2 Hume Highway Chullora

Biodiversity Assessment Report

Final Report (Version 2)

Charter Hall Core Plus Industrial Fund,

Bieson Pty Limited as trustee of the CPIF Hume Highway Logistics Trust and

Prepared for Commercial & Industrial Property Pty Limited

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Biosis staff involved in this project were:

- Carl Corden, James Cole and Lauren Harley

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Glossary

CBD	Central Business District
DoE	Department of the Environment
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FBA	Framework for Biodiversity Assessment
KTP	Key Threatening Process
LEP	Local Environment Plan
NSW	New South Wales
NV Act	*Native Vegetation Act 2003*
NW Act	*Noxious Weed Act 1993*
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
SEARs	Secretary's Environmental Assessment Requirements
subject site	The area of impact for the proposed works
TSC Act	*Threatened Species Conservation Act 1995*

Summary

Biosis Pty Ltd was commissioned by Commercial & Industrial Property Pty Ltd to undertake a flora and fauna assessment of an area of land proposed for a Warehouse and Distribution Facility (the Project) at 2 Hume Highway, Chullora (subject site). The subject site is located in an industrial area in Chullora and approximately 14 kilometres west of the Sydney central business district (CBD).

The subject site, defined by the extent of proposed works, is contained within Lot 12 DP 834734. This assessment approach has been undertaken to allow for assessment of both the subject site as well as any additional areas in the broader subject site, i.e. the area which is likely to be affected by the proposal, either directly or indirectly. Identified constraints will be used to guide detailed design, with an emphasis on avoiding impacts where feasible. This assessment has been prepared to align with the NSW Biodiversity Offsets Policy for Major Projects (OEH 2014b) and the associated underlying tool, the Framework for Biodiversity Assessment (FBA) (OEH 2014a), to support the preparation of this Biodiversity Assessment Report (BAR) and associated Environmental Impact Statement (EIS) being prepared by CIP.

The FBA is underpinned by the requirement to classify vegetation communities into Plant Community Types (PCTs). Based on the provenance of the existing vegetation, which is comprised of vegetation planted in 1996, floristic composition and landscape position are not consistent with the profiles held within the PCTs and vegetation information software (VIS 2.0 database) (OEH 2015). Therefore the FBA as the required methodology for ecological assessment for major projects is unable to be applied to the subject site. No PCTs occur on site that allow for the Threatened Species Profile Database to be refined, thus the FBA cannot be applied.

The subject site encompasses 5.41 hectares of either planted or exotic vegetation, while the remaining 4.89 hectares consist of buildings, hardstand or associated infrastructure.

Ecological values

The subject site contains very limited ecological value as it occurs within a highly fragmented and disturbed industrial landscape. Ecological values identified within the subject site include:

- The subject site contains 5.41 hectares of planted and/or maintained vegetation including:
  - 0.83 hectares of Exotic Grassland.
  - 0.9 hectares of Ornamental Natives and Exotics species.
  - 1.39 hectares of Closed Casuarina Forest (plantation).
  - 0.12 hectares of constructed wetland.
  - 2.17 hectares of Planted Eucalypt Woodland.
- Low quality potential habitat for threatened plants, Downy Wattle and Tadgell's Bluebell.
- Foraging habitat for the threatened, Grey-headed Flying-fox.
- Constructed wetland containing habitat for numerous frog species and wetland birds.

Government legislation and policy

An assessment of the project against key biodiversity legislation and policy is provided and summarised below.

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required
Environment Protection and Biodiversity Conservation Act 1999	Potential low quality habitat for Downy Wattle may occur within the subject site. Grey-headed Flying-fox foraging habitat located within the subject site.	Assessments against the Significant Impact Criteria for these two species has been undertaken and are presented in Appendix 4. The project is considered unlikely to result in a significant impact to any threatened species, populations or communities listed under the EPBC Act. A referral to the Commonwealth Minister of the Environment is not required.
Threatened Species Conservation Act 1995	The subject site also contains potential habitat for three threatened species, being the Grey-headed Flying-fox, Downy Wattle and Tadgell's Bluebell.	Assessments of Significance undertaken under the EP&A Act and are presented in Appendix 3. Species Impact Statement not required.
Environmental Planning & Assessment Act 1979	The subject site also contains habitat for three threatened species, being the Grey-headed Flying-fox, Downy Wattle and Tadgell's Bluebell.	As the FBA cannot be applied to the subject site Assessments of Significance under Section 5A of the EP&A Act have been prepared for: • Grey-headed Flying-fox • Downy Wattle • Tadgell's Bluebell The findings of the Assessments of Significance have determined that a Species Impact Statement is not required.
Native Vegetation Act 2003	The project does not require the removal of vegetation defined as "native vegetation" under the Act.	No permits or approvals are required under the current scope of works.
Noxious Weeds Act 1993	The following noxious weeds are present within the subject site: • Bitou Bush • Asparagus Fern • Scotch Broom • Large-leaved Privet • African Olive	Bitou Bush is listed as a Class 1 noxious weed, meaning that: *The plant must be eradicated from the land and that land must be kept free of the plant.* Green Cestrum is listed as a Class 3 noxious weed, meaning that: *The plant must be fully and*

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required
	• Green Cestrum • Trailing Lantana	*continuously suppressed and destroyed.* Six of these noxious weeds are listed as Class 4, meaning that: *The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction and the plant must not be sold, propagated or knowingly distributed.* Land owners within the subject site have an obligation under the *Noxious Weeds Act 1993* to control all noxious weeds on their land according to the specified control class.

Note: Guidance provided in this report does not constitute legal advice.

Recommendations

The primary measure for the Project to minimise impacts to ecological values on the site is to implement measures to minimise indirect impacts associated with the proposed works. Vegetation losses are unavoidable for the development. However, vegetation is solely comprised of planted native and exotic species.

Offsets are required under the Bankstown Biodiversity Strategic Plan 2015-2025, that suggest each mature tree be offset by the planting of three trees.

Management measures to implement the control of weeds declared as noxious within the Bankstown LGA will be required to prevent the spread of weeds beyond the subject site.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Commercial & Industrial Property Pty Ltd (CIP) to undertake a biodiversity assessment of the subject site and broader subject site (Figure 1). The subject site is defined as Lot 12 DP 834734 within the Bankstown Local Government Area (LGA). The site is located at 2 Hume Highway, Chullora and is approximately 14 kilometres west of the Sydney CBD. As a State Significant Development a request for Secretary's Environmental Assessment Requirements (SEARs) under Section 78A(8A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) was submitted in August 2015 on behalf of CIP. The SEARs were provided by the Department of Planning and Environment (DPE) on 15 September 2015 (SSD – 7235).

1.2 Development proposal

The proposed development of the subject site would involve the construction and operation (24 hour) of a warehouse and distribution facility including:

- Demolition of the existing Fairfax Building (subject to a separate DA with Bankstown City Council).
- Bulk earthworks (subject to a separate DA with Bankstown City Council).
- Construction and fit-out of a warehouse.
- Associated internal roads.

Figure 2 provides a site map of the subject site, and identifies the existing and proposed structures.

1.3 Site description

The approximately 10.3 hectare subject site is located within an industrial estate within the metropolitan region of Sydney, with a history of disturbance and development and is zoned as IN1 – General Industrial under the Bankstown Local Environmental Plan. The development of the subject site in 1996 for the Fairfax Printing Plant and associated landscaping has resulted in a highly modified environment with limited ecological value. The planting of native flora species has occurred throughout the subject site, surrounding the existing building for visual amenity and slope stabilisation. To further improve visual amenity and manage onsite storm water, a wetland/retention basin was constructed in the south-east section of the subject site. Patches of planted native species occur predominantly around the perimeter of the subject site and areas of hardstand within the subject site (Figure 2).

1.4 Information sources

1.4.1 Publications and databases

In order to provide a context for the subject site, information about flora and fauna from within five kilometres (the 'locality') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- DoE Protected Matters Search Tool for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

- NSW BioNet - *the database for the Atlas of NSW Wildlife*, Office of Environment and Heritage (OEH) (TSC Act).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2013 (BA).
- Australian Government's Bureau of Meteorology, Groundwater Dependent Ecosystems Atlas.

Other sources of biodiversity information:

- Relevant vegetation mapping, including:
  - OEH Vegetation Information System (VIS) Mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer.
  - *The Native Vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities* (Tozer 2003).
  - *The Native Vegetation of the Sydney Metropolitan Area* (OEH 2013).

The following reports were also reviewed:

- *Bankstown City Council Biodiversity Strategy 2015-2025* (BCC 2015).
- NSW Scientific Committee final determinations for threatened biodiversity.
- Bankstown Local Environmental Plan 2015.

1.4.2 Spatial data

Aerial photography and site plan (Lot 12 DP 834734) was supplied by CIP, Land Property Information (LPI) (2014) and Near Maps (2015).

Mapping was conducted using hand-held (uncorrected) GPS units (GDA94) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files containing the relevant flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

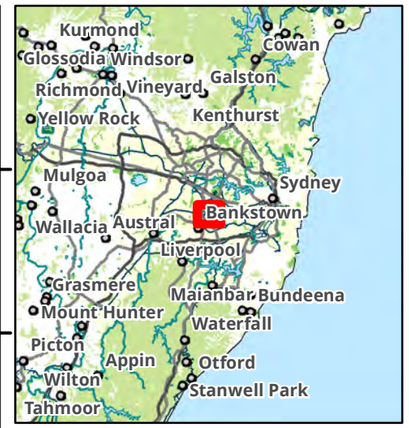
1.5 Additional legislative requirements

The SEARs have been provided by DPE to guide the preparation of an Environmental Impact Statement (EIS) for the Project at Lot 12 DP 834734 2 Hume Highway, Chullora. The SEARs identify the information requirements for the EIS, however no key issues relating to biodiversity are identified, however to support the EIS the following requirements of this Biodiversity Assessment Report (BAR) are to provide:

- Consideration of all relevant guidelines and environmental planning instruments, including identification and justification of any inconsistencies with these instruments.
- A risk assessment of any potential environmental impacts of the development, identifying the key issues for further assessment.
- A detailed assessment of any other significant issues identified in this risk assessment, which includes:
  - A description of the existing environment, using sufficient baseline data.

- An assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and legislation.
- A description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment.

- A consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments to be included in the EIS.



Legend

- Subject site
- Inner assessment circle
- Outer assessment circle
- IBRA Subregions
- CMA Regions
- CMA Subregions
- Mitchell Landscape
- NPWS Estate

Figure 1: Location Map

0 150 300 450 600 750

Metres
Scale: 1:15,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

biosis
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Matter: 20288
Date: 02 October 2015,
Checked by: NMG, Drawn by: LH, Last edited by: lharley
Location:P:\20800s\20879\Mapping\20879_F1_LocationMap

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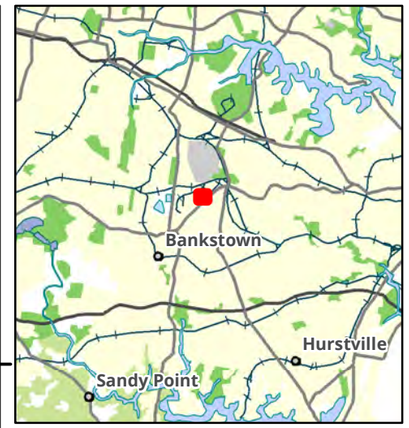

Legend

Subject site

Figure 2: Site Map

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 20879
Date: 01 October 2015,
Checked by: APS, Drawn by: LH, Last edited by: lharley
Location:P:\20800s\20879\Mapping
20879_F2_SiteMap

2. Methods

2.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW (Harden 1990, Harden 1991, Harden 1992, Harden 1993, Harden 2002). All doubtful species names were verified with the on-line Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which the scientific names have been used. Common names, where available, have been included in threatened species tables and the complete flora list is in Appendix 1.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by the Commonwealth Department of Environment (DoE) (DEWHA 2009a). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only. Common and scientific names are included in the fauna list in Appendix 2.

2.2 Site investigation

2.2.1 Flora assessment

The flora assessment was undertaken on 15 September 2015 using the random meander technique (Cropper 1996) to map the vegetation communities present and to determine the floristic composition and condition.

Typically, vegetation would be classified according to the PCTs held within the Vegetation Information System (VIS) classification 2.0 (OEH 2013) and based on the Keith (2004) system which uses three groupings of vegetation: vegetation formation, vegetation class and vegetation type, with vegetation type the finest grouping. This was not possible for the Project subject site as the planted nature of the vegetation was not representative of any NSW pre-defined PCTs. Instead, general classification of vegetation within the subject site has referred to the system developed by Specht and Specht (1979), with reference to the dominant canopy composition.

A list of flora species was compiled for each vegetation community and is summarised in Appendix 1. Flora records will be submitted to OEH for incorporation into the BioNet Wildlife Atlas.

The general condition of native vegetation was observed as well as the effects of current seasonal conditions. Notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

The results of the background research identified a medium likelihood of occurrence for Downy Wattle *Acacia pubescens* and Tadgell's Bluebell *Wahlenbergia multicaulis.* This assessment was based on the presence of a high number of records within the locality and the species' known tolerance of disturbed land. Downy Wattle is a late winter and spring flowering shrub. It is easily distinguishable from other Acacias by the distinctly hairy branches. It is not a cryptic species, during the flowering period, therefore an assessment of potential habitat by way of a random meander is adequate when searching for this species.

2.2.2 Fauna assessment

The subject site was investigated on 15 September 2015 by two ecologists, to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This

included direct observation, searching under rocks and logs, examination of tracks and scats and identifying calls. Particular attention was given to searching for threatened fauna and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

Fauna records will be submitted to OEH for incorporation into the NSW BioNet Wildlife Atlas.

A preliminary review of background research identified a medium to high likelihood of Green and Golden Bell Frog and Curlew Sandpiper to occur within the subject site.

Targeted surveys for Green and Golden Bell Frog were undertaken in addition to the habitat based assessment to confirm their presence or absence from the wetland. As a means of implementing "best practice" to avoid any potential impacts to the species targeted surveys were undertaken. Surveys were undertaken using a combination of current state and federal survey guidelines (CoA 2010 and NPWS 2003) and current literature (Garnham et al 2015).

Targeted surveys were undertaken over four nights between 17 to 29 September 2015. An additional night of survey (as recommended in the draft BAR) was completed on 2 November 2015. Prior to surveys being undertaken at the subject site, a Green and Golden Bell Frog call 'reference site' was established at Narrawang Wetlands, Olympic Park. Surveys commenced following a week of daily maximum temperatures between 20-29° Celsius, which was considered suitable for the species to break winter torpor. The first survey undertaken on 17 September identified the species calling at the reference site on dusk. Rainfall preceding the September survey period totaled 38.8 mm which was coupled with the preceding warmer weather, during the beginning of the known peak activity period. Rainfall preceding the November survey period totaled 24.8 mm and a daily maximum temperature of 32.1° Celsius.

Surveys were undertaken at night preceded by warm weather and light rainfall, however two of the surveys were considered to be undertaken during sub-optimal conditions (moderate winds and low daily maximum temperature) and were therefore augmented by active searching of suitable wintering habitat as identified by Garnham et al (2015). Based on recommendations within the draft report, an additional night of survey was completed during warmer conditions (November 2015).

Survey methods included a combination of call playback, using recordings and experienced personnel mimicking the species, active searching in areas of suitable habitat and spotlighting and inspecting the waterbody and rock gabions. The call playback, aural survey and active searching was undertaken over 2 hours at the subject site and involved:

- Walking the circumference of the wetland listening for calls, twice.
- Playing or mimicking two minutes of Green and Golden Bell Frog calls, followed by listening for responses for a further five minutes over a period of an 45 minutes.
- Active searching of rock gabions, rocks, reeds and wood debris.
- Spotlighting after all other methods completed, with a particular focus on vegetation and open water.

Biosis Research Standard Operating Procedures provide a comprehensive outline of methods used for fauna survey and are available on request.

2.2.3 Permits and Licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by the Office of Environment and Heritage under the *National Parks and Wildlife Act 1974* (SL100758, expiry date 31 March 2017). Fauna survey was conducted under approval 14/271 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2016).

2.3 Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy, seasonal conditions, ephemeral status of waterbodies and migration and breeding behaviours of some fauna. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site. Targeted surveys for Green and Golden Bell Frog were limited by sub optimal rainfall with 38.8 mm and 24.8 mm of rain preceding surveys respectively, whereas the guidelines (CoA 2010 and NPWS 2003) recommend rainfall above 50 mm. The use of a reference site and additional active searching in suitable wintering/refuge habitat was undertaken to increase survey effort as a result of sub-optimal rainfall, to ensure the occurrence of the species could be adequately determined.

The current flora and fauna assessment was conducted in early spring, which is an optimal time for survey for most species. A number of winter flowering species may not be detectable during this period, however seasonality is not considered to have had a significant affect on the assessment of the subject site.

Database searches, and associated conclusions on the likelihood of species to occur within the subject site, are reliant upon external data sources and information managed by third parties.

2.4 Mapping

Aerial photography and site plans (include plan number/s) was supplied by CIP/Near Maps (2014).

Mapping was conducted using hand-held (uncorrected) GPS units (GDA94) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

3. Legislative context

This section provides an assessment of the project against key biodiversity legislation and government policy.

Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

3.1 Commonwealth

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Matters of NES relevant to the project are summarised in Table 1 with Appendix 4 containing Significant Impact Criteria assessments against the *Matters of National Environmental Significance - Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (DoE 2013) for matters of NES potentially impacted by the proposed development.

Table 1: Assessment of the project against the EPBC Act

Matter of NES	Project specifics	Significant Impact Criteria assessment findings
Threatened species (flora and fauna)	18 flora species and 22 fauna species have been recorded or are predicted to occur in the locality. An assessment of the likelihood of these species occurring in the subject site is provided in Appendix 1: Flora – Likelihood of Occurrence Table 11: Threatened flora species recorded, or predicted to occur, within five kilometres of the subject site Appendix 2 (flora) and Appendix 3 (fauna).	Most of these species are not likely to occur within the subject site and development is unlikely to constitute a significant impact. The following two species are considered to have a medium or greater likelihood of occurring within the subject site: • Downy Wattle • Grey-headed Flying-fox Assessments against the Significant Impact Criteria for these two species has been undertaken and are presented in Appendix 4. As a result significant impacts to the Grey-headed Flying-fox or Downy Wattle is considered negligible. A preliminary assessment identified the need to undertake target Green and Golden Bell Frog surveys to confirm their presence/absence within the subject site. As a result of the targeted surveys Green and Golden Bell Frog is considered to have a low likelihood of occurrence within the subject site.
Threatened ecological communities	There is no EPBC Act TEC within the subject site.	N/A

Matter of NES	Project specifics	Significant Impact Criteria assessment findings
Migratory species	45 migratory species have been recorded or are predicted to occur in the locality (Appendix 3).	While some of these species would be expected to use the subject site on occasions, some may do so regularly and others may be resident, the subject site does not provide important habitat for an ecologically significant proportion of any of these species.
Wetlands of international importance (Ramsar sites)	There are 12 Ramsar sites in NSW, the closest one being the Towra Point Nature Reserve on the Kurnell Peninsula in Sydney.	The subject site does not flow directly into a Ramsar site and the development is not likely to result in a significant impact.

On the basis of criteria outlined in the relevant *Significant Impact Guidelines* (CoA, 2013) it is considered unlikely that a significant impact on a Matter of NES would result from the proposed action.

3.2 State

3.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act was enacted to encourage the proper consideration and management of impacts of proposed development or land-use changes on the environment (both natural and built) and the community. The Act is administered by DPE.

Sections of the EP&A Act of primary relevance to the natural environment are considered further below in relation to the current proposal.

State Significant Development (SSD) (Division 4.1)

The Project has been deemed a SSD under Part 4 of the EP&A Act. SEARs (SSD 7235) were issued by DPE on 15 September 2015. This BAR has been prepared to align with the NSW Biodiversity Offsets Policy for Major Projects (OEH 2014b) and underlying tool the FBA (OEH 2014a), to support the preparation of the EIS. The FBA is underpinned by the classification of vegetation communities into PCTs. No PCTs occur on site that allow for the Threatened Species Profile Database to be refined, thus the FBA cannot be applied.

Section 5A of the EP&A Act requires proponents and consent authorities to consider if a development will have a significant effect on threatened species, populations or communities (biota) listed under the TSC Act and *Fisheries Management Act 1995* (FM Act). Section 5A (outlines seven factors that must be taken into account in an Assessment of Significance (AoS; formally known as the "7-part test"). Where any AoS determines that a development will result in a significant effect to a threatened species, population or community a Species Impact Statement (SIS) is required.

Three threatened species listed under the TSC Act have been identified as having a medium to high likelihood of occurrence within the subject site; Downy Wattle, Tadgell's Bluebell and Grey Headed Flying-fox. An AoS has been prepared for each of these species (Appendix 3), as the FBA could not be applied, and it was determined that a significant impact to any of these species is considered unlikely.

3.2.2 Threatened Species Conservation Act 1995

The TSC Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened biota; key threatening processes; and critical habitat for threatened biota.

Native vegetation within the subject site is not a TEC and contains limited habitat for a threatened flora and a fauna species. Impacts to the threatened biota must be assessed through the AoS process under Section 5A of the EP&A. AoS have been prepared for the threatened biota that are deemed likely to be subject to negative impacts and are provided in Appendix 3. They indicate that a significant impact is not likely to result from the proposal. A Species Impact Statement is therefore not required.

Habitat critical to the survival of an endangered or critically endangered species, population or ecological community can be identified under the TSC Act and listed on the Register of Critical Habitat kept by the OEH. The subject site does not contain declared 'critical habitat'.

A licence to harm/pick/damage habitat of a threatened species, population or community or damage critical habitat is not required.

Local Environment Plans (Part 3 Division 4)

Local Environment Plans (LEP) apply either to the whole, or part of, a local government area and make provision for the protection or utilisation of the environment through zoning of land.

The subject site is subject to the Bankstown Local Environmental Plan and is zoned 1N1 – General Industrial. The objectives of this zone are:

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.

State Environmental Planning Policies (Part 3 Division 2)

State Environmental Planning Policies (SEPPs) outline policy objectives relevant to state wide issues. No SEPPs are relevant to the current development in relation to biodiversity.

3.2.3 Native Vegetation Act 2003

The NV Act provides for, encourages and promotes the management of native vegetation on a regional basis. Under the NV Act no clearing of native vegetation is allowed except in accordance with prior development consent from the relevant Council or under a Property Vegetation Plan (PVP) approved by the relevant Catchment Management Authority.

The subject site occurs within the Bankstown LGA which is defined as an Urban Area under Schedule 1, therefore the NV Act does not apply.

3.2.4 Noxious Weeds Act 1993

The NW Act was enacted to provide for the identification, classification and control of noxious weeds. Plants declared as noxious weeds are currently listed under Weed Control Order No. 28 Declaring Certain Plants to be Noxious Weeds published in the New South Wales Government Gazette No. 97 (Department of Premier and Cabinet 2011).

Eight declared noxious weeds were identified within the subject site and the details of these are listed in Table 2. An occupier (other than a public authority or a local control authority) must take all reasonable steps to

eradicate state prohibited weeds and comply with the requirements in the Noxious Weeds Act 1993 for a notifiable weed for restricted plants. As an area within Blacktown LGA, the occupier must also take all reasonable steps to eradicate regionally prohibited weeds; fully and continuously suppress and destroy regionally controlled weeds; and prevent the growth and spread of locally controlled weeds.

Table 2: Noxious weeds recorded within the subject site

Scientific Name	Common Name	Control Class	Legal Requirement
Asparagus aethiopicus	Asparagus Fern	4	*The plant must not be sold, propagated or knowingly distributed.*
Chrysanthemoides monilifera subsp. monilifera	Boneseed	1	*The plant must be eradicated from the land and that land must be kept free of the plant.*
Senecio madagascariensis	Fireweed	4	*The plant must not be sold, propagated or knowingly distributed.*
Cytisus scoparius	Scotch Broom	4	*The plant must not be sold, propagated or knowingly distributed.*
Ligustrum lucidum	Large-leaved Privet	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.*
Olea europaea subsp. cuspidata	African Olive	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.*
Cestrum parqui	Green Cestrum	3	*The plant must be fully and continuously suppressed and destroyed.*
Lantana montevidensis	Trailing Lantana	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.*

4. Vegetation and Landscape Value

4.1 Landscape regions

The subject site is within the Sydney Basin Bioregion and the Sydney Metropolitan section of the Cumberland IBRA subregion. The Cumberland subregion covers 275,693 hectares of land throughout the Hawkesbury-Nepean and Sydney Metropolitan Catchments. This landscape region has been highly modified through urban and industrial expansion of a metropolitan environment. The subject site contains poor habitat connectivity as a result of its occurrence within a fragmented landscape in combination with previous development of the site.

4.2 Waterways and wetlands

One constructed wetland occurs within the subject site and an additional constructed wetland occurs immediately to the north of the subject site. The wetland within the subject site has been constructed to manage stormwater associated with the existing building and associated road/hardstand infrastructure. The surface area of the wetland is approximately 0.15 hectares. To improve the visual amenity of the wetland, revegetation has been undertaken using native species of wetland and riparian vegetation. The wetland vegetation consists primarily of Common Reed *Phragmites australis* and Tall Spike-rush *Eleocharis sphacelata*. Filamentous algae covers most visible substrates within the wetland and is indicative of a eutrophic environment.

The vegetation of the subject site has been previously mapped as *Plantation (native and/or exotic)* and *Weeds and Exotics* (OEH 2013). Beyond the subject site to the north, the vegetation bounding Cooks River has been previously mapped as Castlereagh Ironbark Forest which is listed under both the EPBC Act and TSC Act. A focus of the site investigation was therefore to determine whether the vegetation of the subject site was consistent with this, or any other TEC.

4.3 Vegetation communities

The vegetation of the subject site was classified into five communities based on the floristic composition and structure (figures 3, 4 and 5), these include;

- Closed Casuarina Forest.
- Planted Eucalypt Woodland.
- Exotic Grassland.
- Ornamental native and Exotics.
- Constructed Wetland.

The details of these three communities are outlined in Table 44 to Table 8 below.

4.4 Vegetation observations

In accordance with Appendix 4 of the FBA (OEH 2014), the per cent of native vegetation cover within the inner and outer assessment circles are assessed both pre and post development to provide local context for the ecological impacts. For the purpose of this assessment, the smallest available inner assessment circle of 100

hectares is adequate, therefore the outer assessment circle has an area of 1000 hectares (Figure 3). The figures quoted in Table 3 were calculated using the native vegetation communities within the *Native Vegetation of the Sydney Metropolitan Catchment Management Area* (OEH 2013) mapping (Figure 4). The communities removed from the calculations (since they are planted and do not equate to native vegetation) include;

- Weeds and exotics.
- Urban exotic/native.
- Plantation (native and exotic).
- Water.
- Artificial Wetland.

The outer assessment circle is predominantly devoid of native vegetation due to historic clearance for residential and industrial development. The majority of mapped native vegetation occurs to the north of the subject site, along the Cooks River riparian corridor and within Rookwood Cemetery. These areas contain important ecological values that retain some old growth vegetation, fauna habitat and an array of threatened biota. The impact of the project on native vegetation within the inner and outer assessment circle is summarised inTable 3.

Table 3: Native vegetation cover before and after the Project

	Native Vegetation Cover (current)		Native Vegetation Cover (future)	
	Area	Percent	Area	Percent
100 ha inner circle	5.89	6 (6-10)	5.89	6 (6-10)
1000 ha outer circle	30.75	4 (1-5)	30.75	4 (1-5)

Table 4: Closed Casuarina Forest

Closed Casuarina Forest	
Extent within subject site	The Closed Casuarina Forest (1.39 ha) was recorded within the subject site. This community was mapped predominantly along raised earth batters that surround the existing structure of the subject site (Figure 4).
Description	Within the subject site, the Closed Casuarina Forest was characterised by a closed canopy of planted Swamp Oak *Casuarina glauca* and River Oak *Casuarina cunninghamiana*. The dense nature of these trees and accumulation of casuarina needles has excluded recruitment of other native shrubs and understorey species. Opportunistic weeds such as Bridal Creeper *Asparagus asparagoides*, Lantana *Lantana camara,* Trailing Lantana *Lantana montevidensis* and Moth Vine *Araujia sericifera.*
Condition	This community was considered to be in moderate to poor condition owing to the extremely low diversity of native species. Subsequently, the level of recruitment of weeds was also relatively low.
Legal Status	Commonwealth EPBC Act: Not listed. NSW TSC Act: Not listed.
Threatened species / fauna habitat	No flora threatened species were noted within the Closed Casuarina Forest nor were they considered to provide potential habitat for threatened flora species due to the level of disturbance from previous and current land use and lack of opportunity for recruitment of native flora in the understorey. The mid-storey layers is non existent as dense plantings of Casuarinas restricts light penetration, limiting the availability and likelihood of smaller fauna species including ground-dwelling mammals, smaller perching birds and reptiles occurring within this community. Being located in a fragmented landscape, exotic pest species are likely to be common within the subject site with evidence of introduced species recorded during the field survey. Given the condition of the woodland and surround disturbances, the Closed Casuarina Forest is considered to be of low importance to threatened fauna.
Closed Casuarina Forest within the subject site	 **Plate 1: Closed Casuarina Forest (Moderate)**

Table 5: Planted Eucalypt Woodland

Planted Eucalypt Woodland	
Extent within subject site	Planted Eucalypt Woodland (2.17 ha) was recorded in the more open areas of the subject site, between the Closed Casuarina Forest and the Exotic Grassland communities (Figure 4).
Description	The canopy of the Planted Eucalypt Woodland is characterised by predominantly native species, many of which are not endemic to the Sydney region. These trees include; *Eucalyptus caleyi*, Mugga Ironbark *Eucalyptus sideroxylon* Narrow-leaved Ironbark *Eucalyptus crebra*, Sydney Blue Gum *Eucalyptus saligna*, Sweet Pittosporum *Pittosporum undulatum*, Queensland Silver Wattle *Acacia podalyriifolia*, Parramatta Wattle *Acacia parramattensis* and Swamp Oak. A variety of planted native and exotic shrubs were recorded within this community, including; Sifton Bush Cassinia arcuata, Wirilda Wattle *Acacia retinodes var. retinodes*, Coastal Rosemary *Westringia fruticosa*, Prickly Beard-heath *Leucopogon juniperinus*, Mickey Mouse Plan *Ochna serrulata*, Cassia *Senna pendula var. glabrata*, Crimson Bottlebrush *Callistemon citrinusm,* White Dogwood, Boneseed *Chrysanthemoides monilifera subsp. monilifera*, Ozothamnus diosmifolius and Weeping Bottlebrush *Callistemon viminalis.* The ground cover strata was dominated by exotic grasses and herbs including; Panic Veldtgrass *Ehrharta erecta,* African Lovegrass *Eragrostis curvula,* Perennial Ryegrass *Lolium perenne,* Red Natal Grass *Melinis repens,* Kikuyu Grass *Pennisetum clandestinum,* Buffalo Grass *Stenotaphrum secundatum,* Common Vetch *Vicia sativa*, Fireweed *Senecio madagascariensis,* Common Sowthistle *Sonchus oleraceus,* Soursob *Oxalis pes-caprae* and Lamb's Tongues *Plantago lanceolata*. In the south eastern corner of the subject site is a constructed wetland that has a perimeter of Planted Eucalypt Woodland surrounding it. The floristic composition of this community is more riparian than in other areas but its function is similar. Around the constructed woodland, this community has a canopy of Brush Box *Lophostemon confertus,* Broad-leaved Paperbark *Melaleuca quinquenervia*, Swamp Mahogany *Eucalyptus robusta* and Prickly-leaved Tea Tree *Melaleuca stypheliodes*. The understorey was broadly similar to the other instances of Planted Eucalypt Woodland, but with a dominance of Spiny-headed Mat-rush *Lomandra longifolia* and Tall Sedge *Carex apressa.*
Condition	This community was found to be in moderate-poor condition due to the high proportion of exotic species in the understorey and canopy species that are not endemic to the Sydney region.
Legal Status	Commonwealth EPBC Act: Not listed. NSW TSC Act: Not listed.
Threatened species / fauna habitat	No threatened flora species were noted within this area, however it is considered to provide marginal habitat for Downy Wattle *Acacia pubescens*. This species is known to be tolerant of disturbance and has been recorded a large (699) number of times within the locality. The potential impacts of the Project on this species are further assessed in Appendix 3 and 4. This community was not considered to provide potential habitat for any other threatened flora species due to the disturbed and modified nature of the vegetation and soils. Winter flowering Eucalypts may provide foraging habitat for a suite of migratory bird species, however no suitable permanent habitat occurs due to the lack of mature trees. The cleared and maintained understorey provide limited to no habitat complexity for small mammals or reptiles.

Planted Eucalypt Woodland

Planted Eucalypt Woodland within the subject site

Plate 2: Planted Eucalypt Woodland

Plate 3: Planted Eucalypt Woodland surrounding the constructed wetland

Table 6: Exotic Grassland

Exotic Grassland	
Extent within subject site	The Exotic Grassland community (0.84 ha) was recorded within the cleared areas of the subject site (Figure 4), surrounding the existing building.
Description	The Exotic Grasses community was dominated by exotic grasses and herbs including; Paddy's Lucerne *Sida rhombifolia*, Buffalo Grass , African Lovegrass, Kikuyu Grass, Quaking Grass *Briza maxima,* Shivery Grass *Briza minor,* Spear Thistle *Cirsium vulgare*, Gomphrena Weed *Gomphrena celosioides*, Fennel *Foeniculum vulgare*, Fleabane *Conyza bonariensis* and Common Vetch.
Condition	This community was recorded in poor condition due to the cleared nature and abundance of exotic species.
Legal Status	Commonwealth EPBC Act: Not listed. NSW TSC Act: Not listed.
Threatened species / fauna habitat	No threatened species were noted within this community, nor is it considered to provide potential habitat for threatened flora species due to the high abundance of exotic grasses and lack of opportunity for recruitment. Areas cleared of native vegetation provide habitat for common native bird species such as the Welcome Swallow *Hirundo neoxena* and Willie Wagtail *Rhipidura leucophrys*, as well as several exotic bird species such as Common Myna *Acridotheres tristis*. The threatened Little Eagle *Hieraaetus morphnoides* will forage in the cleared areas containing open grassland, particularly those adjoining intact woodland habitats. This habitat however is not considered to be limited in the project locality. Given that the remainder of the subject site has been cleared and is subject to ongoing disturbances, it is considered to be of poor conservation value to threatened fauna.
Exotic Grassland within the subject site	 **Plate 4: Exotic Grassland**

Table 7: Ornamental Native and Exotics

Ornamental Native and Exotics	
Extent within subject site	The Ornamental Native and Exotics community (0.90 ha) was recorded immediately adjacent to the existing structure and in the landscaped beds within the carpark (Figure 4).
Description	The Ornamental Native and Exotics community was characterised by typical ornamental species, including Lilly Pilly *Acmena smithii*, Crimson Bottlebrush, Weeping Bottlebrush, Blue Flax-lily *Dianella caerulea*, Spiny-headed Mat-rush, Coastal Rosemary *Westringia fruticosa*, Swamp Foxtail *Pennisetum alopecuroides*, Burrawang *Macrozamia communis*, Cotoneaster *Cotoneaster* spp.,Formosan Lily *Lilium formosanum*, Wild Iris *Dietes grandiflora* and Gymea Lily *Doryanthes excelsa*.
Condition	This community was recorded in poor condition due to the cleared nature and abundance of exotic species.
Legal Status	Commonwealth EPBC Act: Not listed. NSW TSC Act: Not listed.
Threatened species / fauna habitat	No threatened species were noted within this community, nor is it considered to provide potential habitat for threatened flora species due to the high abundance of exotic grasses and lack of opportunity for recruitment. Rows of Crimson Bottlebrush and Weeping Bottlebrush provide foraging habitat for common native bird species including Eastern Spinebill *Acanthorhynchus* tenuirostris, New Holland Honey Eater *Phylidonyris novaehollandiae* and Noisy Miner *Manorina melanocephala*. Given that the remainder of the subject site has been cleared and is subject to ongoing disturbances, it is considered to be of poor conservation value to threatened fauna.
Ornamental Native and Exotics	 **Plate 5: Ornamental Native and Exotics**

Table 8: Constructed Wetland

Constructed Wetland	
Extent within subject site	The Constructed Wetland community (0.12 ha) was recorded in the south eastern corner of the subject site, in a man-made detention basin (Figure 4).
Description	The Constructed Wetland community was characterised by emergent macrophytes including Common Reed *Phragmites australis* and Tall Spike Rush *Eleocharis sphacelata.* The banks are constructed of rock gabions and lacking in vegetation cover. Beyond that, there is a dense cover of Spiny-headed Mat Rush, Crofton Weed *Ageratina adenophora*, Coastal Rosemary, Asparagus Fern and Tall Sedge. On the banks of the Constructed Wetland, the vegetation transitions to a combination of the Closed Casuarina Forest and Planted Eucalypt Woodland communities.
Condition	This community was recorded in poor condition due to the cleared nature and abundance of exotic species.
Legal Status	Commonwealth EPBC Act: Not listed. NSW TSC Act: Not listed.
Threatened species / fauna habitat	No threatened species were noted within this community, nor is it considered to provide potential habitat for threatened flora species due to the high abundance of exotic grasses and lack of opportunity for recruitment. Within this community common frog species and wetland birds were observed. Common frog species included Peron's Tree Frog, Eastern Froglet, Striped Marsh Frog and Eastern Dwarf Green Tree Frog. Given that the remainder of the subject site has been cleared and is subject to ongoing disturbances, it is considered to be of poor conservation value to threatened fauna.
Ornamental Native and Exotics	 **Plate 6: Constructed Wetland**

Legend

- Subject site
- Inner assessment circle
- Outer assessment circle
- IBRA Subregions
- CMA Regions
- CMA Subregions
- Mitchell Landscape
- NPWS Estate

Figure 3: Vegetation Map

0 140 280 420 560 700

Metres

Scale: 1:14,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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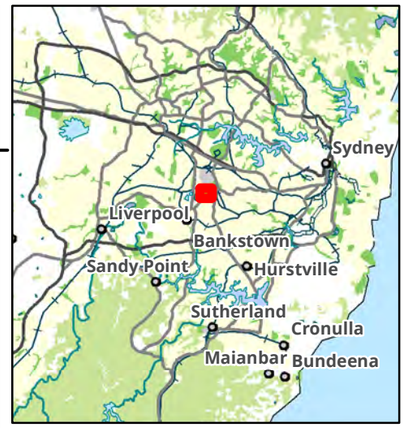

Legend

- Subject site
- Inner assessment circle

SMCMA Vegetation Communities

- S_DSF01: Castlereagh Ironbark Forest
- S_FoW05: Riverflat Paperbark Swamp Forest
- S_FoW06: Cumberland Riverflat Forest

Figure 4: SMCMA Vegetation Mapping

0 40 80 120 160 200

Metres

Scale: 1:4,100 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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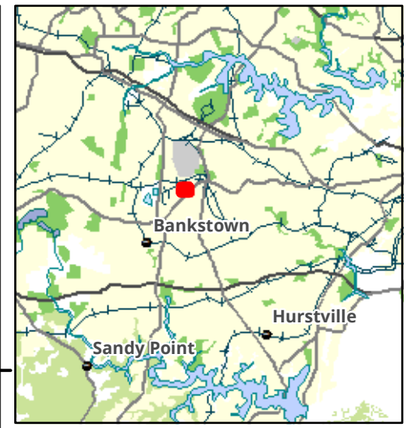

Legend

- Subject site
- GGBF targeted survey
- Early Works DA vegetation
- Stockpile locations from Early Works DA

Vegetation Communities

- Closed Casuarina Forest
- Planted Eucalypt Woodland
- Ornamental Natives and Exotics
- Exotic Grassland
- Constructed Wetland

Figure 5: Biosis Vegetation Mapping and Survey Effort

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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5. Threatened species

Database research identified 23 species of fauna listed as threatened under the EPBC Act and an additional 18 fauna species listed under the TSC Act. Given the fragmented landscape and the presence of threats (i.e. pest fauna species), the majority of these species are highly mobile and likely to use the subject site for dispersal and foraging purposes only. No hollow-bearing trees were identified or considered present within the subject site. Following field investigations, one EPBC Act listed threatened fauna species, the Grey-headed Flying-fox, was determined to have a moderate or higher likelihood of occurrence within the subject site. Targeted surveys for Green and Golden Bell Frog did not identify the species within the subject site. During targeted surveys numerous non-threatened frog species were recorded including; Eastern Froglet *Crinea signifera,* Perons Tree Frog *Litoria peroni,* Eastern Dwarf Tree Frog *Litoria fallax,* and Striped Marsh Frog *Lymnodynastes peroni*.

The initial habitat assessment identified that the wetland is unlikely to provide any suitable habitat for the Curlew Sandpiper as foraging or roosting habitat was not present. The water depth, lack of emergent vegetation and proliferation of filamentous algae precludes the occurrence of this species, or most other wading birds species.

Database research identified 18 species of flora listed as threatened under the EPBC Act and an additional six species listed under the TSC Act. The highly disturbed and fragmented condition of the subject site and the surrounding landscape precluded the occurrence of the majority of these species, with the exception of two species that tolerate disturbed sites; Downy Wattle (Vulnerable, EPBC Act and TSC Act) and Tadgell's Bluebell (Endangered, TSC Act).

5.1 Ecosystem credit species

Not applicable as no PCTs occur within the subject site. Preliminary research identified Curlew Sandpiper as a potential candidate ecosystem credit species which was derived from historic records. The field assessment did not identify any suitable habitat for the species within the subject site and no PCTs associated with Curlew Sandpiper were identified. Therefore, Curlew Sandpiper does not meet the criteria for a predicted ecosystem credit species within the subject site.

5.2 Species credit species

Species credit species could not be identified for the subject site in accordance with the FBA, however a list of potential species credit species were derived. Potential candidate species credit species were identified using species listed in the Threatened Species Profile Database and occurred within the Sydney Metropolitan Cumberland IBRA subregion. This list of potential candidate species was further refined using the NSW BioNet - *the database for the Atlas of NSW Wildlife*, OEH. The list of potential candidate species credit species are provided in Table 9 which includes a determination of the presence of habitat, the requirement to undertake targeted surveys and a determination of whether the species is considered present on site. An extensive list of the likelihood of occurrence of listed threatened species is provided in Appendix 1 and 2.

Table 9: Species credit species and status within the subject site

Candidate Species	Habitat presence	Targeted surveys	Determination of presence and rationale
Green and Golden Bell Frog	Yes, in constructed wetland. No PCTs present on site that align with habitat requirements.	Yes	Not present. Poor quality of potential habitat, no individuals identified in targeted surveys, no connectivity with existing populations/records
Downy Wattle	Yes, marginal habitat was identified within the Planted Eucalypt Woodland community.	Yes	Not present. The targeted surveys were completed during the flowering period for this species. Conformation of this was provided by a known population. The survey effort is considered adequate based on ideal survey conditions and the quality of potential habitat being marginal to poor.
Tadgell's Bluebell	Yes, marginal habitat was identified within the Planted Eucalypt Woodland community particularly in the moist area surrounding the constructed wetland.	Yes	Not present. The targeted surveys focussed on areas of potential habitat and were completed during the spring season. This species flowers year round, however it does have a cryptic nature, often making it difficult to detect. The survey effort is considered adequate the quality of potential habitat being marginal to poor.

6. Ecological impacts and recommendations

This section identifies the potential impacts of proposed development on the ecological values of the subject site and includes recommendations to assist CIP to design a development to minimise impacts on ecological values.

The principal means to reduce impacts on ecological values associated with the Project will be to ensure that no indirect impacts result from activities within the subject site. Under the current proposal, no native vegetation (as defined under the VM Act) is proposed to be removed, however a constructed wetland and all existing (planted) vegetation is proposed to be removed.

Eight species of noxious weeds, listed within the Bankstown LGA were identified within the subject site. Implementing control measures appropriate to the control class specified for each species will minimise or avoid the spread of these species. Soil transportation out of the subject site should also be minimised to the furthest extent practical to further reduce the spread of noxious weeds.

A summary of potential implications of development of the subject site and recommendations to minimise impacts during the design phase of the project is provided in Table 10 below.

Table 10: Ecological values, impacts and recommendations

Ecological value (Figure 3)	Impacts	Recommendations		
		Avoid	Minimise and mitigate	Offset
Native vegetation including trees	3.68 ha of planted native vegetation in the form of Closed Casuarina Forest, Constructed Wetland and Planted Eucalypt Woodland will be cleared to facilitate the Project.	• Based on the planted nature and low value of the modified native vegetation, there is little requirement to avoid impacts to this vegetation.	• Minimise the requirement for clearing of native vegetation through the detailed design phase, where possible.	• Offsetting of the removal of trees within the subject site will be undertaken in accordance with the landscape plan by Lange Design Landscape Architecture.
Wetland	The removal of a 0.12 hectare constructed wetland. No threatened species were considered likely to occur or utilise habitat within the wetland, however, four common frog species were observed.	No suitable or applicable options to avoid impacts to the wetland are feasible.	• Undertake a staged approach to clearing, providing opportunity for existing fauna to evacuate the constructed wetland. • Appropriate erosion and sediment control measures should be installed at all sites to avoid sedimentation of receiving water bodies or other indirect impacts to surrounding potential biodiversity values.	N/A
Unexpected finds	Potential unanticipated finds of threatened flora or fauna may occur during construction.	N/A	• An unanticipated threatened species finds procedure to be developed including fact sheets on threatened species likely to be encountered.	N/A

Ecological value (Figure 3)	Impacts	Recommendations		
Regional biodiversity	Spread of weeds beyond the subject site during construction. Sediment laden run-off exiting the subject site and potentially entering waterways. 8 species noxious weeds within the Bankstown LGA were identified within the subject site (Table 2). Appropriate measures should be implemented to minimise the spread of these species in accordance with the control class of each species.	N/A	• Minimise soil transportation within, out of the Project footprint to reduce the spread of weeds. • Where possible, stockpiling or storage of construction materials should occur in areas already cleared, such as the road or on hard-standing. • Appropriate erosion and sediment control measures should be installed around the works area and any associated stockpiles to avoid sedimentation of receiving water bodies or other indirect impacts to surrounding biodiversity values.	N/A

7. Conclusion

This BAR is an assessment of the potential impact of the construction and operation (24 hour) of a warehouse and distribution facility on biodiversity values within the subject site in accordance with the EP&A Act, the TSC Act and the EPBC Act.

The highly disturbed and modified nature of the subject site precluded the occurrence of threatened ecological communities and the majority of threatened species of flora and fauna predicted to occur.

The potential or confirmed occurrence of two Commonwealth and state listed threatened species, and one state listed threatened species was identified and as such assessments of significance and assessments against significant impact criteria were undertaken for these species; Grey Headed Flying-fox (confirmed) and Downy Wattle (potential) and Tadgell's Bluebell (potential). The findings of these assessments have determined that a significant impact to these species is unlikely and therefore a SIS and/or a referral to the Minister of Environment under the EPBC Act is not required. Given the fragmented landscape and the ongoing disturbance of the subject site (i.e. garden and lawn maintenance), these species are highly unlikely to be impacted by the proposed development.

To mitigate the above residual impacts of the proposal, recommendations have been included in Section 6 of this report, including weed management, recommendations regarding appropriate hygiene protocols for vegetation clearing and plant and the supervision of habitat clearance (refer to Table 6 for full details regarding proposal safeguards).

Overall, the project is considered unlikely to result in a significant impact to any threatened species, populations or communities listed under the EPBC or TSC Acts. A referral to the Commonwealth Minister of the Environment or preparation of a Species Impact Statement are not required.

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Appendices

Appendix 1: Flora Likelihood of Occurrence

Table 11: Threatened flora species recorded, or predicted to occur, within five kilometres of the subject site

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Acacia pubescens	Downy Wattle	VU	V	2014#	Moderate	There are known strong hold populations within the locality and although potential habitat within the subject site is considered marginal, the species is tolerant of disturbance and may occur.	*Acacia pubescens* is found in Sydney Metropolitan, and Hawkesbury/Nepean Catchment Management Region, with concentrated populations around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. The species occurs in open woodland and forest, in a variety of plant communities, including Cooks River/ Castlereagh Ironbark Forest, Shale/ Gravel Transition Forest and Cumberland Plain Woodland.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Allocasuarina glareicola		EN	E1	#	Low	Not previously recorded within the locality and no habitat present within the subject site.	Found in the Hawkesbury/Nepean and Sydney Metropolitan Catchment Authority Regions. 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. Also found in Dry Sclerophyll forest/Woodland. Associated species include *Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla* and *Melaleuca decora*. Common associated understorey species include *Melaleuca nodosa, Hakea dactyloides, Hakea sericea, Dillwynia tenuifolia, Micromyrtus minutiflora, Acacia elongata, Acacia brownei, Themeda australis* and *Xanthorrhoea minor*.
Bothriochloa biloba	Lobed Bluegrass	VU		1935	Low	Not previously recorded within the locality and no habitat present within the subject site.	Found in woodland on nutrient poor soils. This species has a strong preference for heavier textured soils and has previously been recorded on volcanic soils. Restricted levels of grazing and growth of *Aristida ramosa* have been found to cause reduction and exclusion of this species.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Caladenia tessellata	Thick Lip Spider Orchid	VU	E1	#	Negligible	Not previously recorded within the locality and no habitat present within the subject site.	*Caladenia tessellata* is found in the following Catchment Management Regions Sydney Metropolitan, Southern Rivers, Hawkesbury/Nepean, and Hunter/Central Rivers. Currently known from three disjunct areas: Braidwood on southern tablelands, Ulladulla on the south coast and three populations in Wyong area on the Central Coast. It is generally found in grassy, dry sclerophyll forests/woodland, particularly those associated with clay loam, or sandy soils. However, there is one population at Braidwood in lowland on stony soil. This species only grows in very dense shrubbery in coastal areas.
Callistemon linearifolius	Netted Bottle Brush		V	2009	Low	Not previously recorded within the locality and no habitat present within the subject site.	Occurs chiefly from Georges River to the Hawkesbury River, and though the species was more widespread in the past, today it is limited to 5-6 populations in the Sydney area. This species grows in dry sclerophyll forest on the coast and adjacent ranges.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Cryptostylis hunteriana	Leafless Tongue Orchid	VU	V	#	Low	Not previously recorded within the locality and no habitat present within the subject site.	This species typically grows in swamp-heath on sandy soils chiefly in coastal districts but has also been recorded on steep bare hillsides. This species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by *Eucalyptus sclerophylla, E. sieberi, Corymbia gummifera* and *Allocasuarina littoralis*; appears to prefer open areas in the understorey of this community and is often found in association with *Cryptostylus subulata*.
Deyeuxia appressa		EN	E1	#	Low	Not previously recorded within the locality and no habitat present within the subject site.	Only occurs in Sydney Metropolitan Catchment Region. A highly endemic species known only from two pre-1942 records in the Sydney area. This species was first collected in 1930 at Herne Bay, Saltpan Creek and then in 1941 from Killara, near Hornsby. It has not been collected since and may now be extinct. Given that *D. appressa* hasn't been seen in over 60 years, almost nothing is known of the species' habitat and ecology. Flowers spring to summer and is mesophytic (grows in moist conditions).

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Epacris purpurascens* var. *purpurascens			V	2008	Low	This species is typically associated with shale sandstone transitional soils.	Located in the Hawkesbury/Nepean, Hunter/Central Rivers/and Sydney Metropolitan catchment authority region - from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. *Epacris purpurascens* var. *purpurascens* is found in a range of habitat types, most of which have a strong shale soil influence. It is killed by fire and re-establishes from seed in the soil.
Eucalyptus nicholii	Narrow-leaved Black Peppermint	VU	V	2009	Negligible	Outside of natural range.	This species is widely planted as an urban street tree and in gardens but is quite rare in the wild. It is confined to the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield, largely on private property. Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite.
Eucalyptus scoparia	Wallangarra White Gum	VU	E1	2002	Low	Outside of natural range.	Occurs in Queensland and recently found in NSW on the northern tablelands where it grows on well drained granitic hilltops, slopes and outcrops, often as scattered trees in open forest and woodland.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Genoplesium baueri	Bauer's Midge Orchid	E	E	#	Negligible	Not previously recorded within the locality and no habitat present within the subject site.	This terrestrial orchid species grows in open sclerophyll forest or moss gardens on sandstone. Typically the habitat is a drier heathy forest. The species has been recorded from locations between Ulladulla and Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. No collections have been made from those sites in recent years. Currently the species is known from just over 200 plants across 13 sites.
Grevillea beadleana	Beadle's Grevillea	EN	E1	2002	Negligible	Outside of natural range.	This species is known from four separate areas, all in north-east NSW. It occurs in open eucalypt forest with a shrubby understorey, and is usually found on steep granite slopes at high altitudes.
Hypsela sessiliflora		E	E1	1951	Low	Not recently recorded within the locality and no habitat present within the subject site.	Grows in damp areas on the Cumberland Plain. Currently known from only two adjacent sites on a single private property at Erskine Park in the Penrith LGA. Previous sightings are all from western Sydney, at Homebush and at Agnes Banks. May be an early successional species that benefits from some disturbance. Possibly out competed when overgrown by some species such as *Cyndon dactylon*.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
***Pelargonium* sp. Striatellum (G.W.Carr 10345)**	Omeo Stork's Bill	EN		#	Low	Not previously recorded within the locality and no habitat present within the subject site.	*Pelargonium* sp. Striatellum (G.W.Carr 10345) is a tufted perennial herb and is known to occur in habitat usually located just above the high water level of irregularly inundated or ephemeral lakes. During dry periods, the species is known to colonise exposed lake beds. This species occurs within the South Eastern Highlands and South East Corner IBRA Bioregions and the Hawkesbury-Nepean, Murrumbidgee, Southern Rivers and North East Natural Resource Management Regions.
Pimelea curviflora* var. *curviflora		VU	V	#	Low	This species has not been previously recorded within the locality and is typically associated with shale sandstone transitional soils.	Occurring in Hawkesbury/Nepean and Sydney Metropolitan Catchment Authority Areas. Confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. This species occurs on lateritic soils and shale-sandstone transition soils on ridge tops in woodland. Associated with Dry Sclerophyll forests and Coastal valley grassy woodlands. It has an inconspicuous cryptic habit and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Pimelea spicata	Spiked Rice-flower	EN	E1	1988#	Low	This species has not been recently recorded within the locality and is unlikely to occur on the modified soils of the subject site.	Once widespread on the Cumberland Plain, *Pimelea spicata* occurs in two disjunct areas, the Cumberland Plain and the Illawarra. In western Sydney, *P. spicata* occurs on an undulating topography of substrates derived from Wianamatta Shale in areas supporting, or that previously supported, the Cumberland Plain Woodland Vegetation Community. Associated species include: *Eucalyptus moluccana, E. tereticornis, E.crebra, Bursaria spinosa*, and *Themeda australis*. In the Illawarra region, *P. spicata* is found in open woodland and also in coastal grassland communities with emergent shrubs. Dominant species within the woodland habitat include *Eucalyptus tereticornis, E. eugenioides, Themeda australis*, and *Lomandra longifolia*.
Pomaderris prunifolia	Plum-leaf Pomaderris		E2	2009	Low	This species has a well known extent and is unlikely to recruit on the disturbed and modified soils of the subject site.	Known from only three sites within the listed local government areas, at Rydalmere, within Rookwood Cemetery and at The Crest of Bankstown. 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 soil.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Pterostylis saxicola	Sydney Plains Greenhood	EN	E1	#	Negligible	Not previously recorded within the locality and no habitat present within the subject site.	Restricted to western Sydney between Freemans Reach in the north and Picton in the south (Hawkesbury/Nepean and Sydney Metropolitan Catchment). 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.
Pultenaea pedunculata	Matted Bush-pea		E1	1988	Low	This species has not been recently recorded within the locality and no habitat is present within the subject site.	Restricted to the Cumberland Plain and near Merimbula where it grows in dry sclerophyll forest and disturbed sites. In western Sydney it occurs in three locations. This species occurs in a range of habitats, generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. In the Liverpool - Fairfield area the majority of occurrences are in lower-lying areas and often close to creek lines on moderately to poorly drained soils.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Syzygium paniculatum	Magenta Lilly Pilly	VU	E1	2002#	Low	This species is commonly planted and a large number of erroneous records occur within the Sydney region. No habitat is present within the subject site.	This species occur in subtropical and littoral rainforest on sandy soils or stabilised dunes near the sea. It is found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the Magenta Lilly Pilly 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.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Tetratheca juncea	Black-eyed Susan	VU	V	1892	Low	Not recently recorded within the locality and no habitat present within the subject site.	*Tetratheca juncea* occurs in the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It generally prefers well-drained sites and occurs on ridges, although it has also been found on upper slopes, mid-slopes and occasionally in gullies. Vegetation types associated with this species include sandy or swampy heath, and dry sclerophyll forests. Most populations occur in woodland on poor nutrient sandy soils with good drainage and low moisture levels. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. It is typically found in dense understorey of grasses and canopy species including *Angophora costata, Corymbia gummifera, Eucalyptus haemastoma* and *E. capitellata*.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Thesium australe	Austral Toadflax	VU	V	#	Low	Not previously recorded within the locality and no habitat present within the subject site.	Found in very small to large populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. *Thesium australe* is a root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass. It is often found in damp sites in association with *Themeda australe*, but also found on other grass species at inland sites. Occurs on clay soils in grassy woodlands or coastal headlands.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Wahlenbergia multicaulis	Tadgell's Bluebell		E2	2014	Moderate	Previously recorded within the locality and marginal potential habitat identified within the subject site.	Grows in forest, woodland and grassland, chiefly in coastal and tablelands districts south from Sydney and the Blue Mountains, west along the Murray River to Mathoura. There are 13 known sites, two of which are in northern Sydney on the Hawkesbury soil landscape with the remainder in inner-western Sydney on the Villawood soil landscape (Rookwood, Chullora, Bass Hill, Bankstown, Georges Hall, Campsie, South Granville and Greenacre). It is found in damp, disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. In Hornsby LGA it occurs in or adjacent to sandstone gully forest. In Western Sydney it is found in remnants of Cooks River/ Castlereagh Ironbark Forest.
Wilsonia backhousei	Narrow-leafed Wilsonia		V	1992	Negligible	No saltmarsh habitat present within the subject site.	In NSW, *Wilsonia backhousei* is found in the Southern Rivers and Sydney Metropolitan Catchment Area, specifically on the coast between Mimosa Rocks National Park and Wamberal north of Sydney (Nelson's Lake, Potato Point, Sussex Inlet, Wowly Gully, Parramatta River at Ermington, Clovelly, Voyager Point, Wollongong and Royal National Park). It occurs in the margins of salt marshes and lakes.

Appendix 2: Fauna Likelihood of Occurrence

Table 12: Threatened fauna species recorded, or predicted to occur, within five kilometres of the subject site

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Amphibians							
Heleioporus australiacus	Giant Burrowing Frog	VU	V	#	Negligible	No suitable habitat within the subject site.	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water. Spends the majority of its time in non-breeding habitat 20-250 metres from breeding sites.
Litoria aurea	Green and Golden Bell Frog	VU	E1	2013#	Low	Species not detected during targeted surveys and low quality of potential habitat present on site.	Most existing locations for the species occur as small, coastal, or near coastal populations, with records occurring between south of Grafton and northern VIC. The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks, although the species has also been recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land.
Mixophyes balbus	Stuttering Frog	VU	E1	#	Negligible	No suitable habitat within the subject site.	This species is usually associated with mountain streams, wet mountain forests and rainforests. It rarely moves very far from the banks of permanent forest streams, although it will forage on nearby forest floors. Eggs are deposited in leaf litter on the banks of streams and are washed into the water during heavy rains.
Birds							
Anthochaera phrygia	Regent Honeyeater	CE, M	E4A	1987#	Low	Limited suitable foraging habitat present within subject site.	A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises: *Eucalyptus microcarpa, E. punctata, E. polyanthemos, E. mollucana, Corymbia robusta, E. crebra, E. caleyi, C.*

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							maculata, E. mckieana, E. macrorhyncha, E. laevopinea and *Angophora floribunda*. Nectar and fruit from the mistletoes *A. miquelii, A. pendula* and *A. cambagei* are also eaten during the breeding season. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and sheoaks, as well as in mistletoe haustoria.
Botaurus poiciloptilus	Australasian Bittern	EN	E1	2003#	Low	Limited suitable foraging habitat present within subject site. Recent record represents occurrence within high quality habitat 4 km north of subject site.	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including *Typha* spp. and *Eleoacharis* spp.. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.
Burhinus grallarius	Bush Stone-curlew		E1	1996	Negligible	No suitable habitat within the subject site.	Occurs in lightly timbered open forest and woodland, or partly cleared farmland with remnants of woodland, with a ground cover of short sparse grass and few or no shrubs where fallen branches and leaf litter are present.
Calidris ferruginea	Curlew Sandpiper	CE, M	E1	2011#	Low	Limited suitable	The Curlew Sandpiper is distributed around

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						foraging habitat present within subject site.	most of the Australian coastline (including Tasmania). It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. This species is infrequently recorded inland, and inland records are probably mainly of birds pausing for a few days during migration.
Calidris tenuirostris	Great Knot	M	V	#	Negligible	No suitable habitat within the subject site.	In NSW, the species has been recorded at scattered sites along the coast. It occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons, and is often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.
Charadrius leschenaultii	Greater Sand-plover	M	V	1991#	Low	No suitable habitat within the subject site.	Entirely coastal in NSW, foraging on intertidal sand and mudflats in estuaries and roosting during high tide on sandy beaches or rocky shores. Individuals have been recorded on inshore reefs, rock platforms, small rocky islands and sand cays on coral reefs, within Australia. Occasional sightings have also occurred on near-coast saltlakes, brackish swamps, shallow freshwater wetlands and grassed paddocks.
Charadrius mongolus	Lesser Sand-	M	V	#	Low	No suitable habitat	In Australia, the species is known to favour

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
	plover					within the subject site.	coastal environments including beaches, mudflats and mangroves. Within NSW, individuals have been observed on intertidal sand and mudflats in estuaries or roosting on sandy beaches or rocky shores at high tide.
Dasyornis brachypterus	Eastern Bristlebird	EN	E1	#	Negligible	No suitable habitat within the subject site.	The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone. Age of habitat since fires (fire-age) is of paramount importance to this species. The Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years.
Epthianura albifrons	White-fronted Chat		V, E2	1992	Negligible	No suitable habitat within the subject site.	Sydney Metropolitan CMA: The White-fronted Chat occupies foothills and lowlands below 1000 metres above sea level. In NSW it 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. It is

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							found in damp open habitats, particularly wetlands containing saltmarsh areas that are bordered by open grasslands or lightly timbered lands. Along the coastline, they are found in estuarine and marshy grounds with vegetation less than 1 metre tall. Inland, the species is often observed in open grassy plains, saltlakes and saltpans that are along the margins of rivers and waterways. An Endangered Population occurs in the Sydney Metropolitan CMA area, at Newington Nature Reserve near Homebush and at Towra Point Nature Reserve.
Falco subniger	Black Falcon		V	1990	Low	Limited suitable habitat within the subject site, however species may occur sporadically as part of a larger home range.	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. This species mainly occurs in woodlands and open country where it can hunt. Often associated with swamps, rivers and wetlands and nests in tall trees along watercourses.
Glossopsitta pusilla	Little Lorikeet		V	2010	Low	Limited suitable habitat within the subject site, however species may occur sporadically as part of a larger home range.	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range in NSW, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Mostly occur in dry, open eucalypt forests and woodlands. They feed primarily on nectar and pollen in the tree canopy. Nest hollows are

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							located at heights of between 2 and 15 metres, mostly in living, smooth-barked eucalypts. Most breeding records come from the western slopes.
Grantiella picta	Painted Honeyeater	VU	V	#	Negligible	No suitable habitat within the subject site.	Found mainly in dry open woodlands and forests, such as Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands. It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.
Hieraaetus morphnoides	Little Eagle		V	2007	Low	Limited suitable habitat within the subject site, however species may occur sporadically as part of a larger home range.	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. The Little Eagle nests in tall living trees within farmland, woodland and forests.
Lathamus discolor	Swift Parrot	EN	E1	1998#	Low	Limited suitable habitat within the subject site, however species may occur sporadically during seasonal migration.	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
Limosa limosa	Black-tailed Godwit	M	V	#	Negligible	No suitable habitat within the subject site.	The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. In NSW, it is most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the coast, and inland. It is usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps.
Lophochroa leadbeateri	Major Mitchell's Cockatoo		V	2012	Low	Limited suitable habitat within the subject site.	Found mainly in semi-arid and arid regions, in dry woodlands, particularly mallee - casuarina assemblages. Inhabits a wide range of treed and treeless inland habitats, always within easy

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							reach of water and feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.
Neophema chrysogaster	Orange-bellied Parrot	CE, M	E4A	#	Negligible	No suitable habitat within the subject site.	The Orange-bellied Parrot breeds in the south-west of Tasmania and migrates in autumn to spend the winter on the mainland coast of south-eastern South Australia and southern Victoria. On the mainland, the Orange-bellied Parrot spends winter mostly within 3 kilometres 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.
Neophema pulchella	Turquoise Parrot		V	2005	Low	Limited suitable habitat within the subject site.	Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs. Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies. Nest in hollow-bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies that are moist.
Numenius	Eastern Curlew	CE, M		#	Negligible	No suitable habitat	Within Australia, the Eastern Curlew has a

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
madagascariensis						within the subject site.	primarily coastal distribution. Occurs in sheltered coasts, especially estuaries, embayments, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats often with beds of seagrass.
Pachyptila turtur subantarctica	Fairy Prion (southern)	VU		#	Negligible	No suitable habitat within the subject site.	Fairy Prions (including other subspecies) are often beachcast on the south-eastern coast of Australia, and are commonly seen offshore over the continental shelf and over pelagic waters. Observations are less common off Western Australia and Queensland than in south-eastern Australia. Beachcast birds are found along the whole coast of NSW, and the species is common offshore along the entire Victorian coast, where thousands are sometimes seen. In Tasmania, the Fairy Prion is an abundant visitor to all offshore waters. In South Australia, this species is regularly seen and often beachcast.
Pandion cristatus	Osprey	M	V	2005#	Low	Limited suitable habitat within the subject site, however species may occur sporadically as part of a larger home range.	Found in coastal waters, inlets, estuaries and offshore islands. Occasionally found 100 kilometres inland along larger rivers. It is water-dependent, hunting for fish in clear, open water. The Osprey occurs in terrestrial wetlands, coastal lands and offshore islands. It is a predominantly coastal species, generally using marine cliffs as nesting and roosting sites. Nests

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							can also be made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.
Petroica phoenicea	Flame Robin		V	1969	Low	Very limited potential habitat within the subject site, however vagrant individuals may occur sporadically.	Flame Robins are found in a broad coastal band from southern Queensland to just west of the South Australian border. The species is also found in Tasmania. The preferred habitat in summer includes moist eucalyptus forests and open woodlands, whilst in winter prefers open woodlands and farmlands. It is considered migratory. The Flame Robin breeds from about August to January.
Ptilinopus superbus	Superb Fruit-Dove		V	1969	Negligible	No suitable habitat within the subject site.	The Superb Fruit Dove's NSW distribution ranges from northern NSW to as far south as Moruya. It is found in rainforests, closed forests (including mesophyll vine forests) and sometimes in eucalypt and acacia woodlands where there are fruit-bearing trees. It forages in the canopy of fruiting trees such as figs and palms. Nests are constructed high in the canopy throughout September to January.
Rostratula australis	Australian Painted Snipe	EN, M	E1	1999#	Low	Limited suitable habitat within the subject site.	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, ephemeral or permanent,

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							although they have been recorded in brackish waters.
Sternula albifrons	Little Tern	M	E1	2002	Low	Very limited potential habitat within the subject site, however vagrant individuals may occur sporadically.	The Little Tern favours sheltered coasts, harbours, bays, lakes, inlets, estuaries, coastal lagoons and ocean beaches especially with sand-spits and sand islets. It forages over shallow waters close inshore or over sandbars and reefs.
Stictonetta naevosa	Freckled Duck		V	2005	Low	Limited potential habitat within the subject site, however vagrant individuals may occur sporadically.	The Freckled Duck breeds in permanent fresh swamps that are heavily vegetated. Found in fresh or salty permanent open lakes, especially during drought. Often seen in groups on fallen trees and sand spits.
Xenus cinereus	Terek Sandpiper	M	V	2010	Low	Limited suitable foraging habitat present within subject site.	A rare migrant to the eastern and southern Australian coasts, being most common in northern Australia, and extending its distribution south to the NSW coast in the east. Mainly found on saline intertidal mudflats in sheltered estuaries, embayments, harbours and lagoons.
Mammals							
Chalinolobus dwyeri	Large-eared Pied Bat	VU	V	#	Low	No suitable roosting habitat within subject site and limited	Occurs from the Queensland border to Ulladulla, with largest numbers from the sandstone escarpment country in the Sydney Basin and

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						potential foraging habitat.	Hunter Valley. Primarily found in dry sclerophyll forests and woodlands, but also found in rainforest fringes and subalpine woodlands. Forages on small, flying insects below the forest canopy. Roosts in colonies of between three and 80 in caves, Fairy Martin nests and mines, and beneath rock overhangs, but usually less than 10 individuals. Likely that it hibernates during the cooler months. The only known existing maternity roost is in a sandstone cave near Coonabarabran.
Dasyurus maculatus	Spotted-tailed Quoll	EN	V	#			Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000 ha,

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							while males have larger home ranges of between 2000 and 5000 ha.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	EN	E1	#			The Southern Brown Bandicoot has a patchy distribution. It is found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River, southern coastal Victoria and the Grampian Ranges, south-eastern South Australia, south-west Western Australia and the northern tip of Queensland. This species prefers sandy soils with scrubby vegetation and/or areas with low ground cover that are burn from time to time. A mosaic of post fire vegetation is important for this species.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat		V	2013	Low	No suitable roosting habitat within subject site and limited potential foraging habitat.	Occurs from Victoria to Queensland, on both sides of the Great Dividing Range. Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Has a fast, direct flight and forages for flying insects (particularly moths) above the tree canopy and along waterways.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Phascolarctos cinereus	Koala	VU	V	#			In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include *Eucalyptus robusta, E. tereticornis, E. punctata, E. haemostoma* and *E. signata*. They are solitary with varying home ranges. In high quality habitat home ranges may be 1-2 ha and overlap, while in semi-arid country they are usually discrete and around 100 ha.
Pseudomys novaehollandiae	New Holland Mouse	VU		#	Negligible	Limited potential habitat within the subject site occurs in a highly fragmented landscape and no remnant individuals are considered likely to occur.	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The species is nocturnal and omnivorous. It is likely that the species spends considerable time foraging above-ground for food, predisposing it to predation by native predators and introduced species.
Pteropus poliocephalus	Grey-headed	VU	V	2013#	High	Species recorded	Occurs along the NSW coast, extending further

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
	Flying-fox					within the subject site.	inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies (camps), commonly in dense riparian vegetation. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.
Molluscs							
Meridolum corneovirens	Cumberland Plain Land Snail		E1	2013#	Negligible	No potential habitat identified on site and nearest recent record represents the occurrence of the species in high quality habitat over 4 km to the north of the subject site.	Most likely restricted to Cumberland Plain, Castlereagh Woodlands and boundaries between River-flat Forest and Cumberland Plain Woodland. It is normally found beneath logs, debris and amongst accumulated leaf and bark particularly at the base of trees. May also use soil cracks for refuge.
Pommerhelix duralensis	Dural Woodland Snail	EN		2012	Negligible	The subject site occurs outside the known and predicted distribution of the species.	The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and northwest fringes of the Cumberland IBRA subregion on shale-sandstone transitional landscapes. The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							soils, with forested habitats that have good native cover and woody debris. It favours sheltering under rocks or inside curled-up bark. It does not burrow nor climb. The species has also been observed resting in exposed areas, such as on exposed rock or leaf litter, however it will also shelter beneath leaves, rocks and light woody debris.
Reptiles							
Hoplocephalus bungaroides	Broad-headed Snake	VU	E1	#	Negligible	No suitable habitat within the subject site.	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer.

Appendix 3: Assessments of Significance

The following section provides for Assessments of Significance according to the seven factors outlined in Section 5A of the EP&A Act for all species determined to have a moderate or high likelihood of occurrence within the subject site. This applied to a total of 1 flora species and 1 fauna species including:

- Downy Wattle *Acacia pubescens* (Vulnerable).
- Tadgells Bluebell *Wahlambergia multicaulis* (Endangered population).
- Grey-headed Flying-Fox *Pteropus poliocephalus* (Vulnerable).

Downy Wattle *Acacia pubescens*

Downy Wattle *Acacia pubescens* is listed as Vulnerable on the TSC Act. The species is a spreading shrub which grows 1-5 metres in height. The leaves are bipinnate with conspicuously hairy branchlets and the flowers are a brilliant yellow colour (OEH 2012). Downy Wattle is a clonal species (NPWS 2003); it flowers from August to October, and pods mature in October to December. Downy Wattle has been recorded in open, weedy areas and is able to tolerate moderate levels of disturbance (NPWS 2003).

Downy Wattle occurs in open woodland and forest, in a variety of plant communities including Cumberland Plain Woodland, in gravely soils on alluviums, shales and shale-sandstones intergrade (OEH 2012).

Downy Wattle was not recorded in the subject site during the site survey, however there is potential for this species to occur.

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 was not recorded in the subject site however the species is know to be tolerant of soil disturbance therefore there is potential for this species to occur. Background searches revealed that the species has been recorded almost 700 times within the locality, the nearest being approximately 711 metres from the subject site (OEH 2015a). Exotic species such as African Lovegrass, and potentially also African Olive (which were both recorded in the subject site) are known to prevent recruitment of this species (OEH 2012). Surveys for this species were completed during optimal conditions and it was not recorded within the subject site. The Project is therefore not impacting on a population of this species but will require the removal of approximately 2.17 ha of marginal habitat in the form of the Modified Eucalypt Woodland. Since the project is not impacting on a known population and there are a ongoing factors limiting the potential recruitment of this species (such as mowing and the presence of African Lovegrass), it is considered unlikely that the Project will have a significant impact on the life cycle of the Downy Wattle such that it is placed at risk of extinction.

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 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 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, and

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

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.

A maximum of 2.17 hectares of marginal potential habitat for Downy Wattle is expected to be cleared for the Project. It is anticipated that the actual area is lower than this as some areas of the Modified Eucalypt Woodland community do not provide potential habitat, however the precautionary principle has been applied. The reason that a large number of previous records occur within the locality is that the subject site is in the vicinity of important patches of native bushland (such as Norfolk Reserve, Rookwood Cemetery and the riparian corridor of Cooks River) which are known strongholds for the species. In turn, these areas of bushland form more significant habitat than that identified within the study therefore the 2.17 hectares of marginal potential habitat for Downy Wattle to be removed is not important to the long-term survival of the species.

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

Critical habitats are areas of land that are crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for this species.

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

A recovery plan for Downy Wattle has been developed (NPWS 2003) and includes the following recovery action relevant to the Project:

- Informed environmental assessment and planning decisions are made.

The Project is consistent with this recovery action. Additionally, under the *Saving our Species* program, there are three proposed Key Management Sites that have been established by OEH where conservation activities need to take place to ensure the conservation of this species (OEH 2015b). The location of these include; Mountain Lagoon, Hawkesbury and Bankstown-Liverpool. The subject site is located within the Bankstown-Liverpool Management Site and the Project is unlikely to conflict with any of these actions and will therefore unlikely interfere substantially with the recovery of the species. OEH (2012) lists a number of practical Activities to assist this species, of which none are relevant to the Project. None of these activities are applicable to the Project.

To date, no threat abatement plan relevant to Downy Wattle has been developed.

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.

Key Threatening Processes (KTP) are listed under Schedule 3 of the TSC Act 1995. The Project has the potential to increase the operation of the following KTPs relevant to Downy Wattle:

- Clearing of native vegetation.
- Invasion, establishment and spread of Lantana *Lantana camara*.
- Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*.
- Invasion and establishment of Scotch Broom *Cytisus scoparius*.
- Invasion of native plant communities by exotic perennial grasses.
- Invasion and establishment of exotic vines and scramblers.

The majority of these KTPs are already in effect within the subject site and it is unlikely that the Project will further exacerbate them, such that there is a significant impact on Downy Wattle.

Conclusion

In light of the consideration of the above seven factors, it is unlikely that the Project will impose a significant impact on Downy Wattle or its habitat as:

- Downy Wattle was not recorded in the subject site and therefore the Project will not adversely affect the lifecycle of the species such that its local occurrence is placed at risk of extinction.
- The Project will not further fragment or isolate habitat for the species or affect its long term survival in the subject site or in the locality.
- The Project is not likely to adversely affect the recovery of the species.
- The Project will not significantly contribute to any KTP that is either currently in operation within the subject site or that has the potential to come into operation.

Consequently, given that a significant impact on Downy Wattle **is not** likely, a Species Impact Statement is not required for the Project.

Tadgell's Bluebell *Wahlenbergia multicaulis*

Tadgell's Bluebell *Wahlenbergia multicaulis* is listed on the TSC Act as an endangered population within the Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield local government areas. Tadgell's Bluebell is a blue flowering perennial tufted herb which occurs in a range of vegetation communities including those recorded within the subject site. The species is known to be associated with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone (laterite) (OEH 2012). Although typically associated with moist habits on the edges of watercourses and wetlands, it is tolerant of disturbance and can occur in forest, woodland, scrub and grassland communities. It is noted that too much disturbance poses a threat to the species and can exhaust the seed bank. It is likely that the level of disturbance within the subject site is too great, and the potential habitat for this species is considered marginal.

Tadgell's Bluebell was not recorded during the current field survey. Significant effort was applied to searching for the species, however it is relatively cryptic and the subject site broadly aligns with the habitat preferences for this species. Tadgell's Bluebell is considered as having a moderate likelihood of occurrence within the subject site.

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.

Not applicable.

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.

Tadgell's Bluebell has been recorded 128 times within the locality, the nearest being approximately 500 metres away from the subject site. Little information is available on the reproduction and pollination mechanisms for this species. Based on the high abundance of exotic species within the subject site and the ongoing mowing regime, there is little opportunity for recruitment of Tadgell's Bluebell and therefore establishment of a significant population.

It is considered unlikely that these impacts will have an adverse effect on the life cycle of Tadgell's Bluebell such that the local population is likely to be placed at risk of extinction.

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 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, and

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

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.

A maximum of 2.17 hectares of marginal potential habitat for the species is expected to be cleared for the Project. It is anticipated that the actual area is lower than this as the drier areas of the Modified Eucalypt Woodland community do not provide potential habitat for the species. Due to the cryptic nature of this species, the precautionary principle has been applied and it has been assumed that all of the Modified Eucalypt Woodland provides marginal habitat for the species. The habitat characteristics of this species in conjunction with regional development pressure within its natural range has lead to a high level of existing fragmentation. The Project is unlikely to exacerbate this fragmentation of habitat.

The locality is known to contain important habitat for the species, with relatively large population within Rookwood Cemetery and the riparian corridor of Cooks River. In turn, these areas of bushland form far more significant habitat than that identified within the study, therefore the 2.17 hectares of marginal potential habitat for Tadgell's Bluebell to be removed is not important to the long-term survival of the species.

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

Critical habitats are areas of land that are crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for this species.

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

To date, recovery plan for Tadgell's Bluebell has not been developed. The OEH includes a number of *Activities to assist this species* on the threatened species profile (OEH 2013). Those relevant to the Project include:

- Prevent further loss, fragmentation and degradation of habitat.

The Project is not consistent with this recovery action, however based on the marginal nature of the potential in addition to the surrounding development pressure and industrial nature of the immediate vicinity; it is unlikely that the Project will impact the recovery of the species.

To date, no threat abatement plan relevant to Tadgell's Bluebell has been developed.

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.

Key Threatening Processes (KTP) are listed under Schedule 3 of the TSC Act 1995. The Project has the potential to increase the operation of the following KTPs relevant to Tadgell's Bluebell:

- Clearing of native vegetation.
- Invasion, establishment and spread of Lantana *Lantana camara*.
- Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*.
- Invasion and establishment of Scotch Broom *Cytisus scoparius*.
- Invasion of native plant communities by exotic perennial grasses.
- Invasion and establishment of exotic vines and scramblers.

The majority of these KTPs are already in effect within the subject site and it is unlikely that the Project will further exacerbate them, such that there is a significant impact on Tadgell's Bluebell.

Conclusion

In light of the consideration of the above seven factors, it is unlikely that the Project will impose a significant impact on Tadgell's Bluebell or its habitat as:

- Tadgell's Bluebell was not recorded in the subject site and therefore the Project will not adversely affect the lifecycle of the species such that its local occurrence is placed at risk of extinction.
- The Project will not further fragment or isolate habitat for the species or affect its long term survival in the subject site or in the locality.
- The Project is not likely to adversely affect the recovery of the species.
- The Project will not significantly contribute to any KTP that is either currently in operation within the subject site or that has the potential to come into operation.

Consequently, given that a significant impact on Tadgell's Bluebell **is not** likely, a Species Impact Statement is not required for the Project.

Grey-headed Flying-Fox *Pteropus poliocephalus*

Grey-headed Flying-Fox *Pteropus poliocephalus* is listed as Vulnerable under the TSC Act. Grey-headed Flying-Fox is a canopy-feeding frugivore (in particular *Eucalyptus*, *Melaleuca* and *Banksia* species), blossom-eater and a nectarivore of rainforests, tall sclerophyll forests and woodlands, heaths and swamps, gardens and cultivated fruit crops (DoE 2015b; OEH 2015c).

They forage opportunistically, often at distances up to 30 kilometres from camps, and occasionally up to 60–70 kilometres per night, in response to patchy food resources (NSW Scientific Committee 2001). The species congregates in large numbers at roosting sites (camps). Individuals generally exhibit a high fidelity to traditional camps (OEH 2015c) and return annually to give birth and rear offspring.

Grey-headed Flying-fox was recorded within the subject site during the site survey. The subject site provides approximately 3.5 hectares of suitable forage habitat for this species. However, suitable forage habitat is abundant throughout the wider locality.

No roosting or breeding camps of Grey-headed Flying-fox were recorded within the subject site during the current survey.

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.

Grey-headed Flying-Fox was recorded in the subject site but the subject site provides approximately 3.55 hectares of suitable forage habitat for this species. Background searches revealed that one individual has been previously recorded approximately 0.67 kilometres from the subject site (OEH 2015a). The Project will remove 3.5 hectares of forage habitat for Grey-headed Flying-fox. However, given the extent of suitable forage habitat in the locality, the mobility of the species and the absence of roost or breeding camps within or in proximity to the subject site it is unlikely that the Project will have a significant impact on the lifecycle of Grey-headed Flying-Fox such that it is placed at risk of extinction.

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 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 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, and

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

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.

3.55 hectares of potential forage habitat for Grey-headed Flying-Fox is expected to be cleared for the Project. The subject site is in close proximity to native bushland (such as Norfolk Reserve and the riparian corridor of Cooks River) which provides additional habitat for the Grey-headed Flying-Fox in the broader landscape. Therefore the 3.55 hectares of potential forage habitat for Grey-headed Flying-Fox to be removed is not important to the long-term survival of the species.

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

Critical habitats are areas of land that are crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for this species.

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

A draft national recovery plan for Grey-headed Flying-Fox has been developed (DECCW 2009) and includes the following objectives relevant to the Project:

- To identify and protect foraging habitat critical to the survival of Grey-headed Flying-foxes throughout their range.
- To protect and increase the extent of key winter and spring foraging habitat of Grey-headed Flying-foxes.

The Project is consistent with this objective as the potential forage habitat being removed is not considered critical to the species.

A conservation project is not yet available for this species under the *Saving our Species* program. OEH (2015c) lists a number of practical *Activities to assist this species*, of which the following are relevant to the Project:

- Identify and protect key foraging areas.

To date, no threat abatement plan relevant to Grey-headed Flying-Fox has been developed.

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.

Key Threatening Processes (KTP) are listed under Schedule 3 of the TSC Act 1995. The Project has the potential to increase the operation of the following KTPs relevant to Grey-headed Flying-Fox:

- Clearing of native vegetation.
- Invasion, establishment and spread of Lantana *Lantana camara*.
- Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*.
- Invasion and establishment of Scotch Broom *Cytisus scoparius*.
- Invasion of native plant communities by exotic perennial grasses.
- Invasion and establishment of exotic vines and scramblers.

Given recommendations to limit the spread of weeds from the subject site are carried out, it is unlikely that the Project will exacerbate the listed KTPs such that there is a significant impact to Grey-headed Flying-Fox.

Conclusion

In light of the consideration of the above seven factors, it is unlikely that the Project will impose a significant impact on Grey-headed Flying-Fox or its habitat as:

- The Project is not likely to adversely affect the lifecycle of the species such that its local occurrence is placed at risk of extinction.
- The Project will not significantly further fragment or isolate habitat for the species or affect its long term survival in the subject site or in the locality.
- The Project is not likely to adversely affect the recovery of the species.
- The Project will not significantly contribute to any KTP that is either currently in operation within the subject site or that has the potential to come into operation.

Consequently, given that a significant impact on Grey-headed Flying-Fox **is not** likely, a Species Impact Statement is not required for the Project.

Appendix 4: Significant Impact Criteria Assessments

The following Significant Impact Criteria (SIC) assessment has been prepared in accordance with the Matters of National Environmental Significance, Significant Impact Criteria guidelines 1.1 Environment Protection and Biodiversity Conservation Act (DoE 2013) for species determined to have a moderate or high likelihood of occurrence within the subject site. This applied to a total of 1 flora species and 1 fauna species including:

- Downy Wattle *Acacia pubescens* (Vulnerable).
- Grey-headed Flying-Fox *Pteropus poliocephalus* (Vulnerable).

Downy Wattle *Acacia pubescens*

Downy Wattle *Acacia pubescens* is listed as Vulnerable on the EPBC Act. The species is a weeping, spreading shrub which grows 1-5 metres in height (DoE 2015a). The leaves are bipinnate and a brilliant yellow in colour, with conspicuously hairy branchlets (OEH 2012). Downy Wattle is a clonal species and is tolerant of disturbance (DoE 2015a; NPWS 2003). It flowers from August to October, and producing fruit from October to December.

Downy Wattle occurs in open woodland and forest, in a variety of plant communities and often in Cumberland Plain Woodland, in gravely clay or sandy soils on alluviums, shales and shale-sandstones intergrade (DoE 2015a; OEH 2012). Examples of associated species include Red Bloodwood *Corymbia gummifera,* Silvertop Ash *Eucalyptus sieberi,* Grey Gum *E. punctata,* Parramatta Wattle *Acacia parramattensis* and Native Blackthorn *Bursaria spinosa* (DoE 2015a).

Downy Wattle was not recorded in the subject site during the site survey, however there is potential for this species to occur.

Is there a real chance or a possibility that the action will lead to a long-term decrease in the size of an important population of a species?

An 'important population' is defined by DoE (2013) as 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.

Downy Wattle was not recorded in the subject site but there is potential for this species to occur. Background searches revealed that 30 individuals have been previously recorded within approximately 0.73 kilometres of the subject site (OEH 2015a). Exotic species such as African Lovegrass, and potentially also African Olive (which were all recorded in the subject site) are known to prevent recruitment of this species (OEH 2012). Competition and/or habitat degradation is also a known threat to this species (DoE 2015a) and is prevalent throughout the subject site. Recommendations outlined in this report will limit the spread of these and other exotic species. Based on these points, the Project is considered unlikely to lead to a long-term decrease in the size of an important population of Downy Wattle.

Is there a real chance or a possibility that the action will reduce the area of occupancy of an important population?

The targeted surveys for Downy Wattle were completed during optimal conditions following verification of flowering at a reference population. The survey effort was adequate based on the size and condition of potential habitat and no individuals were recorded. The species is therefore considered to be absent from the subject site. Subsequently, the Project will have no impact on the area of occupancy of the species.

Is there a real chance or a possibility that the action will fragment an existing important population into two or more populations?

Downy Wattle was not recorded in the subject site. Therefore, the Project will not fragment an existing important population into two or more populations.

Is there a real chance or a possibility that the action will adversely affect habitat critical to the survival of a species?

'Habitat critical to the survival of a species or ecological community' is defined by DoE (2013) as areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal.
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators).
- To maintain genetic diversity and long term evolutionary development.
- For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to habitat identified within the recovery plan for the species and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DoE 2013; NPWS 2003).

To date, no areas of critical habitat have been listed for Downy Wattle. The subject site provides potential habitat only for Downy Wattle. Exotic species such as African Lovegrass, and potentially also African Olive (which were all recorded in the subject site) are known to prevent recruitment of this species (OEH 2012) and along with other exotic species, lead to habitat degradation which is a known threat to this species (DoE 2015a). Recommendations outlined in this report will limit the spread of exotic species from the subject site, and thus the Project is considered unlikely to adversely affect habitat critical to the survival the Downy Wattle.

Is there a real chance or a possibility that the action will disrupt the breeding cycle of an important population?

The Downy Wattle is a clonal species that relies on both out-crossing and self pollination (DoE 2015a; NPWS 2003). What may appear to be a population of the species can in fact be an individual plant with a number of ramets, produced by vegetative growth (in this case suckering). Pollination is thought to be carried out by insects including bees, wasps and beetles and seed production is typically low due to heavy predation. A number of important populations of Downy Wattle occur within the locality, however it is highly unlikely that the Project will have any impact on the breeding cycle of these populations.

Is there a real chance or a possibility that the action will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The species was not recorded within the subject site, however as the species is known to persist within highly disturbed environments, it may occur in very low abundance. Due to the poor quality of potential habitat proposed to be cleared and the lack of records within the subject site. The resultant clearing is not expected to modify or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Is there a real chance or a possibility that the action will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

Recommendations have been made in this report to reduce the spread of invasive species such as African Lovegrass that is a known threat to the Downy Wattle (OEH 2012; DoE 2015a). While these invasive species have been recorded in the subject site, as long as the recommended actions are carried out it is unlikely that the Project will result in invasive species that are harmful to the Downy Wattle becoming established in its habitat any more than actions that already occur in the area (such as seed dispersal through natural means, vehicles, people and animals) currently do.

Is there a real chance or a possibility that the action will introduce disease that may cause the species to decline?

Pathogens known to affect native plant species such as *Phytophthora* were not observed in the subject site during the current survey, and thus it is unlikely that the Project will introduce diseases that may cause Downy Wattle to decline.

Is there a real chance or a possibility that the action will interfere substantially with the recovery of the species?

The Project would result in the clearing of low quality potential habitat for the species, associated with the Project, however this is not expected to have any significant impacts that would interfere substantially with the recovery of Downy Wattle.

There is a recovery plan for Downy Wattle (NPWS 2003). Recovery actions include:

- Identify sites that are a high priority to protect.
- Informed environmental assessment and planning decisions are made.
- Liaise with private landholders to increase protection of sites.

The Project is unlikely to conflict with any of these actions and will therefore unlikely interfere substantially with the recovery of the species.

Conclusion

Based on the above assessment Downy Wattle **is not** likely to be significantly impacted by the Project and as such, a Referral under the provisions of the EPBC Act is not recommended for this species.

- The Project will not lead to a long-term decrease in the size of an important population of the species.
- The Project will not fragment an existing population of Downy Wattle.
- The Project is considered unlikely to introduce exotic species that will deteriorate habitat for Downy Wattle.
- The Project is considered unlikely to interfere with the recovery of Downy Wattle at a local or regional level.

As such, a Referral under the provisions of the EPBC Act is not recommended for this species.

Grey-headed Flying-Fox *Pteropus poliocephalus*

Grey-headed Flying-Fox *Pteropus poliocephalus* is listed as Vulnerable under the EPBC Act. Grey-headed Flying-Fox is a canopy-feeding frugivore, blossom-eater and a nectarivore of rainforests, tall sclerophyll forests and woodlands, heaths and swamps, gardens and cultivated fruit crops (DoE 2015b).

They forage opportunistically, often at distances up to 30 kilometres from camps, and occasionally up to 60–70 kilometres per night, in response to patchy food resources (NSW Scientific Committee 2001). The species congregates in large numbers at roosting sites (camps). Individuals generally exhibit a high fidelity to traditional camps (OEH 2015c) and return annually to give birth and rear offspring.

Grey-headed Flying-fox was recorded within the subject site during the site survey. The subject site provides approximately 3.55 hectares of suitable forage habitat for this species. However, suitable forage habitat is abundant throughout the wider locality.

No roosting or breeding camps of Grey-headed Flying-fox were recorded within the subject site during the current survey.

Is there is a real chance or possibility that the action will lead to a long-term decrease in the size of an important population of a species?

An 'important population' is defined by DoE (2013) as 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.

During the field survey Grey-headed Flying Fox was recorded within the subject site. Background searches revealed that one individual has been previously recorded approximately 0.67 kilometres from the subject site (OEH 2015a). The Project will remove 3.55 hectares of forage habitat for Grey-headed Flying-fox. However, given the extent of suitable forage habitat in the locality, the mobility of the species and the absence of roost or breeding camps within or in proximity to the subject site it is unlikely that the Project will adversely decrease the size of these populations.

Is there a real chance or possibility that the action will reduce the area of occupancy of an important population?

The subject site is not considered to support an important population of Grey-headed Flying-fox. Approximately 3.55 hectares of forage habitat will be cleared for the Project. This clearing is unlikely to significantly reduce the area of occupancy given that no known breeding or roosting camps were within the subject site.

Is there a real chance or possibility that the action will fragment an existing important population into two or more populations?

Grey-headed Flying-foxes are highly mobile animals. Clearing of approximately 3.55 hectares of forage habitat will not fragment the local population.

Is there a real chance or possibility that the action will adversely affect habitat critical to the survival of a species?

'Habitat critical to the survival of a species or ecological community' is defined by DoE (2013) as areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal.
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators).
- To maintain genetic diversity and long term evolutionary development.
- For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to habitat identified within the recovery plan for the species and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DECCW 2009b; DoE 2013).

To date, no areas of critical habitat have been listed for Grey-headed Flying-fox. The subject site provides forage habitat only for Grey-headed Flying-fox. There are many known examples of better quality and better-suited habitat within the broader area. Given that the Grey-headed Flying-fox is a highly mobile species, habitat clearing associated with the Project is unlikely to adversely affect habitat critical to the survival of the species.

Is there a real chance or possibility that the action will disrupt the breeding cycle of an important population?

No known breeding or roosting camps of the Grey-headed Flying-fox were found within the subject site. Given that individuals generally exhibit a high fidelity to traditional camps and return annually to give birth and rear offspring (OEH 2015c), clearing of the vegetation in the subject site would not disrupt the breeding cycle of the local population.

Is there a real chance or possibility that the action will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

Approximately 3.55 hectares of forage habitat for Grey-headed Flying-fox will be cleared for the Project. There are other suitable habitats within the broader region already known to support Grey-headed Flying-fox populations. Therefore, the Project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

There are no specific invasive species known to be harmful to Grey-headed Flying Foxes therefore the Project is unlikely to have a significant impact.

Is there is a real chance or possibility that the action will introduce disease that may cause the species to decline?

The effects of the diseases such as Australian bat Lyssavirus (ABL), Bat Paramyxovirus and Menangle Pig virus on the Grey-headed Flying-fox are unknown (DoE 2015b). However, the Project is unlikely to introduce disease that may cause species decline.

Is there a real chance or possibility that it will result interfere substantially with the recovery of the species?

There is a draft national recovery plan for Grey-headed Flying fox (DECCW 2009). Objectives of the recovery plan include:

- To reduce the impact of threatening processes.
- To arrest decline throughout their range.
- To conserve their functional roles in seed dispersal and pollination of native plants.
- To improve the comprehensiveness and reliability of information available to guide recovery.

The Project is unlikely to conflict with any of these objectives and will therefore unlikely interfere substantially with the recovery of the species.

Conclusion

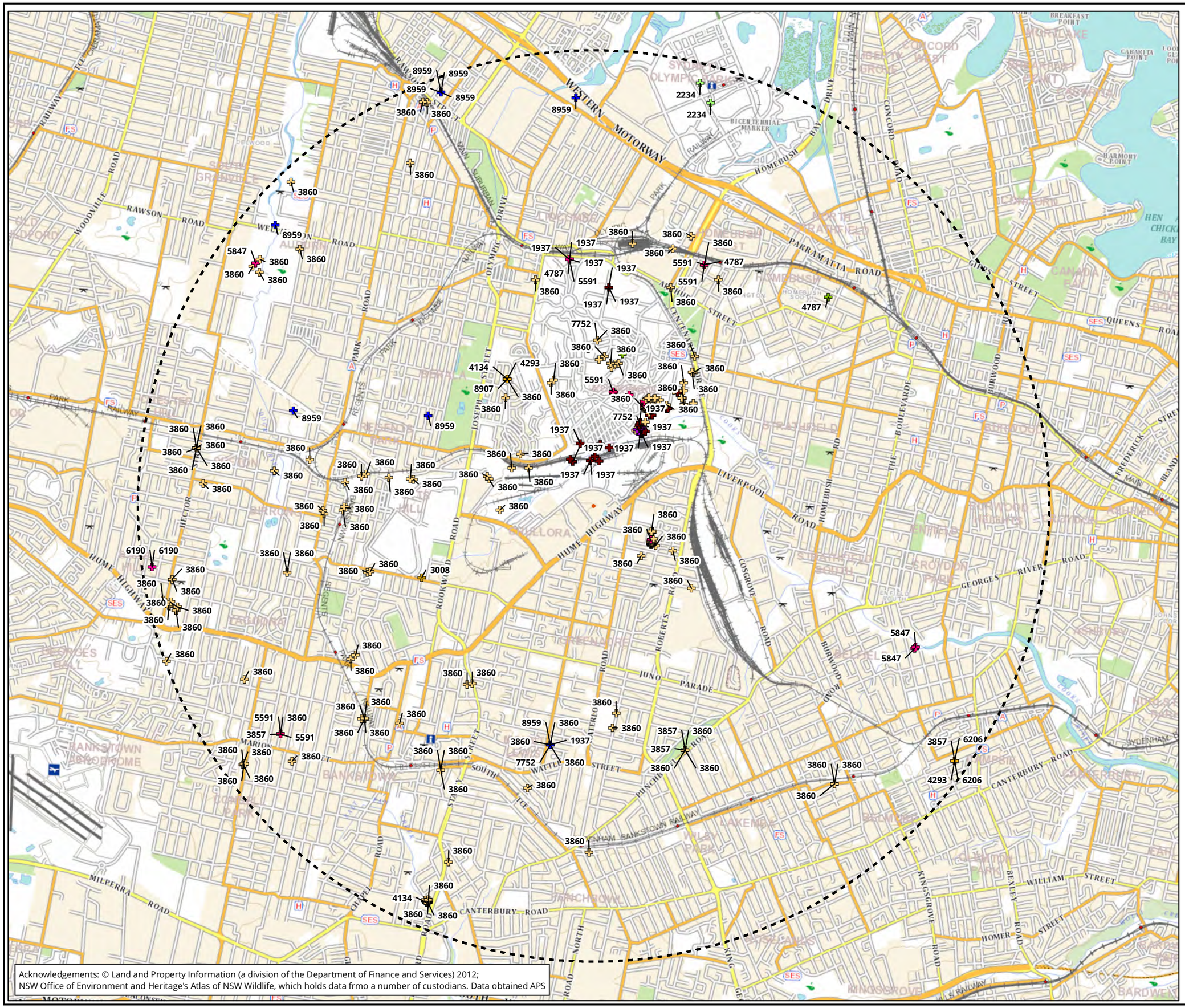
Based on the above assessment Grey-headed Flying-fox **is not** likely to be significantly impacted by the Project and as such, a Referral under the provisions of the EPBC Act is not recommended for this species.

- The Project will not reduce the area of occupancy of Grey-Headed Flying-fox, or fragment an existing population.
- The Project is considered unlikely to introduce exotic species that will deteriorate habitat for Grey-Headed Flying-fox.
- The Project is considered unlikely to interfere with the recovery of Grey-Headed Flying-fox at a local or regional level.

As such, a Referral under the provisions of the EPBC Act is not recommended for this species.

References

Appendix 5: Threatened Species Records



Legend

- Study area
- Search area

Threatened Flora

- 1937 - Wahlenbergia multicaulis
- 2234 - Wilsonia backhousei
- 3008 - Pultenaea pedunculata
- 3857 - Acacia prominens
- 3860 - Acacia pubescens
- 4134 - Eucalyptus nicholii
- 4293 - Syzygium paniculatum
- 4787 - Bothriochloa biloba
- 5591 - Pomaderris prunifolia
- 5847 - Zieria smithii
- 6190 - Pimelea spicata
- 6206 - Tetratheca juncea
- 7752 - Epacris purpurascens var. purpurascens
- 8907 - Eucalyptus scoparia
- 8959 - Eucalyptus parramattensis subsp. parramattensis
- 1911 - Hypsela sessiliflora*
- 4007 - Callistemon linearifolius*
- 8293 - Grevillea beadleana*

* Record is listed as sensitive under OEH's Sensitive Species Data Policy and cannot be shown at this scale

Figure 6: Threatened flora within 5km of the subject site

0 400 800 1,200 1,600 2,000

Metres
Scale: 1:40,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

N

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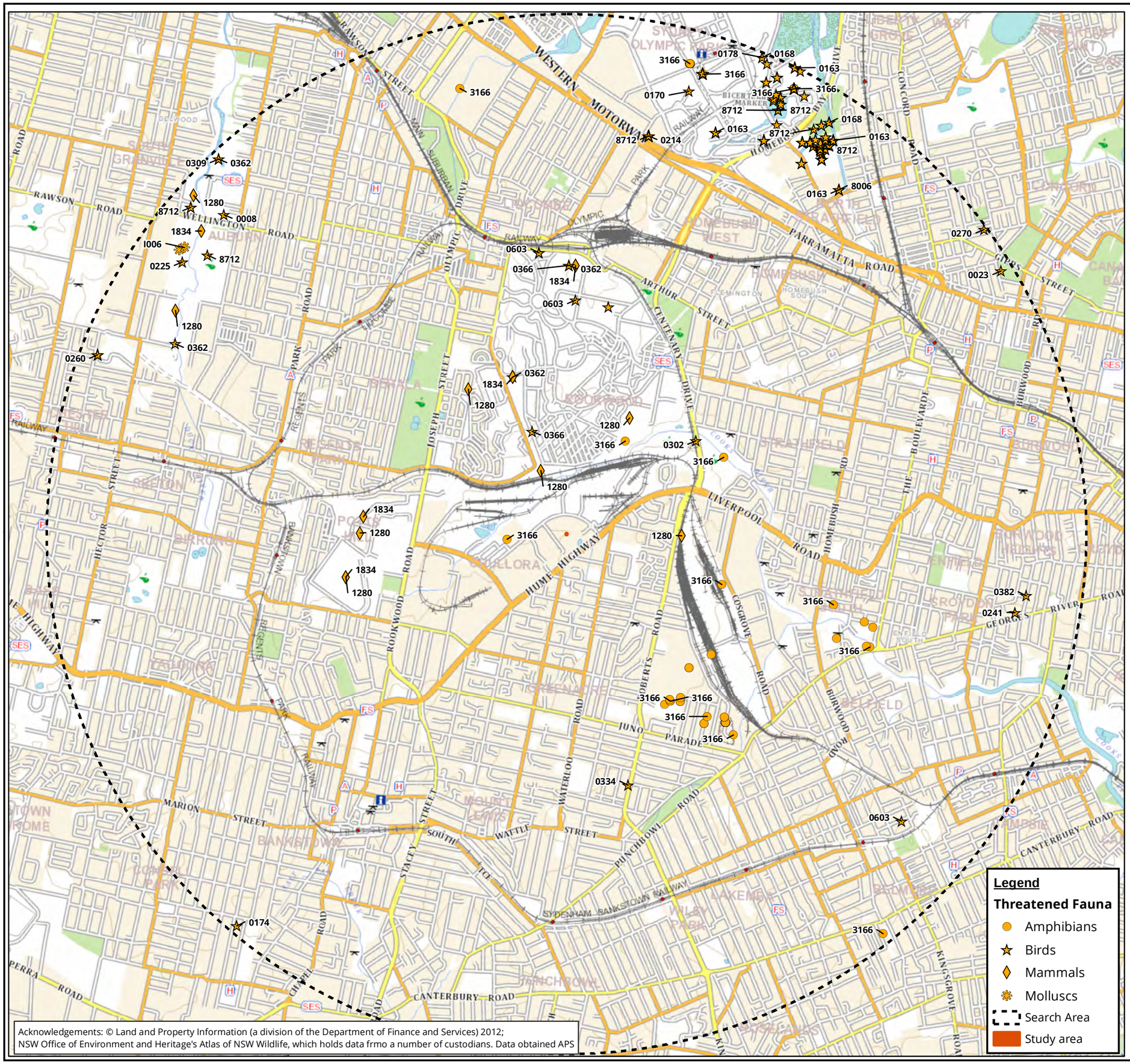
Matter:
Date: 02 October 2015,
Checked by: APS, Drawn by: LH, Last edited by: lharley
Location:P:\20800s\20879\Mapping
20879_F6_ThreatFlora



Acknowledgements: © Land and Property Information (a division of the Department of Finance and Services) 2012;
NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data frmo a number of custodians. Data obtained APS

Species list

Amphibians

3166 - Green and Golden Bell Frog

Birds

0008 - Australian Brush-turkey
0023 - Superb Fruit-Dove
0117 - Little Tern
0141 - Greater Sand-plover
0160 - Terek Sandpiper
0161 - Curlew Sandpiper
0170 - Australian Painted Snipe
0174 - Bush Stone-curlew
0197 - Australasian Bittern
0214 - Freckled Duck
0225 - Little Eagle
0238 - Black Falcon
0241 - Osprey
0260 - Little Lorikeet
0270 - Major Mitchell's Cockatoo
0302 - Turquoise Parrot
0309 - Swift Parrot
0382 - Flame Robin
0448 - White-fronted Chat
0603 - Regent Honeyeater

Mammals

1280 - Grey-headed Flying-fox
1834 - Eastern Bentwing-bat

Molluscs

I006 - Cumberland Plain Land Snail

* Record is listed as sensitive under OEH's Sensitive Species Data Policy and cannot be shown at this scale

Figure 7: Threatened fauna within 5km of the subject site

0 370 740 1,110 1,480 1,850

Metres
Scale: 1:37,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

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Matter: 20879
Date: 02 October 2015,
Checked by: APS, Drawn by: LH, Last edited by: lharley
Location:P:\20800s\20879\Mapping
20879_F7_ThrFauna