposed development. These two species are:

- Downy Wattle (*Acacia pubescens*); and
- Green and Golden Bell Frog (*Litoria aurea*).

Section 5A of the EP&A Act

Section 5A of the EP&A Act consist of seven factors that must be taken into account in deciding whether a proposed development or activity is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats. In the case where suitable habitat for a threatened species or EEC occurs, it will be assumed the species will potential utilise the habitat unless it can be demonstrated otherwise, in accordance with the precautionary principle of ecological sustainable development.

Assessment of Significance

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Downy Wattle

Downy Wattles first flower at around three to five years of age and usually rely on insects and birds for pollination. However, the reproduction of Downy Wattle does not rely heavily on seed set but rather on vegetative reproduction using suckers. Furthermore, the seeds have high seed dormancy and a persistent seed bank. The longevity of individuals is recorded to be up to 50 years but with colonial species, the lifespan can be much longer (DEC 2003).

With these lifecycle characteristics, the success of the individuals present on the site relies on protection of the individuals and the surrounding soils. The proposed development does not include removing any of the individuals. Furthermore, the proposed tree management plan will ensure that the necessary habitat is protected. The proposed landscaping will increase the integrity of the surrounding habitat by removing competing weeds, implementing erosion control and planting natives which will further support the health of the current individuals.

Green and Golden Bell Frog

Green and Golden Bell Frogs breed from late winter to early autumn and have high fecundity with the average clutch size around 3700 eggs. They use temporary or permanent shallow sunlit water bodies with aquatic vegetation to lay spawn and the eggs start to hatch between two and five days after ovipositing/fertilisation. Metamorphosis can take 2 – 11 months but the average time is thought to be six weeks (DEWHA 2010, DEC 2005).

If a population of Green and Golden Bell Frogs were using the site, they would use the grassland as a foraging ground more so than a breeding site due to the lack of native aquatic vegetation. However, the possible breeding sites that occur downstream within the Wildlife Sanctuary could be potentially impacted by contaminated stormwater leaving the site. The stormwater management strategy mentioned in the SEE should address this issue by devising methods of testing the water quality before it leaves the site. Alternative methods to treat or divert contaminated runoff away from the Wildlife Sanctuary should be considered.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable in this case.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable in this case.

d) In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed;

Downy Wattle

The natural habitat for the Downy Wattle is usually dry open sclerophyll forest, woodland and *Melaleuca* scrub. This habitat is not currently present on the site and the individuals growing are believed to be remnant from before the land was transformed for an industrial site. The habitat required for the Downy Wattles growing on the site would not be negatively modified for the proposed development but would instead increase in health due to removal of competing weeds.

Green and Golden Bell Frog

Green and Golden Bell Frog habitat typically consists of four functional types:

- Breeding habitat: shallow, sunlit water bodies, either permanent or temporary, natural or artificial, particularly those with emergent vegetation (typically *Typha* and *Eleocharis* spp.), which lack predatory fish such as the Plague Minnow *Gambusia holbrooki*.
- Foraging habitat: areas of low vegetation, typically dominated by grasses and other grass-like plants usually within 1 km of breeding habitat,
- Overwintering habitat: features such as rocks, logs and other debris, including non-natural materials that provide moist conditions and a relatively stable temperature range during winter when the frogs are inactive,
- Corridor habitat: areas with appropriate environmental conditions (e.g. moisture, temperature) that act as movement corridors between breeding, foraging and overwintering habitat where these are not adjacent to one another – typically streams, ditches and drainage depressions (DEC 2005).

From these habitat characteristics, removal of grassland that has the potential to flood could potentially decrease the foraging and sheltering habitat available for the Green and Golden Bell Frog. Furthermore, any contaminants that leave the site via runoff could potentially impact breeding habitat downstream.

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

Downy Wattle

The area designated for construction is populated by weeds and would be replaced by landscaping using native species. The habitat required for the Downy Wattles present on the site will not be altered due to the proposed development and therefore no fragmentation of habitat would occur.

Green and Golden Bell Frog

Removal of grassland for the proposed development may decrease the connectivity between the Wildlife Sanctuary and other areas prone to flooding surrounding the site. Suitable foraging habitat that would exist in Lot 2 would be potentially fragmented by construction on Lot 1. The creation of designed corridors within the landscaping could help minimise this impact.

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Downy Wattle

The Downy Wattle does not currently rely on the weedy populated area that is designated for removal. Therefore, the proposed development would not remove any important habitat for this species.

Green and Golden Bell Frog

The Green and Golden Bell Frog is able to survive in modified environments and would utilise the area surrounding the site more so than the site itself. Therefore, removal of the weedy grassland would not be of high importance for the long-term survival of the Green and Golden Bell Frog.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

The site does not constitute critical habitat for either the DECCW or DEWHA registers. Furthermore, the proposed development does not involve actions that would adversely affect any of the critical habitats listed on these registers.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

There is a National Recovery Plan for the *Acacia pubescens* (Downy Wattle) (DEC 2003) and a Draft Recovery Plan for the Green and Golden Bell Frog (*Litoria aurea*) (DEC 2005).

The Downy Wattle Recovery Plan outlines two threatening processes for the species; loss of habitat and degradation of existing sites. The proposed development would not remove any individuals and would not degrade the habitat. Through removal of competing weeds, the proposed development has the potential to increase the health of the species, thereby acting in accordance with this recovery plan.

The Green and Golden Bell Frog Draft Recovery Plan covers a list of threatening processes that is impacting the survival of the species. These include disease, predation on larvae by exotic fish, broad scale habitat alteration, isolation and loss, use of pesticides and agricultural chemicals, water quality degradation and pressures from development. The proposed development has the potential to reduce habitat size and connectivity. It also could increase the amount of pesticides which may contribute to the runoff into the Wildlife Sanctuary.

The threat abatement plan “Infection of Amphibians with Chytrid Fungus Resulting in Chytridiomycosis” addresses habitat as a role of spreading the disease. It suggests that providing a suitable habitat for the species will decrease stressors that may otherwise encourage the spread of the disease. The proposed development acts within the objectives for this plan by maintaining suitable habitat for this species within the localised area.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

No key threatening processes are proposed for the site. The clearing of vegetation is only classified as a key threatening process if native vegetation is being destroyed and replaced by non-local species which is not the case for the proposed development.

"This page has been left blank intentionally"

Appendix D

EPBC Act Significance Assessment

"This page has been left blank intentionally"

The EPBC Act Significance Assessment – Vulnerable Species

Introduction

The EPBC Act Significance Assessment has been undertaken for two species that either knowingly or potentially exist within an area that would be potentially impacted by the proposed development. These two species are:

- Downy Wattle (*Acacia pubescens*); and
- Green and Golden Bell Frog (*Litoria aurea*).

The EPBC Act Significance Assessment

This assessment is used to determine whether an action will have, or is likely to have, a significant impact on a matter of national environmental significance. In the case where suitable habitat for a threatened species or EEC occurs, it will be assumed the species will potential utilise the habitat unless it can be demonstrated otherwise, in accordance with the precautionary principle of ecological sustainable development.

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

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

These factors are addressed under separate headings for each vulnerable species.

EPBC Act Significance Assessment – Downy Wattle

The Downy Wattle has been recorded from 195 sites and is currently known from 151 of these. It is restricted to the Sydney region and is scattered throughout the Bankstown-Fairfield-Rookwood area and the Pitt Town Area, in Western Sydney. Outlying populations occur at Barden Ridgem Oakdale and Mountain Lagoon. Within this distribution area, sites are mostly small and fragmented, surrounded by development. Only five of the 151 sites occur within conservation reserves (those being Scheyville National Park and Windsor Downs Nature Reserve) (DEC 2003).

The Downy Wattle has been recorded on a variety of geologies including Tertiary Alluvium, Holocene Alluvium and Wianamatta Shale. The soils at the sites where Downy Wattle occurs are characteristically gravelly soils, often with ironstone. There are also a few sites that occur on the interface between Sandstone and Shale soils. The topography is recorded as flat to gently undulating which is a typical characteristic of the Cumberland Plain region (DEC 2003).

In natural environments, the Downy Wattle occurs in open woodland and forest. Most sites are within Cooks River / Castlereagh Ironbark Forest, Shale Gravel Transition Forest or Shale Plains Woodland (DEC 2003).

Size of an important population

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

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- *key source populations either for breeding or dispersal;*
- *populations that are necessary for maintaining genetic diversity; and/or*
- *populations that are near the limit of the species range.*

The Downy Wattle distribution is concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. The proposed development would not involve removing any of the Downy Wattle present on the site. Furthermore, the implementation of a Sediment and Erosion Control Plan (SECP), Tree Management Plan (TMP) and weed control would increase the health of the species by removing competition by non-native species and monitoring the soil health. It is predicted that the management of the Downy Wattle will maintain if not increase the size of the current population.

Area of occupancy

- *reduce the area of occupancy of an important population;*

The proposed development does not include the removal of any individuals of Downy Wattle. Furthermore, the land surrounding the Downy Wattle is not part of the development footprint, so there would be residual space for the growth in population for this species. Therefore, the proposed development would not reduce the area of occupancy.

Fragmentation

- *fragment an existing important population into two or more populations;*

The population of downy Wattle on the subject site is isolated from other populations by urban development. The proposed development will not involve clearing of of contiguous habitat or cause any further fragmentation in the existing industrial landscape.

Critical habitat

- *adversely affect habitat critical to the survival of a species;*

Critical habitat cannot be identified for the Downy Wattle under the TSC Act as it is listed under Schedule 2, not Schedule 1 of the TSC Act. Under the EPBC Act, critical habitat has not yet been identified due to the clonal nature of the species and lack of genetic understanding of this method of reproduction.

Breeding cycle

- *disrupt the breeding cycle of an important population;*

The breeding cycle of the Downy Wattle relies on both vegetative and sexual reproduction, but it is thought to rely more heavily on vegetative reproduction using suckers. The seeds have high seed dormancy and a persistent seed bank, which allows them to wait for many years until suitable environmental conditions encourage germination. They first flower at around three to five years of age and are known to survive up to 50 years. Including the use of vegetative reproduction increases their expected lifespan beyond 50 years.

The proposed development would have a low impact on the breeding cycle of the Downy Wattle. The population on the site has ample space for growth and reproduction. With their high reliance on vegetative reproduction, they can survive at a healthy stage whilst being isolated from a larger population.

Habitat removal and modification

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

The non-native species that would be removed for the proposed development site are not considered quality habitat for this species. Furthermore, the residual space from the proposed development is ample for the survival of this population. The removal of weedy grassland is unlikely to cause the Downy Wattle to decline.

Invasive species

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

The landscaping outlined for the proposed development utilises native ground cover, shrubs and trees. This would markedly improve the health of the flora community as it is currently dominated by non-native groundcover. For the Downy Wattle, the removal of non-native species would decrease competition pressure and remove compounding stresses on the population.

Disease

- *introduce disease that may cause the species to decline; or*

The Downy Wattles exist in a highly modified environment, with possible flora diseases already present. The mitigation measures outlined in this ecological assessment include measures on reducing the chances of importing new diseases onto the site by cleaning excess soil of earth-working equipment. Following these measures, the construction and operation of the proposed development would not include activities that are likely to introduce diseases that may harm the species.

Recovery

- *interfere substantially with the recovery of the species.*

The Downy Wattles on the site exist in a highly modified environment, with the surrounding habitat bearing little resemblance to their preferred habitat of open woodlands and forests. The proposed development would not interfere with the recovery of the Downy Wattle but would instead ensure regular monitoring of the populations health and the surrounding environment by following mitigation measures outlined in this ecological assessment.

EPBC Act Significance Assessment – Green and Golden Bell Frog

The Green and Golden Bell Frog was once distributed along the coastal lowlands in NSW from approximately 50 km south of the Queensland border to north-east Victoria. Populations were also reported from the southern tablelands and central slopes of NSW. Since the 1970's the species has undergone a decline in its population and distribution, particularly in inland areas.

Extant key populations in the Sydney region include populations in the following locations (DEC 2005):

- Kurnell,
- Homebush Bay,
- Greenacre,
- Clyde/Rosehill,
- Merrylands,
- Arncliffe,
- St Marys,
- Hammonville.

The Green and Golden Bell Frog is often considered to be a colonising species that is tolerant of a wide range of environmental conditions but does not compete favourably with other frog species. The Green and Golden Bell Frog tends to be displaced from newly created or disturbed habitats in a form or ecological succession as environmental conditions change and additional frog species establish in such areas (DEC 2005).

Green and Golden Bell Frog habitat typically consists of four functional types:

- Breeding habitat: shallow, sunlit water bodies, either permanent or temporary, natural or artificial, particularly those with emergent vegetation (typically *Typha* and *Eleocharis* spp.), which lack predatory fish such as the Plague Minnow *Gambusia holbrooki*.
- Foraging habitat: areas of low vegetation, typically dominated by grasses and other grass-like plants usually within one kilometre of breeding habitat,
- Overwintering habitat: features such as rocks, logs and other debris, including non-natural materials that provide moist conditions and a relatively stable temperature range during winter when the frogs are inactive,
- Corridor habitat: areas with appropriate environmental conditions (e.g. moisture, temperature) that act as movement corridors between breeding, foraging and overwintering habitat where these are not adjacent to one another – typically streams, ditches and drainage depressions (DEC 2005).

It is not known if the Green and Golden Bell Frog exists in Chollura Wetland which is directly linked to habitat within the subject site. Using the precautionary principle, it was concluded that they may use the site as foraging habitat that is joined to the Wildlife Sanctuary. Further communication with BCC indicated that previous surveys of the Wildlife Sanctuary did not record any Green and Golden Bell Frogs using the Wildlife Sanctuary.

Size of an important population

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

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- *key source populations either for breeding or dispersal;*
- *populations that are necessary for maintaining genetic diversity; and/or*
- *populations that are near the limit of the species range.*

Green and Golden Bell Frogs were not detected during the site investigation. Other frog species recorded were *Limnodynastes peronii* (Striped Marsh Frog) and *Crinia signifera* (Common Eastern Froglet). These are common and disturbance tolerant species that are not listed as threatened under the TSC Act or EPBC Act.

In general, the site does not contain breeding habitat that may be suitable for Green and Golden Bell Frog and the presence of other frog species may also result in competitive exclusion of the species. Stormwater ponds established beyond the eastern boundary of the study area may contain suitable breeding habitat however these areas are well beyond the proposed development site and will not be impacted by the proposed works.

There are no known records for the Green and Golden Bell Frog within the proposed development site. Nearest known records for this species are in Greenacre where a presumed metapopulation exists centred on the disused, but soon to be developed, Punchbowl Brickpit and is comprised of a number of sub-populations on the nearby Freightcorp and RailCorp lands as well as at Cox's Creek Reserve and adjacent Bankstown Council land (DEC 2005).

The proposed development will not result in the long-term decrease of an 'important population' as an 'important population' is not likely to occur on site.

Area of occupancy

- *reduce the area of occupancy of an important population;*

The proposed works would not involve the removal of any potential Green and Golden Bell Frog breeding habitat and will not reduce the area of occupancy of an 'important population' as an 'important population' is not likely to occur within the proposed development site.

While some of this area is considered to be potential foraging habitat for this species, most of this area is considered to be marginal or unsuitable as habitat due to a lack of suitable vegetation cover, dry surface conditions and distance from potential breeding habitat.

Fragmentation

- *fragment an existing important population into two or more populations;*

The subject site is within an existing urban and industrial area. The wider area is extremely fragmented with only small, disturbed patches of habitat present. In this context, the proposed works will not increase fragmentation in any way.

The Green and Golden Bell Frog is a relatively mobile frog species that forages and seeks shelter at distances of up to 1 km or more from breeding sites during favourable weather conditions. In doing so, individuals may move through and forage within highly cleared and fragmented landscapes.

Removal of grassland for the proposed development could possibly fragment habitat for the Green and Golden Bell Frog by cutting off access between possible foraging habitat to the east of Lot 1 and the Wildlife Sanctuary. Should this species be seeking shelter in adjacent areas, movement to more suitable habitat in surrounding areas could be restricted. However, this species may also utilise landscaped areas of the proposed development.

Critical habitat

- *adversely affect habitat critical to the survival of a species;*

No critical habitat has been listed for the Green and Golden Bell Frog.

Breeding cycle

- *disrupt the breeding cycle of an important population;*

The proposed works would not involve the removal of any potential Green and Golden Bell Frog breeding habitat. However, polluted runoff from the subject site may involve disturbance to potential breeding habitat in the Wildlife Sanctuary as a result of water quality effects.

Habitat removal and modification

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

The removal of grassland that has the potential to flood could potentially decrease the foraging and sheltering habitat available for the Green and Golden Bell Frog. Furthermore, any contaminants that leave the site could potentially impact breeding habitat downstream.

Invasive species

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

Only the Plague Minnow *Gambusia holbrooki* and the European Red Fox *Vulpes vulpes* are likely to affect the Green and Golden Bell Frog. The proposed works are not likely to result in the increase of these species.

The proposed works are not considered likely to modify the habitats of the study area in such a way as to encourage the establishment of any additional invasive fauna species. These include any fauna species that may compete with, parasitise or prey upon the Green and Golden Bell Frog or increase the impact of existing species (such as the European Red Fox).

The proposed works do have some potential to result in the introduction to the locality of invasive exotic plant species and plant diseases that may be detrimental to the habitat of the Green and Golden Bell Frog. With the implementation of the proposed measures to minimise the likelihood of spreading weeds and plant diseases the likelihood of introducing these species is however considered to low. Proposed mitigation measures such as revegetation works and machinery hygiene protocol will minimise the spread of exotic flora species.

Disease

- *introduce disease that may cause the species to decline; or*

With the use of equipment in wet environments there is a risk that Amphibian Chytrid Fungus *Batrachochytrium dendrobatidis* could be spread in wet mud. With the implementation of the proposed mitigation measures, this risk of spreading this disease to uninfected water bodies beyond the study area is considered to be low. No construction equipement will come into proximity with the adjacent wetlands.

Recovery

- *interfere substantially with the recovery of the species.*

No recovery plans have been finalised for this species. A draft recovery plan has been prepared (DEC 2005).

The following measures have been identified by DEC (2005) as being required for the recovery of the species:

- Maintain captive bred populations for future possible re-introduction programs.
- Initiate community awareness programs that highlight the presence of populations and catchment management approaches to improving stormwater quality, habitat retention and management.
- Develop measures to control or eradicate the introduced Plague Minnow.
- Establish protocols for handling of frogs and educational strategies to minimise the inadvertent spread of fungal pathogens from site to site.
- Develop strategies to provide for the development or enhancement of frog habitat to improve reproductive success and recruitment at known sites.
- Develop site specific plans of management to improve conservation outcomes for targeted populations.
- Develop strategies to provide disease-free and fish-free breeding habitat.

The proposed development is not inconsistent with any of the above objectives.

Worldwide Locations

Australia	+61-2-8484-8999
Azerbaijan	+994 12 4975881
Belgium	+32-3-540-95-86
Bolivia	+591-3-354-8564
Brazil	+55-21-3526-8160
China	+86-20-8130-3737
England	+44 1928-726006
France	+33(0)1 48 42 59 53
Germany	+49-631-341-13-62
Ireland	+353 1631 9356
Italy	+39-02-3180 77 1
Japan	+813-3541 5926
Malaysia	+603-7725-0380
Netherlands	+31 10 2120 744
Philippines	+632 910 6226
Scotland	+44 (0) 1224-624624
Singapore	+65 6295 5752
Thailand	+662 642 6161
Turkey	+90-312-428-3667
United States	+1 978-589-3200
Venezuela	+58-212-762-63 39

Australian Locations

Adelaide
Brisbane
Canberra
Darwin
Melbourne
Newcastle
Perth
Sydney
Singleton

www.aecom.com