QANTAS AIRWAYS LIMITED

APRIL 2019

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

QANTAS FLIGHT TRAINING CENTRE

Question today
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Create for the future

Biodiversity Development Assessment Report
Qantas Flight Training Centre

Qantas Airways Limited

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GLOSSARY

*	Denotes exotic species
BAM	Biodiversity Assessment Method 2017 that supports the *Biodiversity Conservation Act 2016*.
Biodiversity	The biological diversity of life is commonly regarded as being made up of the following three components: — Genetic diversity — the variety of genes (or units of heredity) in any population. — Species diversity — the variety of species. — Ecosystem diversity — the variety of communities or ecosystems.
Candidate species	Species assessed as having a moderate to high likelihood of occurrence within the site.
Credit calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, in particular by using the data required to be entered and the equations in Appendix 6 and Appendix 9 to calculate the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Critical habitat	The whole or any part or parts of an area or areas of land comprising the habitat of an Endangered species, an Endangered population or an Endangered Ecological Community that is critical to the survival of the species, population or ecological community (Department of Environment and Conservation 2004). Critical habitat is listed under the EPBC Act with the Secretary (Department of the Environment and Energy) maintaining a register of this habitat. Capitalisation of the term 'Critical Habitat' in this report refers to the habitat listed specifically under Commonwealth legislation.
Cryptic species	An inconspicuous species which can be difficult to identify
Department of the Environment and Energy	The department develops and implements national policy, programs and legislation to protect and conserve Australia's natural environment and cultural heritage and administers the EPBC Act. The Commonwealth Department of Department of the Environment was previously known as: — Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) — Department of the Environment, Water, Heritage and the Arts (DEWHA). — Department of Environment and Heritage (DEH). — Department of the Environment and Water Resources (DEWR).
Ecological community	An assemblage of species occupying a particular area.
Ecosystem credit	A measurement of the value of threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur with a PCT, and PCTs generally. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
Environmental weed	Any plant that is not native to a local area that has invaded native vegetation.

Exotic	Introduced from outside the area (Stralberg, et al. 2009). Used in the context of this report to refer to species introduced from overseas.
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic components.
High Threat Weed	Vascular plants not native to Australia that if not controlled will invade and outcompete native species. A list of high threat weeds is available as part of the BAM Calculator (https://www.lmbc.nsw.gov.au/bamcalc)
Indigenous	Native to the area: not introduced (Stralberg, et al. 2009).
Introduced	Not native to the area: not indigenous (Stralberg, et al. 2009). Refers to both exotic and non-indigenous Australian native species of plants and animals.
Jetbase	Qantas leased land within the boundaries of Sydney Kingsford Smith Airport.
Likely	Taken to be a real chance or possibility (Department of Environment and Conservation 2004).
Local population	The population that occurs within the site, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated.
Locality	The area within a 10 kilometre radius of the site.
Mascot Campus	Over 19ha of Qantas Airways Limited controlled land in Mascot to the north of Sydney Kingsford Smith Airport consisting of freehold and leased land. The following lots are owned by Qantas: Lot 133 DP 659434; Lots 4 & 5 DP 38594 Lot 23 DP 883548; Lots 1 & 2 DP 738342; Lot 3 DP 230355; Lot 4 DP 537339; Lots 2 & 4 DP 234489; Lot 4 234489; Lot 1 DP 81210; Lot 1 DP 202093; Lot 1 DP 721562; Lot 2 DP 510447; Lot 1 DP 445957; Lot B DP 164829 and Lot 1 DP 202747 and equates to 16.5ha of land. The following lots are leased by Qantas: Lot 14 DP 1199594 and Lot 2 DP 792885 and equates to 2.7ha of land.
Migratory species	Species listed as Migratory under the EPBC Act relating to international agreements to which Australia is a signatory. These include Japan-Australia Migratory Bird Agreement, China-Australia Migratory Bird Agreement, Republic of Korea-Australia Migratory Bird Agreement and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Capitalisation of the term 'Migratory' in this report refers to those species listed as Migratory under the EPBC Act.
Plant community type (PCT)	A NSW plant community type identified using the PCT classification system.
Priority Weeds	An introduced species listed under the *Biosecurity Act 2015*. Under the Act, priority weeds have specific control measures for each region.
Protected species	Those species defined as protected under the *National Parks and Wildlife Act 1974*. Includes all native animals, as well as all native plants listed on Schedule 13 of the *National Parks and Wildlife Act 1974*.
Region	A bioregion defined in a national system of bioregionalisation. The Proposal is located within the Sydney Basin Bioregion as defined in the Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway and Cresswell 1995).
Significant	Important, weighty or more than ordinary

Species credit	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Species richness	Species richness is simply the number of species present in a sample, community, or taxonomic group. Species richness is one component of the concept of species diversity, which also incorporates evenness, that is, the relative abundance of species (Matteson and Langellotto 2010).
Sydney Gateway Project	A RMS Project including a road and rail component that is intended to increase capacity and improve connections to the ports to assist with growth in passenger, freight and commuter movements across the region, by expanding and improving the existing road and freight rail networks.
The Project	The construction of a new Flight Training Centre and ancillary uses to replace the existing facility on the Qantas Jetbase that will be impacted by RMS' Sydney Gateway Project.
The Site	Qantas Airways Limited owned land in Mascot to the north of Sydney Kingsford Smith Airport consisting of Lots 2-5 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. Current site improvements include including at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility and Qantas tri-generation plant.
Threatened biodiversity	Threatened species, populations or ecological communities as listed under the BC Act, FM Act or the EPBC Act.
Threatened species, populations and ecological communities	Species, populations and ecological communities listed as Vulnerable, Endangered or Critically Endangered (collectively referred to as threatened) under the TSC Act, FM Act or the EPBC Act. Capitalisation of the terms 'Vulnerable', 'Endangered' or 'Critically Endangered' in this report refers to listing under the relevant state and/or Commonwealth legislation.
Viable local population	A population that has the capacity to live, develop and reproduce under normal conditions, unless the contrary can be conclusively demonstrated through analysis of records and references (Department of Environment and Climate Change 2007).
Weed	A plant growing out of place or where it is not wanted: often characterised by high seed production and the ability to colonise disturbed ground quickly (Stralberg, et al. 2009). Weeds include both exotic and Australian native species of plant naturalised outside of their natural range.

ABBREVIATIONS

ARTC	Australian Rail Track Corporation
BBLEP	Botany Bay Local Environmental Plan 2013
BDAR	Biodiversity Development Assessment Report
BAM	Biodiversity Assessment Method 2017
BC Act	*Biodiversity Conservation Act 2016*
BC Regulation	*The NSW Biodiversity Conservation Regulation 2017*
BOS	Biodiversity Offset Scheme
CAMBA	China Australia Migratory Bird Agreement
CASA	Civil Aviation Safety Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
FTE	Full-time Equivalent
Gateway	Sydney Gateway Project
ha	Hectares
IBRA	Interim Biogeographic Regionalisation for Australia
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
JAMBA	Japan Australia Migratory Bird Agreement
LEP	Local Environmental Plan
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NSW	New South Wales
OEH	The NSW Office of Environment & Heritage
PCT	Plant Community Type
Qantas	Qantas Airways Limited
RoKAMBA	Republic of Korea Australia Migratory Bird Agreement
RMS	NSW Roads and Maritime Services
SACL	Sydney Airport Corporation Limited
SAII	Serious and Irreversible Impact
SEPP	*State Environmental Planning Policy*
SEPP 55	*State Environmental Planning Policy No. 55 - Remediation of Land*

SEPP SRD	*State Environment Planning Policy (State and Regional Development) 2011*
Simulators	Full Motion Flight Simulators
sqm	Square Metres
SSD	State Significant Development
TEC	Threatened Ecological Community
the Airport	Sydney Kingsford Smith Airport
the Department	Department of Planning and Environment
the District Plan	Eastern City District Plan (2018)
the Minister	the Minister for Planning
the Region Plan	A Metropolis of Three Cities – the Greater Sydney Region Plan (2018)
the Strategy	The Future Transport Strategy 2056 (2018)

EXECUTIVE SUMMARY

This Biodiversity Development Assessment Report (BDAR) has been prepared in accordance with the NSW Biodiversity Assessment Method 2017 established under the *Biodiversity Conservation Act 2016* (BC Act) to form part of an Environmental Impact Statement (EIS) for a State Significant Development application for a proposed flight training centre on land known as known as Lots 2-5 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434, within the broader Qantas Mascot Campus, Mascot in the Bayside LGA.

Safety is Qantas' first priority. The flight training centre is a key pillar of this value. The facility enables pilots and flight crews to undertake periodic testing to meet regulatory requirements by simulating both aircraft and emergency procedural environments. The project seeks consent for the construction and operation of a new flight training centre, and associated ancillary uses including a multi-deck car park.

In total, the project would remove about 0.30 hectares of vegetation, comprising

- 0.07 hectares of PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
- 0.23 hectares of Miscellaneous ecosystem – urban exotic / native landscape plantings.

No threatened species, ecological communities or their habitat, listed under the BC Act or EPBC Act, have been determined to be affected by the project.

Biodiversity offsetting for residual impacts on BC Act biodiversity values is mandatory for SSD developments being assessed under Part 7 of the Act and subject to a BDAR. Biodiversity offset obligations have been determined using the BAM calculator as follows:

- No ecosystem credits are required for PCT 1232 as the vegetation integrity score is less than 17
- No species credits are required.

The project is considered unlikely to result in a significant impact on any Matters of National Environmental Significance (MNES). Given this, a referral of this development under the EPBC Act to the Department of the Environment and Energy is not warranted.

1 PROJECT BACKGROUND

1.1 INTRODUCTION

WSP has been commissioned by Qantas Airways Ltd (Qantas) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the **SSD 10154** for the development of a new flight training centre at 297 King Street, Mascot.

Specifically, this BDAR has been prepared in accordance with the Biodiversity Assessment Method 2017 (BAM) and addresses legislative matters prescribed under the *Biodiversity Conservation Act 2016* (BC Act) and *Biodiversity Conservation Regulation 2017*.

1.2 DESCRIPTION OF SITE AND LOCALITY

The site is located at 297 King Street, Mascot and comprises land known as Lots 2-5 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. The site is identified in Figure 1.1.

Key features of the site are as follows:

- The site is approximately 5.417ha and is an irregular shape. It is approximately 240m in length and maintains a variable width of between approximately 321m in the northern portion of the site and approximately 93m along the King Street frontage (refer to Figure 1.1).
- The site possesses a relatively level slope across the site. An open Sydney Water drainage channel bisects the northern portion of the site in an east-west direction. There are some isolated changes in level immediately adjacent to this channel. A Site Survey Plan accompanies the application which details the topographic characteristics of the site.
- Multiple mature *Platanus* sp. (Plane Trees) are scattered throughout the site. A variety of native and exotic tress and vegetation also exist around the perimeter of the site which help screen the site from surrounding uses.
- Site improvements include at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility and Qantas tri-generation plant.
- The site forms part of a larger land holding under the ownership of Qantas that generally extends between Qantas Drive to the west, Ewan Street to the south, Coward Street to the north, with the Qantas "Corporate Campus" fronting Bourke Road.
- Vehicular access to the site from the local road network is available from King Street. The site has intra-campus connections along the northern boundary in the form of two connecting driveways in the north-eastern and north-western corner of the site along the northern boundary which link it to the broader Mascot Campus.
- The site is located within the Bayside LGA.

Key features of the locality are:

- **North:** The site is bounded to the north by low scale industrial development, beyond which is Coward Street. Further north of the site is the Mascot Town Centre which is characterised by transport-oriented development including high density mixed-use development focused around the Mascot Train Station.
- **East:** The site is bordered to the east by commercial development including a newly completed Travelodge hotel which includes a commercial car park. Additional commercial development to the east includes the Ibis Hotel and Pullman Sydney Airport fronting O'Riordan Street.

— **South:** The site is bounded to the south by King Street, beyond which is Qantas owned at-grade car parking and other industrial uses. Further south is the Botany Freight Rail Line and Qantas Drive beyond which is the Domestic Terminal at Sydney Airport.

— **West:** The site is bordered to the west by the Botany Freight Rail Line and Qantas Drive, beyond which lies Sydney Kingsford Smith Airport and the Qantas Jetbase (location of the current Flight Training Centre).

1.3 PROJECT DESCRIPTION

Safety is Qantas' first priority. The flight training centre is a key pillar of this value. The facility enables pilots and flight crews to undertake periodic testing to meet regulatory requirements by simulating both aircraft and emergency procedural environments. The Project seeks consent for the construction and operation of a new flight training centre, and associated ancillary uses including a multi-deck car park (refer Figure 1.2). The Project is comprised of the following uses:

1.3.1 FLIGHT TRAINING CENTRE

The proposed flight training centre will occupy the southern portion of the site. It is a building that comprises four core elements as follows:

— An emergency procedures hall that contains;
  — cabin evacuation emergency trainers,
  — an evacuation training pool,
  — door trainers,
  — fire trainers
  — slide descent towers,
  — security room,
  — aviation medicine training and equipment rooms.
— A flight training centre that contains:
  — a flight training hall with 14 bays that will house aircraft simulators,
  — integrated procedures training rooms, computer rooms, a maintenance workshop, storerooms, multiple de-briefing and briefing rooms, pilot's lounge and a shared lounge.
— Teaching Space that contains
  — training rooms,
  — classrooms and two computer based exam rooms.
— Office Space
  — Office space for staff and associated shared amenities including multiple small, medium and large meeting rooms, think tank rooms, informal meeting spaces, a video room and lunch/tea room.
— Ancillary spaces including the reception area at the ground floor, toilets, roof plant and vertical circulation. The external ground floor layout will include a loading dock, at-grade car parking for approximately 39 spaces and a bus drop-off zone at the northern site boundary.

1.3.2 CAR PARK

The proposed multi-deck car park will be located to the north-east of the flight training centre and adjacent the existing Qantas catering facility and tri-generation plant. The car park is 13 levels and will provide 2059 spaces for Qantas staff. Vehicle access to the car park will be provided via King Street, Kent Road and from Qantas Drive via the existing catering bridge.

PRELIMINARY

329000 330000 331000 332000 333000 334000 335000 336000

6246000 6245000 6244000 6243000

DULWICH HILL ENMORE ERSKINEVILLE WATERLOO CENTENNIAL PARK

NEWTOWN SHEA'S CREEK ZETLAND

WARDELL ROAD ILLAWARRA ROAD VICTORIA ROAD EDINBURGH ROAD SYDNEY PARK ROAD HUNTLEY STREET JOYNTON AVENUE

MARRICKVILLE ROAD MAY STREET BEACONSFIELD EPSOM ROAD

ALEXANDRIA COLLINS STREET

LIVINGSTONE ROAD MARRICKVILLE UNWINS BRIDGE ROAD RANDWICK

ST PETERS BOURKE ROAD O'RIORDAN STREET ROTHSCHILD AVENUE

SYDENHAM PRINCES HIGHWAY CANAL ROAD ALEXANDRA CANAL SYDNEY ROSEBERY

HARCOURT PARADE

INNER WEST KENT ROAD

GARDENERS ROAD KINGSFORD

COOKS RIVER

EARLWOOD TEMPE COWARD STREET

CANTERBURY-BANKSTOWN BOTANY ROAD SUTHERLAND STREET MALONEY STREET

AIRPORT DRIVE EASTLAKES DACEYVILLE

WOLLI CREEK KING STREET

TURRELLA ROBEY STREET SOUTHERN CROSS DRIVE

JOYCE DRIVE

WOLLI CREEK MASCOT

BAYSIDE WENTWORTH AVENUE

SOUTH WESTERN MOTORWAY MARSH STREET PAGEWOOD

HEFFRON ROAD

ARNCLIFFE BOTANY PAGE STREET BANKS AVENUE

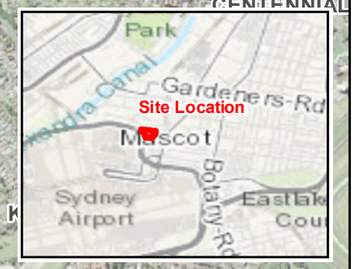
BANKSIA STREET WILLIAM STREET

M5 EAST FREEWAY MILL STREAM MAROUBRA

BANKSMEADOW

GENERAL HOLMES DRIVE

KYEEMAGH BOTANY BAY EASTGARDENS HILLSDALE



Legend

- Railway
- Watercourse
- Local Government Area boundary
- Water bodies
- The Site

Map: PS113050_Qantas_GIS_001_A3	Author: Trent.Bowman
Date: 20-Feb-19	Approved by: Julia.Wyllie

0 270 540 m

1:20,000

Coordinate system: GDA 1994 MGA Zone 56
Scale ratio correct when printed at A3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

QANTAS flight training centre

Figure 1.1
The site locatlity

PRELIMINARY

332000 332100 332200 332300 332400

6244600 6244500 6244400

Lot X DP408199
Lot 100 DP580123
Lot 1 DP1005951
Lot 26 DP29697
Lot 25 DP29697
Lot 24 DP29697
Lot 23 DP29697
Lot 22 DP29697
Lot 21 DP29697
Lot 20 DP29697
Lot 19 DP29697
Lot 18 DP29697
Lot 17 DP29697
Lot 16 DP29697
Lot 1 DP81210
Lot 1 DP721562
Lot 133 DP659434
Lot 2 DP792885
Lot 13 DP213317
Lot 4 DP209847
Lot 11 DP213317
Lot 17 DP217443
Lot 1 DP202747
Lot 6 DP209847
Lot 6 DP792885
Lot 5 DP234489
Lot 1 DP234489
Lot 2 DP234489
Lot 9 DP747022
Lot B DP164829
Lot 4 DP270981
Lot 3 DP234489
Lot B DP164829
Lot 1 DP528711
Lot 1 DP270981
Lot 2 DP528711
Lot 3 DP270981
Lot 2 DP270981
Lot 8 DP1050923
Lot 4 DP234489
Lot 1 DP23141
Lot 2 DP23141
Lot 4 DP23141
Lot D DP421206
Lot C DP421206
Lot 5 DP23141
Lot 7 DP23141
Lot 3 DP23141
Lot 8 DP23141
Lot 2 DP510447
Lot 5 DP15034

Legend

- Railway
- Watercourse
- Development Detail
- Cadastre boundaries
- The Project
- The Site

Map: PS113050_Qantas_GIS_002_A3	Author: Trent.Bowman
Date: 20-Feb-19	Approved by: Julia.Wyllie

0 10 20 m
1:1,300

Coordinate system: GDA 1994 MGA Zone 56
Scale ratio correct when printed at A3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

QANTAS flight training centre

Figure 1.2
The project

2 LEGISLATIVE CONTEXT

2.1 BIODIVERSITY CONSERVATION ACT 2016

The NSW BC Act came into effect on the 25 August 2017. This Act repealed the *Threatened Species and Conservation Act 1995* (TSC Act), *Native Vegetation Act 2003* and parts of the *National Parks and Wildlife Act 1974*. All threatened entities previously listed under the TSC Act have now been listed under the schedules of the BC Act.

The BC Act outlines the framework for addressing impacts on biodiversity from development and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme. The Biodiversity Offsets Scheme (BOS) creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity (Office of Environment and Heritage, 2017).

The Biodiversity Assessment Method (BAM) was established by OEH as a standard method to implement the aims of the BOS and to address the loss of biodiversity and threatened species. The scheme creates a market framework for the conservation of biodiversity values and the offsetting of development impacts. It also provides the mechanisms to offset impacts of development, clearing or biodiversity certification such that there is no loss of biodiversity values.

This BDAR has been prepared in accordance with the BAM and includes prescribed biodiversity matters under the *Biodiversity Conservation Regulation 2017*.

2.2 FISHERIES MANAGEMENT ACT 1994

The key objects of the *Fisheries Management Act 1994* (FM Act) are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. The Act provides for the listing of threatened species, populations and ecological communities, listing of ‘Key Threatening Processes’, and the requirements or otherwise for the preparation of a Species Impact Statement (SIS).

One of the objectives of the FM Act is to 'conserve key fish habitats ' which includes aquatic habitats that are important to the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. To assist in the protection of key fish habitats, the Department of Primary Industries (DPI) has produced the Policy and guidelines for fish habitat conservation and management (DPI, 2013). This policy applies to the following developments, works or activities, each of which can impact on key fish habitat:

— Dredging or reclamation

— Impeding fish passage

— Damaging marine vegetation

— De-snagging.

The project will not impact on any watercourse or potential fish habitat such that it would result in dredging or reclamation, imped fish passage, damage marine vegetation or de-snagging. Springvale drain occurs to the west of Nant Street that runs adjacent to the project and will not be directly impacted upon.

2.3 BIOSECURITY ACT 2015

The *Biosecurity Act 2015* provides for risk-based management of biosecurity in NSW. It provides a statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds.

The primary object of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Priority weeds recorded in the site and their control measures are detailed in section 5.4.

2.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to ensure that actions likely to cause a significant impact on 'Matters of National Environmental Significance' (MNES) undergo an assessment and approval process. Under the EPBC Act, an action includes a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Minister for the Environment. MNES relevant to this report include threatened species and ecological communities and migratory species.

The EPBC Act has been considered in this assessment through:

- Desktop review to determine the listed biodiversity matters that are predicted to occur within the locality of the project and hence could occur, subject to the habitats present
- Targeted field surveys for listed threatened biota and migratory species
- Assessment of potential impacts on threatened and migratory biota, including assessments of significance in accordance with the EPBC Act significant impact guidelines (Department of the Environment 2013) where relevant
- Identification of suitable impact mitigation and environmental management measures for threatened and migratory biota, where required.

2.5 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The Secretary of the NSW Department of Planning & Environment has issued requirements for the proposed development to be assessed as State Significant Development (SSD) under Part 4, Division 4.7 of the EP&A Act (Appendix H). The Secretary's Environmental Assessment Requirements (SEARs) for biodiversity are;

'Biodiversity – including: an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted.'

This BDAR has been prepared in accordance with the BAM 2017 and addresses the proposal's biodiversity impacts in accordance with the BC Act.

3 METHODOLOGY

The following methods have been undertaken in the preparation of this BDAR in accordance with the BAM. All work was carried out under the appropriate licences, including a scientific licence as required under Part 2 of the BC Act (License Number: SL100630) and an Animal Research Authority issued by the DPI (Agriculture).

3.1 PERSONNEL

The contributors to the preparation of this report, their qualifications and roles are provided in Table 3.1.

Table 3.1 Contributors and their qualifications

Name	Qualifications	Role
Mark Stables	Bachelor of Science (Hons) Accredited BAM Assessor (BAAS18097)	Principal Ecologist - Field surveys / reporting
Alex Cockerill	Bachelor of Science (Hons) Accredited BAM Assessor (BAAS17020)	Principal Ecologist - Field surveys / technical review
Julia Wyllie	Bachelor of Environment; Certificate 3 Conservation and Land Management Accredited BAM Assessor (BAAS18034)	Ecologist - Field surveys
Trent Bowman	Bachelor of Science (Hons); Master of Science in Geoscience	GIS Consultant – Mapping and data management

3.2 NOMENCLATURE

Names of vegetation communities used in this report are based on the PCTs used in the NSW BioNet Vegetation Classification Database (Office of Environment & Heritage 2019a).

These names are cross-referenced with those used for threatened ecological communities listed under the BC Act and/or the EPBC Act.

Names of plants used in this document follow PlantNET (Royal Botanic Gardens and Domain Trust 2019). Scientific names are used in this report for species of plant. Scientific and common names (where available) are provided in the species results provided in Appendix C. The names of introduced species are denoted with an asterisk (*).

For threatened species of plants, the names used in the OEH Threatened Species Website (Office of Environment & Heritage 2019b) are also provided in Appendix A where these differ from the names used in the PlantNET database.

Names of vertebrate fauna follow the Australian Faunal Directory maintained by the Department of the Environment and Energy (Department of Environment and Energy, 2019). Common names are used in the report for species of animal.

For threatened species of animals, the names used in the OEH Threatened Species Website and NSW Department Primary Industries (Office of Environment and Heritage, 2019b, Department of Primary Industries, 2019b).

3.3 BACKGROUND RESEARCH

Background research was conducted to identify:

— landscape-scale features of the development site in accordance with Section 4.2 of the BAM (Office of Environment & Heritage 2017)

— site context of the development site that includes assessing vegetation cover and patch size as required under Subsections 4.3.2 and 5.3.2 of the BAM (Office of Environment & Heritage 2017).

— the likely distribution of native vegetation and threatened ecological communities, based on previous mapping and aerial photograph interpretation, for targeted field verification as required under Section 5 of the BAM (Office of Environment & Heritage 2017)

— a list of predicted and candidate threatened species and populations of flora and fauna to assess the habitat suitability and threatened biodiversity data collection as required under Section 6 of the BAM (Office of Environment & Heritage 2017)

— baseline information to determine whether additional surveys, mapping and reporting is required to support project approval.

The background research included analysis of the following information sources:

— Aerial photographic imagery (Land and Property Information, 2018a)

— NSW Mitchell Landscapes (Land and Property Information, 2018b)

— Interim Biogeographic Regionalisation of Australia (IBRA version 7.0) (Department of Environment & Energy 2016)

— Atlas of Groundwater Dependent Ecosystems (GDE) (Australian Bureau of Meteorology 2019)

— Directory of Important Wetlands of Australia (Department of Environment & Energy 2019b)

— State Environmental Planning Policy (Coastal Management) 2018 – Coastal Wetlands (NSW Department of Planning & Environment, 2018)

— Priority weed listings for the Greater Sydney region (Department of Primary Industries 2019)

— The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage 2016a).

— Native vegetation of Southeast NSW: A Revised Classification and Map for the Coast and Eastern Tablelands (Tozer *et al.* 2010)

— Threatened species database searches outlined in Table 3.2.

Table 3.2 Threatened species database searches

DATABASE	SEARCH DATE	AREA SEARCHES	REFERENCE
PlantNET spatial search	January 2019	5 km radius centred on the suburb of Mascot	Royal Botanic Gardens and Domain Trust (2019)
BioNet Atlas species sighting search	January 2019	10 km x 10 km centred on the development site	Office of Environment and Heritage (2019a)
EPBC Protected Matters Search Tool	January 2019	10 km x 10 km centred on the development site	Department of Environment & Energy (2019a)
NSW Department of Primary Industries (Fishing and Aquaculture) spatial data	January 2019	Bayside Council LGA	Department of Primary Industries (2019a)

3.4 NATIVE VEGETATION AND THREATENED FLORA SURVEYS

Native vegetation and threatened flora surveys were undertaken on the 6 February 2019. Surveys focused on the mapping of any native and non-native vegetation types and targeting the possible presence of threatened flora species using a combination of vegetation integrity plots, random meanders and parallel field traverses generally in accordance with the NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (Department of Environment and Conservation 2004), NSW Guide to Surveying Threatened Plants (Office of Environment & Heritage 2016a) and the BAM (Office of Environment & Heritage 2017). A detailed overview of terrestrial flora survey methods is presented below.

3.4.1 STRATIFICATION AND VERIFICATION OF EXISTING VEGETATION MAPPING

Preliminary mapping of vegetation community boundaries was undertaken through analysis of existing vegetation mapping and aerial photograph interpretation.

Vegetation within the development site and locality has been mapped at the regional scale in:

— Native vegetation of the Southeast NSW: Revised Classification and Map for the Coast and Eastern Tablelands (Tozer *et al*. 2010).

— The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage 2016b).

Analysis of the aerial photographs was used to identify areas of disturbance (e.g. buildings, vehicle tracks, dams and power lines), vegetation structure and likely native versus exotic species composition throughout the site. This provided an initial definition of vegetation communities into simple structural and disturbance classifications for verification during field surveys.

Data on geology, dominant canopy species, native species richness, vegetation structure and condition was collected across the development site during field surveys to validate and refine this existing vegetation classification to determine their associated PCT in accordance with the BioNet Vegetation Classification System (Office of Environment & Heritage, 2019a).

No remnant native vegetation has been mapped within the site. Historic literature and field validation was undertaken to verify the broad scale mapping.

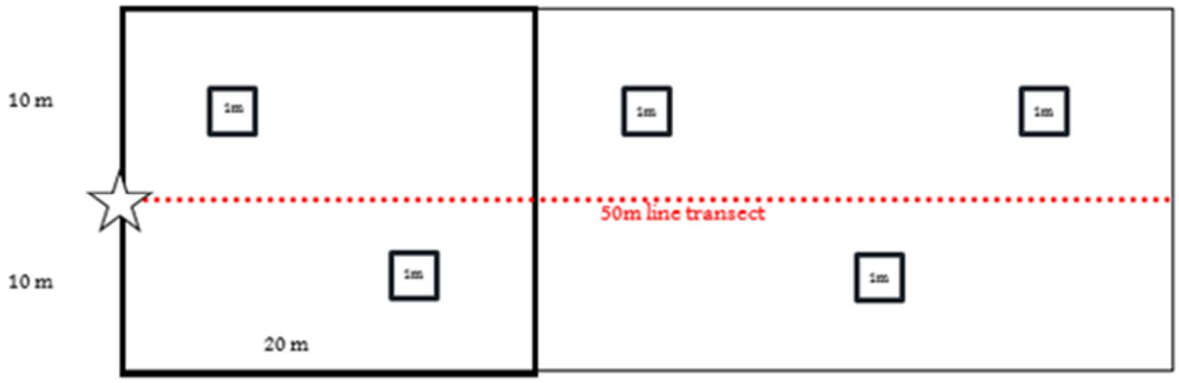
3.4.2 MAPPING OF VEGETATION ZONES

The vegetation within the site was firstly assessed to determine if it met PCT level and then if it was to be aligned to a vegetation zone which is defined in the BAM as ‘an area of native vegetation on the subject land that is the same PCT and has a similar broad condition state’ (Office of Environment & Heritage, 2019a). No patches of any remnant native vegetation were observed within the site and therefore no PCT or vegetation zones were assigned as part of the BDAR.

3.4.3 VEGETATION INTEGRITY PLOTS

A single vegetation integrity plot was completed as outlined in the BAM and as described below. A schematic diagram illustrating the layout of each vegetation integrity plot is provided in Figure 3.1.

Figure 3.1 Schematic diagram illustrating the layout of the nested 20 m x 20 m and 20 m x 50 m plot used for the assessment of vegetation integrity at each plot location



The following site attributes were recorded at each vegetation integrity plot location:

Location (easting – northing grid type MGA 94, Zone 56)

- Vegetation structure and dominant species and vegetation condition. Vegetation structure was recorded through estimates of percentage foliage cover, average height and height range for each vegetation layer
- Native and exotic species richness (within a 400 m2 quadrat): This consisted of recording all species by systematically walking through each 20 m x 20 m quadrat. The cover and abundance (percentage of area of quadrat covered) of each species was estimated. The growth form, stratum/layer and whether each species was native/exotic/high threat weed was also recorded
- Number of trees with hollows (1,000 m2 quadrat): This was the frequency of hollows within living and dead trees within each 50 m x 20 m quadrat. A hollow was only recorded if (a) the entrance could be seen: (b) the estimated entrance width was at least 5 cm across: (c) the hollow appeared to have depth: (d) the hollow was at least 1 m above the ground and the (e) the centre of the tree was located within the sampled quadrat
- Number of large trees and stem size diversity (1,000 m2 quadrat): tree stem size diversity was calculated by measuring the diameter at breast height (DBH) (i.e. 1.3 m from the ground) of all living trees (>5 cm DBH) within each 50 x 20 m quadrat. For multi-stemmed living trees, only the largest stem was included in the count. Number of large trees was determined by comparing living tree stem DBH against the PCTs benchmarks
- Total length of fallen logs (1,000 m2 quadrat): This was the cumulative total of logs within each 50 m x 20 m quadrat with a diameter of at least 10 cm and a length of at least 0.5 m.
- Litter cover: This comprised estimating the average percentage groundcover of litter (i.e. leaves, seeds, twigs, branchlets and branches with a diameter <10 cm which is detached from a living plant) from within five 1 m x 1 m sub-plots spaced evenly either side of the 50 m central transect
- Evaluation of regeneration: This was estimated as the presence/absence of overstorey species present at the site that was regenerating (i.e. saplings with a diameter at breast height ≤5 cm).
- Prior to establishing plot survey locations, vegetation stratification was undertaken to provide a representative vegetation zone for sampling. Stratification involved marking waypoints and bearings randomly to provide a representative assessment of the vegetation integrity of the vegetation zone in the study area and establishing the required number of plots at some of these waypoints.
- A comparison of the number of BAM survey plots that were completed and the required BAM plots per vegetation zones is provided in Table 3.3.

Vegetation integrity plot locations and orientations are provided in Table 3.4 and illustrated in Figure 5.1.

Table 3.3 Comparison of number of plots required under the BAM and completed per vegetation zone

VEGETATION TYPE AND ZONE	VEGETATION ZONE AREA (HA)	BAM PLOT REQUIRED	NUMBER OF PLOTS COMPLETED
VZ1 - PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion – Poor condition	0.07	1	1(Q1)

Table 3.4 Location and orientation of vegetation integrity plots completed within the site

PLOT ID	VEGETATION TYPE AND ZONE	EASTING	NORTHING	ORIENTATION
Q1	VZ1 - PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion – Poor condition	332292	6244450	260°

3.4.4 RANDOM MEANDER SURVEY

Random meander surveys are a variation of the transect type survey and were completed in accordance with the technique described by Cropper (1993), whereby the recorder walks in a random meander throughout the development site recording dominant and key plant species (e.g. threatened species, priority weeds), boundaries between various vegetation communities and condition of vegetation. The time spent in each vegetation community was generally proportional to the size of the community and its species richness.

Random meander surveys were conducted to locate candidate threatened species and populations within area of suitable habitat.

3.4.5 PARALLEL FIELD TRAVERSES

Parallel field traverses followed methods outlined in the NSW Guide to Surveying Threatened Plants (Office of Environment & Heritage 2016a). Parallel field traverses involved two people walking a fixed bearing transect at 10 metre intervals over known or high likelihood potential habitat for candidate threatened flora species.

3.4.6 THREATENED FLORA LIKELIHOOD OF OCCURRENCE ASSESSMENT

Threatened flora species and populations subject to likelihood of occurrence assessments were those identified during the background research, BAM calculator candidate and predicted species lists and any additional species considered to have the potential to occur in the professional opinion of contributors to this assessment.

The likelihood of occurrence assessment was utilised to produce a candidate species list to inform appropriate targeted surveys. The assessment was based on the habitat profile for the species and other habitat information in the Threatened Species Profile Database (Office of Environment and Heritage 2019c) and the Species Profile and Threats Database (Department of the Environment and Energy 2019c).

The assessment also included consideration of the dates and locations of nearby records and information about species distribution and populations in the locality along with key habitat requirements such as:

- Associated native plant community types and taxa
- Topographic, soil or geological preferences
- Microhabitats (e.g. preference for rocky outcrops, ground soaks or tree canopies)
- Disturbances, such as fire history, and the level and type of disturbance (e.g. slashing, canopy removal).

For this study, the likelihood of occurrence of threatened flora species and populations was determined based on the criteria outlined in Table 3.5.

Table 3.5 Likelihood of occurrence criteria for terrestrial threatened flora species and populations

LIKELIHOOD	CRITERIA
Known	The species was observed in the site either during the current survey or during another survey less than 5 years prior; assuming no significant change in conditions on site (e.g. vegetation clearing, fire).
High	A species has a high likelihood of occurrence if: — The site contains or forms part of a large area (> 1 ha) of high quality suitable habitat that has not been subject to recent disturbance (e.g. fire), the species is known to form a persistent soil seedbank and the species has been recorded recently (within 10 years) in the locality — The species is a cryptic flowering species that has been recorded recently (within 10 years) in the locality and has a large area (> 1 ha) of high quality potential habitat on site that was not seasonally targeted by surveys.
Moderate	A species has a moderate likelihood of occurrence if: The species: — Has a small area (< 1 ha) of high quality suitable habitat or a large area (> 1 ha) of marginal habitat in the site that has not been subject to recent disturbance (e.g. fire), and — The species is known to form a persistent soil seedbank, and — The species has been recorded recently (within 10 years) in the locality. The species is a cryptic flowering species, with a small area of high quality potential habitat (< 1 ha) or a large area of marginal habitat on site (> 1 ha), that was not seasonally targeted by surveys.
Low	A species has a low likelihood of occurrence if: — The species' potential habitat is of high quality but is small in area (< 1 ha) and it is not a cryptic species nor a species known to have a persistent soil seedbank or — The species' potential habitat is marginal and the species has not been recorded in the locality.
None	Potentially suitable habitat is absent from the site.

3.5 THREATENED FAUNA SURVEYS

This section outlines the fauna survey effort completed for candidate species which were predicted to have a moderate to high likelihood of occurrence within the development site based on database searches outlined in section 3.3. Threatened fauna surveys completed within the development site were carried out as described below and where applicable, considering the methodology detailed in the NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (Department of Environment and Conservation 2004). Fauna surveys were limited to fauna habitat assessments, opportunistic sightings, diurnal bird surveys and amphibian surveys.

3.5.1 FAUNA HABITAT ASSESSMENT

Fauna habitat assessments were undertaken to assess the likelihood of threatened species of animal (those species known or predicted to occur within the locality from the literature and database review) occurring within the site. Fauna habitat assessments were the primary assessment tool in assessing whether threatened species were likely to occur within the site. Fauna habitat characteristics assessed included:

— Structure and floristics of the canopy, understorey and ground vegetation, including the presence of flowering and fruiting trees providing potential foraging resources

— Presence of hollow-bearing trees providing roosting and breeding habitat for arboreal mammals, birds and reptiles

— Presence of the ground cover vegetation, leaf litter, rock outcrops and fallen timber and potential to provide protection for ground-dwelling mammals, reptiles and amphibians

— Presence of waterways (ephemeral or permanent) and water bodies.

The criteria were used to evaluate the condition of habitat values is outlined in Table 3.6.

Table 3.6 Fauna habitat assessment evaluation criteria

HABITAT VALUE	EVALUATION CRITERIA
Good	A full range of fauna habitat components are usually present (for example, old growth trees, fallen timber, feeding and roosting resources) and habitat linkages to other remnant ecosystems in the landscape are intact.
Moderate	Some fauna habitat components are missing or greatly reduced (for example, old-growth trees and fallen timber), although linkages with other remnant habitats in the landscape are usually intact, but sometimes degraded.
Poor	Many fauna habitat elements in low quality remnants have been lost, including old growth trees (for example, due to past timber harvesting or land clearing) and fallen timber, and tree canopies are often highly fragmented. Habitat linkages with other remnant ecosystems in the landscape have usually been severely compromised by extensive clearing in the past.

3.5.2 OPPORTUNISTIC RECORDING OF FAUNA SPECIES AND EVIDENCE OF FAUNA ACTIVITY

Opportunistic sightings of animals were recorded during field surveys. Evidence of animal activity, such as scats, diggings, scratch marks, nests/dreys, burrows etc. were also noted. This provided indirect information on animal presence and activity.

During these surveys, a hand-held GPS was used to record the locations significant fauna habitat values such as large hollow-bearing trees, aquatic habitat and rock outcrops where observed.

3.5.3 DIURNAL BIRD SURVEYS

Formal 20-minute diurnal bird searches were completed within the site. Bird surveys were completed by actively walking through the site over a period of 20 minutes. All birds were identified to the species level, either through direct observation or identification of calls. Bird surveys were completed generally during morning or evening hours. Birds were also recorded opportunistically during all other surveys.

Where seasonal conditions for some species were not suitable during the timing of onsite investigations, as was the case for endangered blossom nomads such as Swift Parrot, likelihood of occurrence assessments were conducted by the presence/absence of suitable habitat and its condition.

3.5.4 THREATENED FAUNA LIKELIHOOD OF OCCURRENCE ASSESSMENT

Threatened species identified in the desktop review were assessed for likelihood of occurrence based on results of the desk and field-based assessments. The likelihood of threatened species occurring within the site was assessed against the criteria outlined in Table 3.7.

Table 3.7 Likelihood of occurrence criteria for threatened fauna species

LIKELIHOOD	CRITERIA
Known	The species was observed in the site either during the current survey or during another survey less than 5 years prior; assuming no significant change in conditions on site (e.g. vegetation clearing, fire).
High	A species has a high likelihood of occurrence if: — the site contains or forms part of a large area (home range of more than a single individual or pair) of high quality suitable habitat — important habitat elements (i.e. for breeding or important life cycle periods such as winter foraging periods) are abundant within the site — the species has been recorded recently in similar habitat in the locality — the site is likely to support a resident population or to contain habitat that is visited by the species during regular seasonal movements or migration.
Moderate	A species has a moderate likelihood of occurrence if: — the site contains or forms part of a small area (home range of more than a single individual or pair) of high quality suitable habitat — the site contains or forms part of a large area of marginal habitat — important habitat elements (i.e. for breeding or important life cycle periods such as winter foraging periods) are sparse or absent within the site — the site is unlikely to support a resident population or to contain habitat that is visited by the species during regular seasonal movements or migration but is likely to be used occasionally during seasonal movements and/or dispersal.
Low	A species has a low likelihood of occurrence if: — potentially suitable habitat exists but — the species has not been recorded recently (previous 10 years) in the locality despite intensive survey (i.e. the species is considered to be locally extinct) — the habitat is marginal and small in area and isolated from other areas of suitable habitat. and/or — the species is considered to be a rare vagrant, likely only to visit the development site very rarely; e.g. during juvenile dispersal or exceptional climatic conditions (e.g. extreme drought conditions in typical habitat of inland birds).
None	Potentially suitable habitat is absent from the site.

4 LANDSCAPE CONTEXT

4.1 LANDSCAPE FEATURES

The site is in the Sydney Basin IBRA bioregion and occurs within the SYB07 Pittwater IBRA subregion (IBRA version 7.0). Landscape features within the site as prescribed in Section 4 of the BAM are summarised in Table 4.1 and shown in Figure 4.1.

Table 4.1 Landscape feature associated with the site

LANDSCAPE FEATURE	THE SITE
IBRA bioregions and subregions	Sydney Basin Bioregion / SYB07 Pittwater subregion
NSW landscape regions (Mitchell landscapes)	Sydney – Newcastle Barriers and Beaches
Local Government Area (LGA)	Bayside
Rivers and streams	No river or streams occur within the site or the project. Springvale drain (constructed) occurs to the west of Nant Street that runs adjacent to the site.
Important and local wetlands	Important wetland – Towra Point Wetland (~5km to the south)
Connectivity features	The site is isolated from any surrounding areas of biodiversity value
Areas of geological significance and soil hazard features	The site does not contain any areas of geological significance. The site has been subject to contamination of both land and groundwater. Site remediation has occurred between 2014-2016 and is ongoing with respect to groundwater as part of the broader Botany Groundwater Clean-up Project
Areas of outstanding biodiversity value	No declared areas of outstanding biodiversity value occur in or near the site

4.2 DETERMINING SITE CONTEXT

To determine site context as required under Section 4.3 of the BAM, an assessment of native vegetation cover and patch size in accordance with Subsections 4.3.2 and 5.3.2 of the BAM have been undertaken and are outlined below.

4.2.1 NATIVE VEGETATION COVER

Native vegetation cover within the site and a 1500-metre buffer area surrounding the outside edge of the boundary of the development site was determined in accordance with Subsection 4.2.1.2 of the BAM and is summarised in Table 4.2 and shown in Figure 4.2

Table 4.2 Native vegetation cover

ASSESSMENT AREA	TOTAL ASSESSMENT AREA (HA)	AREA OF NATIVE VEGETATION COVER (HA)	NATIVE VEGETATION PERCENTAGE COVER
1500m buffer	862.07 ha	47.00 ha	0-10%

4.2.2 PATCH SIZE

Patch size is defined under the BAM (Office of Environment & Heritage, 2017) as an area of native vegetation that:

— occurs on the development site or stewardship site, and

— includes native vegetation that has a gap of less than 100 m from the next area of moderate to good native vegetation (or ≤ 30 m for non-woody ecosystems).

Patch size may extend onto adjoining land that is not part of the project.

Patch size area is assigned to each vegetation zone as a class, being < 5ha, 5-24 ha, 25-100 ha or ≥ 100 ha. Due to the highly disturbed and fragmented landscape, patch size for each native vegetation zone has been determined to be < 5 ha.

PRELIMINARY

Cumberland IBRA Subregion
Sydney Basin IBRA Region

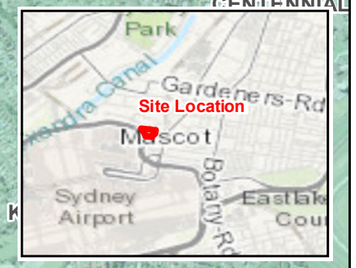
Pittwater IBRA Subregion
Sydney Basin IBRA Region

329000 330000 331000 332000 333000 334000 335000 336000

6246000 6245000 6244000 6243000

DULWICH HILL ENMORE NEWTOWN ERSKINEVILLE ALEXANDRIA WATERLOO CENTENNIAL PARK BEACONSFIELD ZETLAND MARRICKVILLE ST PETERS SYDENHAM INNER WEST SYDNEY ROSEBERY RANDWICK KINGSFORD DACEYVILLE EARLWOOD CANTERBURY-BANKSTOWN TEMPE WOLLI CREEK EASTLAKES PAGEWOOD MASCOT BAYSIDE BOTANY BANKSMEADOW MAROUBRA EASTGARDENS HILLSDALE KYEEMAGH BOTANY BAY

WARDELL ROAD MARRICKVILLE ROAD EDINBURGH ROAD SYDENHAM ROAD MAY STREET SYDNEY PARK ROAD HUNTLEY STREET COLLINS STREET EPSOM ROAD JOYNTON AVENUE LIVINGSTONE ROAD UNWINS BRIDGE ROAD CANAL ROAD BOURKE ROAD O'RIORDAN STREET ROTHSCHILD AVENUE ALEXANDRA CANAL SHEA'S CREEK HARCOURT PARADE GARDENERS ROAD KENT ROAD PRINCES HIGHWAY AIRPORT DRIVE COWARD STREET BOTANY ROAD SUTHERLAND STREET MALONEY STREET KING STREET ROBEY STREET JOYCE DRIVE SOUTHERN CROSS DRIVE MILL STREAM WENTWORTH AVENUE HEFFRON ROAD PAGE STREET BANKS AVENUE BANKSIA STREET WILLIAM STREET GENERAL HOLMES DRIVE M5 EAST FREEWAY COOKS RIVER



Legend

- Railway
- Watercourse
- Local Government Area boundary
- IBRA boundary
- Water bodies
- NPWS Reserves
- The Site

Mitchell Landscapes

- Ashfield Plains
- Port Jackson Basin
- Sydney - Newcastle Barriers and Beaches
- Woronora Plateau

Areas of Biodiversity Value

- Biodiversity Values more than 90 days old
- Biodiversity Values added in the last 90 days

Map: PS113050_Qantas_GIS_003_A3	Author: Trent.Bowman
Date: 20-Feb-19	Approved by: Julia.Wyllie

0 270 540 m
1:20,000

Coordinate system: GDA 1994 MGA Zone 56
Scale ratio correct when printed at A3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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Figure 4.1
Landscape Features

PRELIMINARY

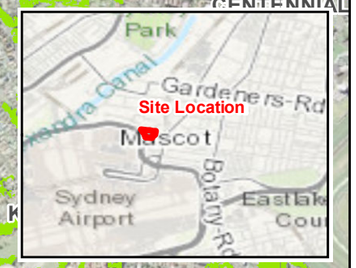
Cumberland IBRA Subregion
Sydney Basin IBRA Region

Pittwater IBRA Subregion
Sydney Basin IBRA Region

329000 330000 331000 332000 333000 334000 335000 336000

6246000 6245000 6244000 6243000

DULWICH HILL ENMORE ERSKINEVILLE WATERLOO CENTENNIAL PARK NEWTOWN ALEXANDRIA SHEA'S CREEK WARDELL ROAD MARRICKVILLE ROAD EDINBURGH ROAD SYDENHAM ROAD MAY STREET SYDNEY PARK ROAD HUNTLEY STREET JOYNTON AVENUE ZETLAND BEACONSFIELD COLLINS STREET EPSOM ROAD LIVINGSTONE ROAD MARRICKVILLE UNWINS BRIDGE ROAD ST PETERS RANDWICK SYDENHAM CANAL ROAD ALEXANDRA CANAL BOURKE ROAD O'RIORDAN STREET SYDNEY ROSEBERY ROTHSCHILD AVENUE INNER WEST HARCOURT PARADE KENT ROAD GARDENERS ROAD KINGSFORD PRINCES HIGHWAY TEMPE EARLWOOD CANTERBURY-BANKSTOWN COWARD STREET BOTANY ROAD SUTHERLAND STREET MALONEY STREET AIRPORT DRIVE WOLLI CREEK KING STREET EASTLAKES DACEYVILLE TURRELLA ROBEY STREET SOUTHERN CROSS DRIVE JOYCE DRIVE MASCOT MILLS TREAM WOLLI CREEK BAYSIDE WENTWORTH AVENUE PAGEWOOD HEFFRON ROAD PAGE STREET BANKS AVENUE BOTANY BANKSIA STREET WILLIAM STREET MAROUBRA BANKSMEADOW M5 EAST FREEWAY GENERAL HOLMES DRIVE COOKS RIVER KYEEMAGH BOTANY BAY EASTGARDENS HILLSDALE



Legend

- Railway
- Watercourse
- Landscape Assessment Buffer (1500m)
- Local Government Area
- IBRA boundary
- Water bodies
- NPWS Reserves
- Native Vegetation
- The Site

Map: PS113050_Qantas_GIS_004_A3	Author: Trent.Bowman
Date: 20-Feb-19	Approved by: Julia.Wyllie

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Coordinate system: GDA 1994 MGA Zone 56
Scale ratio correct when printed at A3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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Figure 4.2
Native vegetation cover

5 VEGETATION TYPES AND THREATENED ECOLOGICAL COMMUNITIES

The section has been prepared to address section 5 of the BAM. Specifically, this section maps and identifies all native and non-native vegetation types within the site and provides and assessment of vegetation integrity and whether any recorded vegetation types correspond to threatened ecological communities listed under the BC Act.

5.1 OVERVIEW

One candidate PCT was considered potentially representative of native planted / self-regenerating vegetation within the site, being:

— PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

In addition, one non-native vegetation type was assigned to a miscellaneous ecosystem class, being:

— Miscellaneous ecosystem – urban exotic / native landscape plantings

These two vegetation types (listed above) were assigned to two vegetation zones based on broad vegetation condition class criteria as outlined in Section 3.2.3. A summary of PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion and non-native vegetation type miscellaneous ecosystem are presented in Table 5.1. The extent and distribution of each vegetation type and zone is shown in Figure 5.1.

Detailed descriptions and selection justification for PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion is provided in Section 5.2 below. A summary and description of non-native vegetation type miscellaneous ecosystem is presented in Section 5.3.

Table 5.1 Overview of native and non-native vegetation types and zones identified within the site

VEGETATION TYPE	VEGETATION ZONE	THREATENED ECOLOGICAL COMMUNITY (BC ACT)	VEGETATION FORMATION	VEGETATION CLASS	IBRA REGION / SUBREGION	PCT % CLEARED	PATCH SIZE (HA)	VEGETATION INTEGRITY SCORE	EXTENT IN THE SITE (HA)	EXTENT IN THE PROJECT (HA)
Native vegetation										
PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	VZ1 -poor condition	Does not meet TEC listing (refer section 5.5)	KF_CH9 Forested Wetlands	Coastal Swamp Forests	Sydney Basin / Pittwater	95	<5	10.6	0.16	0.07
								Total native vegetation	0.16	0.07
Non-native vegetation										
Miscellaneous ecosystem – urban exotic / native landscape plantings	VZ2	-	-	-	-	-	-	-	0.29	0.23
								Total non-native vegetation	0.29	0.23
								Total all vegetation types	**0.45**	**0.30**

PRELIMINARY

332000 332100 332200 332300 332400

6244600 6244500 6244400

Lot X DP408199
Lot 100 DP580123
Lot 1 DP1005951
Lot 26 DP29697
Lot 25 DP29697
Lot 24 DP29697
Lot 23 DP29697
Lot 22 DP29697
Lot 21 DP29697
Lot 20 DP29697
Lot 19 DP29697
Lot 18 DP29697
Lot 17 DP29697
Lot 16 DP29697
Lot 1 DP81210
Lot 1 DP721562
KENT ROAD
Lot 13 DP213317
Lot 4 DP209847
Lot 11 DP213317
Lot 133 DP659434
Lot 2 DP792885
BOURKE ROAD
Lot 6 DP792885
Lot 17 DP217443
Lot 1 DP202747
Lot 6 DP209847
Lot 5 DP234489
Lot 1 DP234489
Lot 2 DP234489
Lot 3 DP234489
Lot B DP164829
Lot 4 DP270981
Lot 9 DP747022
QANTAS DRIVE
Q1
Lot B DP164829
Lot 1 DP528711
Lot 1 DP270981
Lot 2 DP528711
Lot 3 DP270981
Lot 2 DP270981
Lot 4 DP234489
Lot 1 DP23141
Lot 2 DP23141
Lot 4 DP23141
Lot D DP421206
Lot C DP421206
Lot 5 DP23141
Lot 7 DP23141
Lot 3 DP23141
Lot 8 DP23141
O'RIORDAN STREET
KING STREET
Lot 2 DP510447
Lot 5 DP15034

Legend

- Vegetation plot
- Vegetation transect
- Railway
- Watercourse
- Cadastre boundaries
- The Project
- The Site

Vegetation Types

- PCT1232- Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (Poor Condition)
- Miscellaneous Ecosystem: Urban Exotic/Native Landscape Planting

Map: PS113050_Qantas_GIS_005_A4	Author: Trent.Bowman
Date: 20-Feb-19	Approved by: Julia.Wyllie

0 10 20 m
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Coordinate system: GDA 1994 MGA Zone 56
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Figure 5.1
Vegetation Types and Zones

5.2 NATIVE VEGETATION

Although mostly planted, one vegetation type has been considered as a candidate PCT based on areas of self-regenerating vegetation in the form of *Casuarina glauca* (Swamp Oak). This species has been widely planted in the broader locality but has also been recorded as regrowth vegetation based on the presence of a soil seedbank within fill material sourced from the wider local floodplain.

5.2.1 PCT 1232 SWAMP OAK FLOODPLAIN SWAMP FOREST, SYDNEY BASIN BIOREGION AND SOUTH EAST CORNER BIOREGION

The occurrence of this vegetation type within the site is illustrated in Figure 5.1 with photographic representation provided in Photo 5.1 to Photo 5.4. A profile of PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion is provided in Table 5.2 and a comparison of recorded vegetation integrity data against community condition benchmark data is presented in Table 6.5.

Table 5.2 Summary of PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

PCT 1232 SWAMP OAK FLOODPLAIN SWAMP FOREST, SYDNEY BASIN BIOREGION AND SOUTH EAST CORNER BIOREGION	
PCT Justification	All patches were dominated by *Casuarina glauca* (Swamp Oak) that generally occurs as planted landscape specimens or young even age class regrowth arising from mostly fill material within modified areas. This vegetation type was assigned as candidate PCT 1232 as it is assumed that a persistent soil seed bank occurs within discrete areas of fill material that was most likely sourced from the local floodplain or active seed dispersal within the site.
Vegetation formation	KF_CH9 Forested Wetlands
Vegetation class	Coastal Swamp Forests
Vegetation zone	VZ1
Conservation status	Does not meet the criteria for the TEC listing under either the BC Act (refer section 5.5) or EPBC Act (refer section 7.1)
Percent cleared	95%
Patch size class	<5%
Area within the site	0.16 ha
Vegetation integrity plots	Q1 (Appendix D)
Current vegetation integrity score	10.6
Landscape position	This vegetation type occurs as landscape plantings and opportunistic regrowth associated with areas fringing the existing Qantas staff carpark. Patches of this vegetation were also recorded within an open Sydney Water drainage channel adjacent to the site. All patches of this vegetation type recorded, do not appear to have any current association with active coastal floodplain processes or periodic influence of saline groundwater. These patches are not considered to occur on natural soils of an active floodplain system.
Species upper stratum	*Casuarina glauca* (Swamp Oak)

PCT 1232 SWAMP OAK FLOODPLAIN SWAMP FOREST, SYDNEY BASIN BIOREGION AND SOUTH EAST CORNER BIOREGION	
Species middle stratum	Native species are absent
Species ground stratum	Native species are absent
Vegetation condition	This vegetation type was recorded in low condition and generally occurs as planted and regrowth even age class stands of *Casuarina glauca* (Swamp Oak). The middle and ground stratum is absent of native species and is dominated by exotic annual and perennials such as *Anredera cordifolia** (Madeira Vine), *Araujia sericifera** (Moth Vine), *Cestrum parqui** (Green Cestrum), *Ehrharta erecta** (Panic Veldtgrass), *Panicum maximum var. maximum** (Guinea Grass), *Parietaria judaica** (Asthma Weed), *Phoenix canariensis** (Canary Island Date Palm), *Ricinus communis** (Castor Oil Plant).

Photo 5.1 *Casuarina glauca* (Swamp Oak) fringing Sydney Water drainage channel

Photo 5.2 PCT 1232 upper stratum cover

Photo 5.3 PCT 1232 *Casuarina glauca* (Swamp Oak) plantings and opportunistic regrowth

Photo 5.4 PCT 1232 opportunistic even age class regrowth

Table 5.3 Comparison of PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion vegetation integrity plot data against PCT condition benchmark data

PLOT	TREE RICHNESS	SHRUB RICHNESS	GRASS RICHNESS	FORB RICHNESS	FERN RICHNESS	OTHER RICHNESS	TREE COVER	SHRUB COVER	GRASS COVER	FORB COVER	FERN COVER	OTHER COVER	LENGTH TIMBER	LEAF LITTER	LARGE TREE	VEGETATION INTEGRITY SCORE
BM[1]	5	10	7	6	2	5	24	19	57	3	2	2	44	44	5	100
Q1[2]	1	0	0	0	0	0	40	0	0	0	0	0	0	52	0	10.6

(1) Benchmark data for equivalent community in NSW Sydney Basin IBRA Bioregion; Vegetation Type - PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion; Keith Formation: KF_CH9 Forested Wetlands; Keith Class: Coastal Swamp Forests; source (NSW BioNet Vegetation Classification database accessed February 2019 and cross referenced with Biodiversity Assessment Method Calculator)

(2) BAM vegetation integrity plot data is presented in Appendix D with raw field data sheets shown in Appendix E

5.3 NON-NATIVE VEGETATION

5.3.1 MISCELLANEOUS ECOSYSTEM – URBAN EXOTIC / NATIVE LANDSCAPE PLANTINGS

This non-native vegetation type is the result of landscape plantings that have occurred throughout the site (about 0.29 hectares). The distribution of this vegetation type is shown in Figure 5.1 with photographic representation provided in Photo 5.5 to Photo 5.7.

The dominant planted species include; *Platanus x hybrida** (London Plane Tree), *Platanus orientalis** (Oriental Plane), *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Lophostemon confertus* (Brush Box), *Schinus ariera** (Peppercorn Tree), *Eucalyptus saligna* (Blue Gum), *Eucalyptus scoparia* (Wallangarra White Gum), *Corymbia maculata* (Spotted Gum) *Casuarina cunninghamiana* (River Oak) and *Casuarina glauca* (Swamp Oak).

Photo 5.5 Planted *Lophostemon confertus* (Brush Box) specimens

Photo 5.6 A planted specimen of *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Photo 5.7 Widespread plantings *Platanus x hybrida** (London Plane Tree) throughout the Qantas staff carpark

5.4 PRIORITY WEEDS

During field surveys, 65 species of plant were recorded. Of these 24 were native and 41 were introduced species (refer to Appendix C).

Of the 41 introduced species recorded within the project, five species were listed under the NSW *Biosecurity Act 2015* as priority weeds for the Greater Sydney region (Department of Primary Industries, 2019a) whilst three are also listed as Weeds of National Significance (Australian Weeds Committee, 2019). All priority weeds identified and species listed as Weeds of National Significance are outlined below in Table 5.4.

Table 5.4 Priority weeds and weeds of national significant recorded

SCIENTIFIC NAME	COMMON NAME	DUTY UNDER THE BIOSECURITY ACT	WEED OF NATIONAL SIGNIFICANCE?
*Anredera cordifolia**	Madeira Vine	Prohibition on dealings: Must not be imported into the State or sold	Yes
*Asparagus aethiopicus**	Ground Asparagus	Prohibition on dealings: Must not be imported into the State or sold	Yes
*Cestrum parqui**	Green Cestrum	Regional Recommended Measure: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment.	No
Olea europaea subsp. *cuspidata**	African Olive	Regional Recommended Measure: The Greater Sydney region is classified as the core infestation area. Whole region: The plant or parts of the plant are not traded, carried, grown or released into the environment. Core infestation area: Land managers prevent spread from their land where feasible. Land managers reduce impacts from the plant on priority assets.	No
*Senecio madagascariensis**	Fireweed	Prohibition on dealings: Must not be imported into the State or sold	Yes

5.5 THREATENED ECOLOGICAL COMMUNITIES

One candidate threatened ecological community listed under the BC Act was considered based on the occurrence of PCT 1232, being Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. A comparison of BC Act-listed Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions final determination criteria and associated PCT 1232 is provided in Table 5.5. Based on landform, altitudinal range, soils, geology and vegetation structure the recorded patches of PCT 1232 are not considered to meet the BC Act listing for this threatened ecological community.

Table 5.5 Comparison of BC Act-listed Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions final determination criteria and associated PCT 1232

TEC & PCT	BIOREGION	LANDFORM AND ALTITUDINAL RANGE	SOIL / GEOLOGY	STRUCTURE	SPECIES ASSEMBLAGE
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Threatened Ecological Community	North Coast, Sydney Basin and South East Corner bioregions	It generally occupies low-lying parts of floodplains, alluvial flats, drainage lines, lake margins and fringes of estuaries; habitats where flooding is periodic and soils show some influence of saline ground water.	Alluvium; silts, clay-loams and sandy loams.	The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees.	Dominated by a tree canopy of either *Casuarina glauca* or, more rarely, *Melaleuca ericifolia* with or without subordinate tree species; the relatively low abundance of Eucalyptus species; and the prominent groundcover of forbs and graminoids. There are 45 characteristic species listed for this community. The total species list of the community is larger with many species present at a small number of sites or in low abundance.
PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Sydney Basin	Occurs as regrowth from fill material that is not subject to floodplain processes or periodic influence of saline groundwater.	This vegetation type was recorded from areas subject to historic filling and disturbance and does not occur on naturally occurring soil profiles.	This vegetation type was recorded as regrowth *Casuarina glauca* (Swamp Oak) only and lacked any floristic structure in both the middle and ground stratum	Tree canopy dominated by *Casuarina glauca* (Swamp Oak) but no other diagnostic species were recorded.
Comparison	Meets criterion	Does not meet criterion	Does not meet criterion	Does not meet criterion	Partially meets criterion
Outcome					**Does not meet BC Act listing**

6 THREATENED SPECIES

6.1 THREATENED FLORA

6.1.1 POTENTIAL HABITAT FOR THREATENED FLORA SPECIES

In general, the site has been identified to provide limited potential habitat for threatened flora species. The overall likelihood of occurrence for the 19 threatened flora species that are known or predicted to occur within the locality have been assessed as low (Appendix A).

Given patches of PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion are highly disturbed and provide limited habitat for threatened flora species the likelihood of future threatened flora recruitment within the site is also considered low.

Non-native vegetation is a prescribed matter under Reg 6.1 of the *Biodiversity Conservation Regulation 2017* and section 6.7 of the BAM and requires the consideration of impacts on any biodiversity values. The non-native vegetation types recorded within the site are considered to provide limited to no potential habitat for threatened flora species.

Based on the long history of disturbance (including site regrading and carpark construction), the overall likelihood of occurrence for the 19 threatened flora species that are known or predicted to occur within the locality have been assessed as low (Appendix A).

6.1.2 THREATENED FLORA CANDIDATE SPECIES

Overall, two threatened flora species were considered as candidate species as part of this BDAR. These species were identified based on the BAM candidate species report for the project (Appendix F). A brief overview of survey and likelihood assessment results for each threatened flora candidate species is presented in Table 6.1.

Table 6.1 Threatened flora candidate species assessment results

SCIENTIFIC NAME	COMMON NAME	SURVEY MONTH	PRESENCE	JUSTIFICATION
Melaleuca biconvexa	Biconvex Paperbark	All year	No – (surveyed)	This species has not been recorded within the project locality. Within the site, documented potential habitat identified by the BAM calculator occurs in the form of PCT 1232. *Melaleuca biconvexa* is readily identifiable based on leaf morphology. No individuals of this species were recorded during targeted surveys. Given this, *Melaleuca biconvexa* is not considered affected by the project and as such no further consideration or assessment of this species is deemed warranted.

6.1.3 AFFECTED THREATENED FLORA

The project is considered unlikely to impact on threatened flora species or their habitats and as such no species are considered affected in terms of project impacts and BAM calculations.

6.2 FAUNA HABITATS

Fauna habitats identified within the site include several small patches of low condition PCT 1232 Swamp Oak floodplain swamp forest and urban exotic / native landscape plantings. The patches dominated by Swamp Oak, which often occurred in single age-class stands, lacked any large hollow-bearing trees with habitat being generally restricted to common bird species that would forage and roost in this habitat type. These would include species such as the Noisy

Miner (*Manorina melanocephala*), Red-browed Finches (*Neochmia temporalis*), Superb Fairy-wrens (*Malurus suberbus*) and Australian Magpies (*Cracticus tibicen*).

Landscape plantings include native species such as *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Lophostemon confertus* (Brush Box), *Eucalyptus saligna* (Blue Gum), *Eucalyptus scoparia* (Wallangarra White Gum), *Corymbia maculata* (Spotted Gum), *Casuarina cunninghamiana* (River Oak) *and Casuarina glauca* (Swamp Oak). These landscape plantings provide some nectar and seed resources for fauna. However, it is likely that these resources would only be intermittently utilised in seasonal periods when resources are available. Due to the small amount of potential resources available and the site's isolated nature, it is unlikely that the native plantings within the site are highly relied upon by locally occurring fauna. No hollow-bearing trees were identified within the site.

Overall the fauna habitat is in a poor condition due to many habitat elements having been lost (i.e. old growth trees, fallen timber, rocky habitat etc.) and tree canopies are highly fragmented. Habitat linkages with other remnant ecosystems in the landscape are severely compromised by extensive clearing in the past.

6.3 THREATENED FAUNA SPECIES

Background investigations identified 38 threatened fauna species (BC Act) as having been previously recorded or are predicted to occur within the locality (Appendix B). The likelihood of these species occurring within the site was determined based on field investigations and fauna habitat available. No threatened fauna has been identified to have a moderate – high likelihood to occur. No threatened fauna was identified utilising the site during field surveys.

6.3.1 PREDICTED THREATENED FAUNA

Based on the vegetation types and habitat resources present within the site, the BAM calculator generates a list of threatened fauna species that are predicted to utilise the site (Appendix F). Habitat assessments during field surveys and review of existing information was used to refine the list of predicted species Table 6.2. The BAM does not require targeted surveys for these species. Based on the poor condition class of PCT 1232, these predicted threatened fauna species are considered to have a low likelihood of occurrence within the site (Appendix B) and are only likely to periodically fly over the site or intermittently utilise limited foraging resources available. The site is not considered important to the life cycle of any predicted species associated with poor condition class PCT 1232.

Table 6.2 Predicted threatened fauna that may periodically occur in the site

COMMON NAME	SCIENTIFIC NAME	PCT ASSOCIATION
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Eastern Freetail-bat	*Mormopterus norfolkensis*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Gang-gang Cockatoo	*Callocephalon fimbriatum*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Grey-headed Flying-fox	*Pteropus poliocephalus*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Little Bentwing-bat	*Miniopterus australis*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Little Lorikeet	*Glossopsitta pusilla*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

6.3.2 CANDIDATE FAUNA SPECIES CREDIT SPECIES

Threatened species that cannot reliably be predicted to occur in a site based on PCT, distribution and habitat criteria are identified by the Threatened Biodiversity Data Collection as 'species credit species'. The credit calculator processes geographic, vegetation and habitat data collected for the site to generate a list of the candidate threatened species that requiring additional assessment (Appendix F). Searches of threatened species databases were also completed to determine any further species to those generated by the credit calculator that are known or predicted to occur in the locality (Appendix B).

Based on desktop assessment and field validated habitat assessments the site does not provide suitable habitat features such that any candidate species would be considered affected by the project. A list of candidate species generated by the BAM calculator are presented in Table 6.3.

Table 6.3 Potential candidate fauna species credit species not on site

COMMON NAME	SCIENTIFIC NAME	PRESENCE	SUITABLE HABITAT
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	No	No cave habitat present for breeding
Eastern Osprey	*Pandion cristatus*	No	No raptor nests present
Glossy Black-cockatoo	*Calyptorhynchus lathami*	No	No, this species needs larger patches and more intact landscape for breeding
Green and Golden Bell Frog	*Litoria aurea*	No	No optimal habitat present in the form of water-bodies that are unshaded, have a grassy area nearby and diurnal sheltering sites available
Green-thighed Frog	*Litoria brevipalmata*	No	Outside known distribution. No suitable habitat present
Grey-headed Flying Fox	*Pteropus poliocephalus*	No	No breeding camp present.
Little Bentwing-bat	*Miniopterus australis*	No	No cave habitat present for breeding
Regent Honeyeater	*Anthochaera phrygia*	No	No important area of foraging habitat present
Southern Myotis	*Myotis macropus*	No	No, there are no records of the species in the last 30 years associated the lower Cooks River area (OEH 2019c). The project will not impact on culverts, caves or hollow trees within 200 metres of a water body of 3 metres width or greater
Swift Parrot	*Lathamus discolor*	No	No important area of foraging habitat present
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	No	No raptor nests present

6.3.3 AFFECTED THREATENED FAUNA

The project is considered unlikely to impact on threatened fauna species or their habitats and as such no species are considered affected in terms of project impacts and BAM calculations.

6.4 THREATENED AQUATIC SPECIES

The site does not contain any mapped watercourses or permanent water bodies that would provide habitat for any listed threatened aquatic species under the FM Act.

An inspection of open Sydney Water drainage channel that bisects the site, identified the channel to be concrete lined and exhibits little in the way of suitable habitat for any listed threatened aquatic species under the FM Act. This drainage channel will not be directly or indirectly impacted upon by the project.

7 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

7.1 THREATENED ECOLOGICAL COMMUNITIES

The protected matters search conducted for this project identified eleven predicted threatened ecological communities as potentially occurring within the locality. These communities are:

- Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community
- Coastal Upland Swamps in the Sydney Basin Bioregion
- Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion
- Eastern Suburbs Banksia Scrub of the Sydney Region
- Littoral Rainforest and Coastal Vine Thickets of Eastern Australia
- *Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion
- Shale Sandstone Transition Forest of the Sydney Basin Bioregion
- Subtropical and Temperate Coastal Saltmarsh
- Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion
- Western Sydney Dry Rainforest and Moist Woodland on Shale

Of these, one threatened ecological community listed under the EPBC Act, being Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community, was considered as a candidate to occur within the site. An overview and analysis of this ecological community against recorded field data and the conservation listing advice is provided in section 7.1.1 below.

7.1.1 COASTAL SWAMP OAK (CASUARINA GLAUCA) FOREST OF NEW SOUTH WALES AND SOUTH EAST QUEENSLAND ECOLOGICAL COMMUNITY

Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community is listed as endangered under the EPBC Act.

Within the site, the following PCT was considered a candidate to form part of this EPBC Act threatened ecological community listing:

- PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

To be considered a Matter of National Environmental Significance (MNES), areas or patches of PCT 1232 must meet both:

- the key diagnostic characteristics AND
- at least the minimum condition thresholds for Category C.

An overview of key diagnostics of the EPBC Act-listed community against candidate PCT 1232 is presented in Table 7.1.

Table 7.1 Comparison of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community key diagnostics against candidate PCT 1232

KEY DIAGNOSTIC	PCT 1232 - LOW
Occurs from south-east Queensland to southern NSW within the South-Eastern Queensland, NSW North Coast, Sydney Basin, or South East Corner bioregions	Yes, the site occurs within the Sydney Basin Bioregion
Occurs in coastal catchments at elevations up to 50 m ASL, typically less than 20 m ASL, on coastal flats, floodplains, drainage lines, lake margins, wetlands and estuarine fringes where soils are at least occasionally saturated, water-logged or inundated. There are also minor occurrences on coastal dune swales or flats, particularly deflated dunes and dune soaks.	No, all patches were recorded as planted specimens or regrowth growing from fill material of generally unknown origin. These areas of fill are not considered to form part of a natural floodplain system.
Occurs on soils derived from unconsolidated sediments (including alluvium), typically hydrosols (grey-black clay-loam and/or sandy loam soils) and sometimes organosols (peaty soils). It may occur in transitional soils (or catenas) where shallow unconsolidated sediments border lithic substrates.	No, all patches were recorded as plantings or regrowth growing from fill material of generally unknown origin. No intact undisturbed soil profiles are considered to be associated with patches of PCT1232 recorded within the site.
Has an open woodland, woodland, forest, or closed forest structure, with a tree canopy that has a total crown cover of at least 10 per cent.	Yes - does contain a total crown cover of >10%.
Has a canopy of trees dominated by *Casuarina glauca* (swamp-oak, swamp she-oak).	Yes - *Casuarina glauca* forms a dominant canopy
Does this condition type meet the EPBC Act listed of Coastal Swamp Oak (*Casuarina glauca*) Forest key characteristics?	**No, based on the lack of suitable geomorphology and natural soil profile no patches of PCT 1232 are considered to meet EPBC Act key diagnostic and as such no patches meet the EPBC Act listed form of Coastal Swamp Oak (*Casuarina glauca*) Forest**

Based on a comparison of candidate PCT 1232 against key diagnostic data in Table 7.1, none of the areas mapped as PCT 1232 within the site meet the EPBC Act listing of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community.

7.2 THREATENED SPECIES

7.2.1 THREATENED FLORA SPECIES

The protected matters search conducted for this project identified 17 predicted threatened flora species as potentially occurring within the locality. The results of the field surveys and likelihood of occurrence assessments have determined these species to have a low likelihood of occurrence and are not considered to be affected by the project (Appendix A).

7.2.2 THREATENED FAUNA SPECIES

The protected matters search conducted for this project identified 59 EPBC listed threatened fauna species that have been previously recorded or have the potential to occur within the locality (Appendix B). The likelihood of these species

occurring within the site was determined based on field investigations and fauna habitat available. No EPBC listed threatened fauna species have been identified to have a moderate – high likelihood to occur. No threatened fauna was identified utilising that site during field surveys. Whilst the Grey-headed Flying-fox (*Pteropus poliocephalus*) is considered to have a low likelihood of site habitat utilisation, it is recognised that the site does contain a small number of Eucalypt and Melaleuca specimens that may provide occasional foraging opportunities for this species.

7.3 MIGRATORY SPECIES

Migratory species are protected under international agreements to which Australia are a signatory, including Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA), Republic of Korea-Australia Migratory Bird Agreement (RoKAMBA) and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Migratory species are considered MNES and are protected under the EPBC Act.

Based on field investigations, EPBC Protected Matters area search and other desktop database searches, 40 migratory fauna species were identified that could occur within the locality. Based on field investigations and habitat assessments none of these have a moderate – high likelihood to utilise the site, due to the site's isolated and disturbed nature.

The habitats within the site are unlikely to constitute important habitat for any of the identified species. The habitat present is unlikely to support significant proportions of the population of any migratory species nor are the habitats critical to any life stage of these species. Due to their mobile nature, the mentioned species are likely to utilise higher quality habitat within the greater locality and where more extensive tracts of native vegetation occur. Because of this, the identified species are not considered to be impacted by the project and are not considered further in this report.

8 AVOID AND MINIMISING IMPACTS ON BIODIVERSITY VALUES

8.1 MEASURES TO AVOID IMPACTS

Given the site contains overall limited biodiversity values, the positioning of the project was not considered to warrant any specific avoidance or mitigation measures.

Limited biodiversity values associated with open Sydney Water drainage channel are unlikely to be affected by any direct or indirect impacts associated with the project and will be retained in their current state.

8.2 RECOMMENDED MEASURES TO MINIMISE IMPACTS

A Construction Environmental Management Plan (CEMP) would be required for the construction phase of the project. The CEMP would include, as a minimum, industry-standard measures for the management of soil, surface water, weeds and pollutants, as well as site-specific measures, including the procedures outlined below. The proposed mitigation measures would include environmental safeguards for protection of neighbouring properties and waterways in accordance with relevant policy documentation and Government guidelines.

Mitigation measures are detailed in section 10.

9 ASSESSMENT OF IMPACTS

9.1 ASSESSMENT OF IMPACTS ON NATIVE VEGETATION AND THREATENED SPECIES HABITAT

9.1.1 NATIVE VEGETATION

The project will result in a direct or indirect impact on any area of native vegetation or associated PCT as outlined under section 9.1 of the BAM.

Most the vegetation to be removed for the project is not native vegetation and comprises exotic plants or planted, often non-indigenous, native species on fill material. Construction within these areas would remove a small number of individuals of non-threatened native plants, including planted trees, and priority and environmental weeds within highly modified habitat that does not support a native vegetation community.

Within the site, several small patches of Swamp Oak plantings and regrowth were recorded, this vegetation provides marginal habitat for a small number of highly mobile common fauna species. Native vegetation and habitat within the site is in low condition and features impacts from existing development, edge effects, weed infestation, and exotic pests.

In total project impact on native vegetation is summarised in Table 9.1 and shown in Figure 9.1.

Table 9.1 Development footprint impacts on native vegetation types

NON-NATIVE VEGETATION TYPE	THE SITE (HA)	THE PROJECT (HA)
PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	0.16	0.07
Total	**0.16**	**0.07**

9.1.2 THREATENED FLORA SPECIES

No threatened flora species or their habitat, listed under BC Act, have been determined to be affected by the project.

9.1.3 THREATENED FAUNA SPECIES

No threatened fauna species or their habitat, listed under BC Act, have been determined to be affected by the project.

9.1.4 INDIRECT IMPACTS ON NATIVE VEGETATION

Given the highly disturbed nature of the site and lack of any substantial patches of native vegetation adjoin the site, the potential for indirect impacts is limited and would be suitably managed through the appropriate mitigation measures (see section 10).

9.2 SERIOUS AND IRREVERSIBLE IMPACTS

9.2.1 THREATENED ECOLOGICAL COMMUNITIES

No Serious and Irreversible Impacts to threatened ecological community entities under the BC Act will be impacted by the project.

9.2.2 THREATENED SPECIES

No Serious and Irreversible Impacts to threatened species entities under the BC Act will be impacted by the project.

9.3 PRESCRIBED BIODIVERSITY IMPACTS

Prescribed biodiversity impacts are outlined under section 9.2 of the BAM and addressed below.

9.3.1 AREAS OF GEOLOGICAL SIGNIFICANCE

No areas of geological significance are present. No caves which may provide potential breeding habitat for bats were recorded.

9.3.2 HUMAN MADE STRUCTURES AND NON-NATIVE VEGETATION

No human made structures have been identified within the site that would provide suitable habitat for any threatened species.

One non-native vegetation type has been recorded within the project impact area. This non-native vegetation type and extent within the site and the project impact area is outlined in Table 9.2 and shown in Figure 9.1.

Table 9.2 Development footprint impacts on non-native vegetation types

NON-NATIVE VEGETATION TYPE	THE SITE (HA)	THE PROJECT (HA)
Miscellaneous ecosystem – urban exotic / native landscape plantings	0.29	0.23
Total	**0.29**	**0.23**

Based on targeted field surveys and habitat assessments, this non-native vegetation type has been assessed as providing limited to no habitat for any threatened species listed under the BC Act.

9.3.3 CONNECTIVITY AND MOVEMENT

The site is isolated from any large patches of native remnant vegetation and is surrounded by industrial development. Given this, the project is not considered likely to adversely impact wildlife connectivity or movement in the locality.

9.3.4 HYDROLOGY

The project will not result in any adverse changes to the local hydrology and the project has been designed to maintained existing compensatory flood storage levels. The project will not directly impact on any watercourse and stormwater management will be appropriately addressed through water sensitive urban design.

During construction, ground surface disturbances have the potential to cause pollution of adjacent waterbodies open Sydney Water drainage channel and as such mitigation measures have been provided in section 10 to address these impacts.

9.3.5 VEHICLE STRIKE

The site is in a busy industrial area within Sydney, subject to high levels of vehicular traffic. Given the existing high levels of daily traffic, the project is unlikely to increase the number of truck movements per day. The project is unlikely to increase the risk of fauna mortality or injury because of vehicle strike. Few terrestrial fauna species occur in the site that are at risk of vehicle strike. The risk of vehicle strike is unlikely to have a substantial impact on any local populations of fauna species.

9.4 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Given the general lack of habitat present and small area of mostly non-native vegetation to be removed, the project is considered unlikely to result in a significant impact on any MNES.

In respect to the Grey-headed Flying-fox (*Pteropus poliocephalus*), whilst it is considered to have a low likelihood of site habitat utilisation, it is recognised that the site does contain a small number of Eucalypt and Melaleuca specimens that may provide occasional foraging opportunities for this species. Given this an assessment of significance has been undertaken for this species (Appendix G). This assessment has concluded that the project is unlikely to result in a significant impact on the Grey-headed Flying-fox (*Pteropus poliocephalus*).

A referral of this project to the Department of the Environment and Energy is not warranted.

9.5 OTHER IMPACTS

9.5.1 GROUNDWATER DEPENDENT ECOSYSTEMS

No groundwater dependent ecosystems have been identified to occur in the site.

PRELIMINARY

332000 332100 332200 332300 332400

6244600 6244500 6244400

KENT ROAD

QANTAS DRIVE

BOURKE ROAD

KING STREET

O'RIORDAN STREET

Legend

- Railway
- Watercourse
- The Site
- The Project
- Building Footprint

Vegetation Types

- PCT1232- Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (Poor Condition)
- Miscellaneous Ecosystem: Urban Exotic/Native Landscape Planting

Map: PS113050_Qantas_GIS_006_A3	Author: Trent.Bowman
Date: 20-Feb-19	Approved by: Julia.Wyllie

0 10 20 m

1:1,300

Coordinate system: GDA 1994 MGA Zone 56
Scale ratio correct when printed at A3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

QANTAS flight training centre

Figure 9.1
The project impact

10 MITIGATION MEASURES AND ENVIRONMENTAL RISK ASSESSMENT

An environmental risk analysis has been conducted to identify potential environmental impacts associated with the project. This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 Risk Management–Principles and Guidelines (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposed development prior to application of any mitigation or management measures.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for 'likelihood' and 'consequence' (Table 10.1).

Table 10.1 Risk descriptors

LIKELIHOOD		**CONSEQUENCE**	
A	Almost certain	1	Widespread and/or irreversible impact
B	Likely	2	Extensive but reversible (within 2 years) impact or irreversible local impact
C	Possible	3	Local, acceptable or reversible impact
D	Unlikely	4	Local, reversible, short term (<3 months) impact
E	Rare	5	Local, reversible, short term (<1 month) impact

The risk levels for likely and potential impacts were derived using the following risk matrix (Table 10.2).

Table 10.2 Risk matrix

		LIKELIHOOD				
		A	B	C	D	E
CONSEQUENCE	1	High	High	Medium	Low	Very Low
	2	High	High	Medium	Low	Very Low
	3	Medium	Medium	Medium	Low	Very Low
	4	Low	Low	Low	Low	Very Low
	5	Very Low	Very Low	Very Low	Very Low	Very Low

The results of the environmental risk assessment for the project are presented in Table 10.3. It is considered that the level of risk to biodiversity is considered generally low and with the mitigation measures required, the impacts resulting from the proposal will be acceptable.

Table 10.3 Risk assessment and mitigation measures

MATTER	POTENTIAL IMPACT	LIKELIHOOD	CONSEQUENCE	RISK LEVEL	PROPOSED MITIGATION MEASURES
Biodiversity Impact	Removal of native vegetation	B	3	Medium	Replanting of landscape areas to incorporate native species (Landscape Plan)
	Impact on threatened flora species	E	3	Very Low	No mitigation is required as the occurrence of any threatened flora species is considered unlikely.
	Impact on threatened fauna species	D	3	Low	No mitigation is required as the occurrence of any threatened flora species is considered unlikely.
	Impact on aquatic habitat	D	4	Low	Best practise erosion and sedimentation controls in accordance with approved CEMP

11 OFFSETTING

Biodiversity offset requirements for the project have been assessed in accordance with the BC Act, FM Act and EPBC Act. No biodiversity offset obligation has been deemed necessary for the project. Details relating to the project biodiversity offset assessment for each legislative control is provided below.

11.1 BC ACT - OFFSET FOR AFFECTED THREATENED BIOTA

Biodiversity offsetting for residual impacts on BC Act biodiversity values is mandatory for SSD projects being assessed under Part 7 of the Act and subject to a BDAR. A biodiversity offset obligation however is not required under the thresholds for the assessment and offsetting of impacts of project on native vegetation and/or threatened species habitat if the vegetation integrity score of the impacted PCT is <17 (sections 10.3.1.1 and 10.3.2.1 of the BAM). In this regard, PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion has been determined under the credit calculator to have a vegetation integrity score of 10.6. Based on this vegetation integrity score the project has been determined to have a biodiversity offset obligation of zero (Appendix F).

11.2 FM ACT - OFFSETTING OF IMPACTS ON KEY FISH HABITATS

The project would not result in impacts to nay area of key fish habitat and as such no offset obligation under the FM Act are deemed warranted.

11.3 EPBC ACT - OFFSET FOR AFFECTED THREATENED BIOTA

The project would not result in a significant impact on any Matters of National Environmental Significance and as such the project would not require an environmental offset under the EPBC Act.

12 CONCLUSION

Limited native vegetation is present within the site given the long history of commercial infrastructure development in the area.

One native vegetation candidate PCT was recorded in the site being:

— PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

In addition, one non-native vegetation type was recorded within the site, being:

— Miscellaneous ecosystem – urban exotic / native landscape plantings

In total, the project would remove about 0.30 hectares of vegetation, comprising 0.07 hectares of PCT 1232 Swamp Oak floodplain swamp forest and 0.23 hectares of Miscellaneous ecosystem – urban exotic / native landscape plantings.

No threatened species, ecological communities or their habitat, listed under the BC Act or EPBC Act, have been determined to be affected by the project.

Biodiversity offsetting for residual impacts on BC Act biodiversity values is mandatory for SSD developments being assessed under Part 7 of the Act and subject to a BDAR. Biodiversity offset obligations have been determined using the BAM calculator as follows:

— No ecosystem credits are required for PCT 1232 as the vegetation integrity score is less than 17

— No species credits are required.

The project is considered unlikely to result in a significant impact on any Matters of National Environmental Significance (MNES). Given this, a referral of this development under the EPBC Act to the Department of the Environment and Energy is not warranted.

13 LIMITATIONS

13.1 SCOPE OF SERVICES

This report has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and WSP (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

13.2 RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

13.3 ENVIRONMENTAL CONCLUSIONS

In accordance with the scope of services, WSP has relied upon the data provided for the preparation of the report. Within the limitations imposed by the scope of services, the surveys and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

13.4 REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the client (and no other party). WSP assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of WSP or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Except as provided below parties other than the client should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

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APPENDIX A

LIKELIHOOD OF OCCURRENCE OF THREATENED FLORA

A1 LIKELIHOOD OF OCCURRENCE OF THREATENED FLORA

A.1 THREATENED FLORA LIKELIHOOD OF OCCURRENCE WITHIN THE SITE

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT ASSOCIATION[3]	NATURE OF RECORD	LIKELIHOOD OF OCCURRENCE
Acacia bynoeana	Bynoe's Wattle	E	V	This species occurs in heath or dry sclerophyll forest on sandy soils and is generally associated with overstorey species such as Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksias and Narrow-leaved Apple.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Acacia bynoeana* within the site is considered unlikely.
Acacia pubescens	Downy Wattle	V	V	Restricted to the Sydney Region from Bilpin to the Georges River and also at Woodford where it usually grows in open sclerophyll forest and woodland on clay soils. Typically it occurs at the intergrade between shales and sandstones in gravely soils often with ironstones.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Acacia pubescens* within the site is considered unlikely.
Acacia terminalis subsp. *terminalis*	Sunshine Wattle	E	E	This species is associated with coastal scrub and dry sclerophyll woodland on sandy soils.	BioNet, PlantNET	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Acacia terminalis* subsp. *terminalis* within the site is considered unlikely.

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SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT ASSOCIATION[3]	NATURE OF RECORD	LIKELIHOOD OF OCCURRENCE
Allocasuarina glareicola	Allocasuarina glareicola	E	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows on lateritic soil in open forest.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Allocasuarina glareicola* within the site is considered unlikely.
Allocasuarina portuensis	Nielsen Park She-oak	E	E	The original known habitat of the Neilsen Park She-oak is at Nielsen Park, in Woollahra local government area. There are no plants left at the original site where it was discovered. However, propagation material has been planted successfully at a number of locations at Nielsen Park and other locations in the local area, e.g. Gap Bluff, Hermit Point and Vaucluse House.	EPBC Act Protected matters search	Low The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Allocasuarina portuensis* within the site is considered unlikely.
Caladenia tessellata	Thick Lip Spider Orchid	E	V	Occurs south of Swansea where it grows on clay loam or sandy soils. Prefers low open forest with a heathy or sometimes grassy understorey. Within NSW, currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Previously known also from Sydney and South Coast areas.	BioNet	Low Two historic records of this species occur within the locality. These records exceed 100 years in date and are located within highly urbanised areas of Marrickville South and Tempe. The local occurrence of this species is considered to be extinct. In addition, the site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Caladenia tessellata* within the site is considered unlikely.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT ASSOCIATION[3]	NATURE OF RECORD	LIKELIHOOD OF OCCURRENCE
Callistemon linearifolius	Netted Bottle Brush	V	-	This species is associated with dry sclerophyll forest on the coast and adjacent ranges.	BioNet, PlantNET	Low There are 3 known records of this species within the locality (OEH 2018). These records occur to the east of the site at Phillip Bay and La Perouse. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Callistemon linearifolius* within the site is considered unlikely.
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Occurs south from the Gibraltar Range, chiefly in coastal districts but also extends on to tablelands. Grows in swamp-heath and drier forest on sandy soils on granite & sandstone. Occurs in small, localised colonies most often on the flat plains close to the coast but also known from some mountainous areas growing in moist depressions and swampy habitats.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Cryptostylis hunteriana* within the site is considered unlikely.
Genoplesium baueri	Yellow Gnat-orchid	E	E	Grows in dry sclerophyll forest and moss gardens over sandstone. The species has been recorded from locations between Ulladulla and Port Stephens (OEH 2018).	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Genoplesium baueri* within the site is considered unlikely.
Melaleuca biconvexa	Biconvex Paperbark	V	V	Occurs as disjunct populations in coastal New South Wales from Jervis Bay to Port Macquarie, with the main concentration of records is in the Gosford/Wyong area. Grows in damp places, often near streams, or low-lying areas on alluvial soils of low slopes or sheltered aspects.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Melaleuca biconvexa* within the site is considered unlikely.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT ASSOCIATION[3]	NATURE OF RECORD	LIKELIHOOD OF OCCURRENCE
Pelargonium sp. Striatellum	Omeo Stork's-bill	E	E	Known from only 4 locations in NSW, with three on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. The only other known population is at Lake Omeo, Victoria. It has a narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities. It occurs on sandy soils or gravelly soils or amongst rocks.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Pelargonium* sp. Striatellum within the site is considered unlikely.
Persoonia hirsuta	Hairy Geebung	E	E	The species is distributed from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. It has a large area of occurrence, but occurs in small populations. Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone or very rarely on shale. Often occurs in areas with clay influence, in the ecotone between shale and sandstone.	BioNet, EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Persoonia hirsuta* within the site is considered unlikely.
Pimelea curviflora var. *curviflora*	Pimelea curviflora var. curviflora	V	V	Confined to coastal areas around Sydney where it grows on sandstone and laterite soils. It is found between South Maroota, Cowan, Narrabeen, Allambie Heights, Northmead and Kellyville, but its former range extended south to the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly. Usually occurs in woodland in the transition between shale and sandstone, often on Lucas Heights soil landscape.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Pimelea curviflora* var. *curviflora* within the site is considered unlikely.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT ASSOCIATION[3]	NATURE OF RECORD	LIKELIHOOD OF OCCURRENCE
Pimelea spicata	Spiked Rice-flower	E	E	This species occurs in two disjunct areas: in coastal districts from Lansdowne to Shellharbour, and in Cumberland Plain Woodland inland to Penrith. In western Sydney it grows on Wianamatta Shales in Greybox - Ironbark Woodland with Bursaria spinosa and Themeda australis. In the Illawarra, it occurs on well structured clay soils in grassland or open woodland.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Pimelea spicata* within the site is considered unlikely.
Pterostylis saxicola	Sydney Plains Greenhood	E	E	Known now only from Freemans Reach to Picton district. Grows in Sydney Sandstone Gully Forest in shallow or skeletal soils over sandstone shelves, often near streams.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Pterostylis saxicola* within the site is considered unlikely.
Pterostylis sp. Botany Bay	Botany Bay Bearded Greenhood	E	E	This species favours moist level sites on skeletal sandy soils derived from sandstone. It is associated with coastal heath vegetation dominated by *Melaleuca nodosa* and *Baeckea imbricata.*	EPBC Act Protected matters search	Low The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Pterostylis* sp. Botany Bay within the site is considered unlikely.
Senecio spathulatus	Coast Groundsel	E	-	Grows on frontal dunes and recorded from Nadgee Nature Reserve (Cape Howe) and between Kurnell in Sydney and Myall Lakes National Park (with a possible occurrence at Cudmirrah). In Victoria there are scattered populations from Wilsons Promontory to the NSW border.	BioNet	Low The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Senecio spathulatus* within the site is considered unlikely.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT ASSOCIATION[3]	NATURE OF RECORD	LIKELIHOOD OF OCCURRENCE
Syzygium paniculatum	Magenta Lilly Pilly	E	E	Occurs between Bulahdelah and St Georges Basin where it grows in subtropical and littoral rainforest on sandy soils or stabilized dunes near the sea. 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.	BioNet, EPBC Act Protected matters search	Low The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Syzygium paniculatum* within the site is considered unlikely.
Thesium australe	Austral Toadflax	V	V	Grows in grassland or woodland often in damp sites. It is a semi-parasitic herb and hosts are likely to be Themeda triandra (Syn. Themeda australis and Poa spp.	EPBC Act Protected matters search	Low This species has not been recorded within the locality. The site does not contain associated habitat attributes such as vegetation formation, floristic assemblage or geological substrate. The occurrence of *Thesium australe* within the site is considered unlikely.

(1) Listed as Vulnerable (V), Endangered (E) or Critically Endangered (CE) under the NSW *Biodiversity Conservation Act 2016* (BC Act).

(2) Listed as Vulnerable (V), Endangered (E) or Critically Endangered (CE) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

(3) Habitat association data derived from BioNet (Office of Environment & Heritage 2018).

APPENDIX B

LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA

B1 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA

B.1 THREATENED FAUNA LIKELIHOOD OF OCCURRENCE WITHIN THE SITE

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Amphibians (3)						
Crinia tinnula	Wallum Froglet	V		Occurs along coast from south-eastern Queensland to Sydney. Mostly associated with swamps, dams and flooded roadside ditches, usually in heathland, where it is confined to acid, paperbark swamps and sedge swamps of the 'wallum' country. Males call any time of year. Breed in late winter.	Bionet	Low – no suitable habitat identified within the site
Heleioporus australiacus	Giant Burrowing Frog	V	V	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Breeding habitat of this species is generally soaks or pools within first or second order streams. Species is dependent on hanging swamps on the top of sandstone plateaus and deeply dissected gullies that occur as erosion features in the Sydney Basin.	EPBC	Low – no suitable habitat identified within the site

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SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Litoria aurea	Green and Golden Bell Frog	E1	V	Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available.	Bionet, EPBC	Low – the site does not contain ponds of open water or basking habitat in the form of rocks or logs. There is a lack of any recent records in the locality with the Botany Wetland population being generally accepted to be extinct locally.
Birds (56)						
Actitis hypoleucos	Common Sandpiper		M	The Common Sandpiper frequents a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity. It is mostly encountered along muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Anthochaera phrygia (syn. Xanthomyza phrygia)	Regent Honeyeater	CE	EM	Inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. It inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. It feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany.	Bionet, EPBC	Low – no suitable habitat identified within the site
Apus pacificus	Fork-tailed Swift		M	Breeds in the northern hemisphere, wintering south to Australia. It is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. It mostly occurs over inland plains but sometimes above foothills or in coastal areas over cliffs, beaches, islands and well out to sea. It also occurs over towns and cities. It mostly occurs over dry and/or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, grassland, spinifex sandplains, farmland and sand-dunes. It sometimes occurs above forests. It probably roosts aerially, but has occasionally been observed to land.	EPBC	Low – although species may use aerial spaces above subject site is unlikely to occur within terrestrial vegetation within the site.
Arenaria interpres	Ruddy Turnstone		M	Occurs at beaches and coasts with exposed rock, stony or shell beaches, mudflats, exposed reefs and wave platforms.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Bionet	Low – marginal habitat within the site.
Botaurus poiciloptilus	Australasian Bittern	E1	E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Calidris (Crocethia) alba	Sanderling	V	M	The Sanderling occurs in coastal areas around Australia. Inland records have occurred in most states of singles or small groups, birds probably on migration. In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. Sanderlings also occur on beaches that may contain wave-washed rocky outcrops. Less often the species occurs on more sheltered sandy shorelines of estuaries, inlets and harbours. Rarely, they are recorded in near-coastal wetlands, such as lagoons, hypersaline lakes, saltponds and samphire flats. There are rare inland records from sandy shores of ephemeral brackish lakes and brackish river-pools.	Bionet, EPBC	Low – no suitable habitat identified within the site
Calidris acuminata	Sharp-tailed Sandpiper		M	Occurs in a variety of habitats: tidal mudflat, mangrove swamps, saltmarshes, shallow fresh, brackish, salt inland swamps and lakes; flooded and irrigated paddocks, sewage farms and commercial saltfields.	EPBC	Low – no suitable habitat identified within the site
Calidris canutus	Red Knot		EM	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps.	EPBC	Low – no suitable habitat identified within the site
Calidris ferruginea	Curlew Sandpiper	E1	M	Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes.	Bionet, EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Calidris melanotos	Pectoral Sandpiper		M	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species frequents coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. It is usually found in coastal or near coastal habitat but occasionally further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. It has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands.	EPBC	Low – no suitable habitat identified within the site
Calidris ruficollis	Red-necked Stint		M	Mostly found in coastal areas, including sheltered inlets, bays lagoons and estuaries. They also occur in shallow wetlands near the coast or inland, including lakes, waterholes and dams. They forage in mudflats, shallow water, sandy open beaches, flooded paddocks and in samphire feeding along the edges. The species roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle. Occasionally they roost on exposed reefs or shoals and amongst seaweed, mud and cow-pats. During high tides they may also use sand dunes and claypans.	EPBC	Low – no suitable habitat identified within the site
Calidris tenuirostris	Great Knot	V	CEM	Generally a coastal species found on tidal mudflats and sandy ocean shores. A migratory species visiting Australian waters between September and March.	Bionet, EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta*, and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites.	Bionet	Low – marginal habitat within the site.
Charadrius bicinctus	Double-banded Plover		M	The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. It is sometimes associated with coastal lagoons, inland saltlakes, exposed seagrass beds, exposed reefs and rock platforms and coastal sand dunes.	EPBC	Low – no suitable habitat identified within the site
Charadrius leschenaultii	Greater Sand Plover	V	VM	Entirely coastal in NSW foraging on intertidal sand and mudflats in estuaries, and roosting during high tide on sand beaches or rocky shores. A migratory species it is found in New South Wales generally during the summer months.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Charadrius mongolus	Lesser Sand Plover	V	EM	Migratory bird that migrates from the northern hemisphere to coastal areas of northern and east coast of Australia. The species is almost strictly coastal during the non-breeding season, preferring sandy beaches, mudflats of coastal bays and estuaries, sand-flats and dunes near the coast, occasionally frequenting mangrove mudflats (IUCN Redlist entry).	Bionet, EPBC	Low – no suitable habitat identified within the site
Charadrius veredus	Oriental Plover		M	Oriental Plovers are found in coastal habitats, including estuarine mudflats and sandbanks, on sandy or rocky ocean beaches, nearby reefs, or near-coastal grasslands. They also disperse further inland inhabiting flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps. Oriental Plovers may move to lightly wooded grasslands in wet season and sometimes roost on soft wet mud or in shallow waters of ocean or mudflats, and also occasionally in dry, open habitats, such as saltmarsh or paddocks.	EPBC	Low – no suitable habitat identified within the site
Cuculus opatus (syn. Cuculus saturatus)	Oriental Cuckoo, Himalayan Cuckoo		M	A non-breeding migrant to Australia, it often inhabits rainforest, vine thickets, wet sclerophyll forest and open woodland and sometimes occurs in mangroves, wooded swamps and as vagrants in gardens. The population trend appears to be stable.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Dasyornis brachypterus	Eastern Bristlebird	E1	E	The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia. There are three main populations: Northern - southern Queensland/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. 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.	EPBC	Low – no suitable habitat identified within the site
Gallinago hardwickii	Latham's Snipe		M	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Epthianura albifrons	White-fronted Chat	E		The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Two isolated sub-populations of White-fronted Chats are currently known from the Sydney Metropolitan Catchment Management Authority (CMA) area; one at Newington Nature Reserve on the Parramatta River and one at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated from each other by 25 km of urbanised land, across which the Chats are unlikely to fly. The nearest extant populations outside Sydney Metropolitan CMA are at Ash Island north of Newcastle and Lake Illawarra, south of Wollongong. White-fronted Chats were previously recorded at Penrith Lakes (2001), Hawkesbury Swamps (2002), Tuggerah Lake (1997) and Lake Macquarie (1998).	Bionet	Low – no suitable habitat identified within the site
Gallinago megala	Swinhoe's Snipe		M	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens. Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Gallinago stenura	Pintail Snipe		M	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands.	EPBC	Low – no suitable habitat identified within the site
Grantiella picta	Painted Honeyeater	V	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	EPBC	Low – no suitable habitat identified within the site
Haematopus fuliginosus	Sooty Oystercatcher	V		The Sooty Oystercatcher is found on rocky headlands, rock shelves, exposed reefs with rock pools, beaches and muddy estuaries. The species forages on exposed intertidal rocky shorelines at low tide. It breeds almost exclusively on offshore islands, and occasionally on isolated promontories during spring and summer. They nest on the ground in amongst rocks, seaweed, shells and pebbles.	Bionet	Low – no suitable habitat identified within the site
Haematopus longirostris	Australian Pied Oystercatcher	E1		The species is distributed around the entire Australian coastline, although it is most common in coastal Tasmania and parts of Victoria, such as Corner Inlet. In NSW the species is thinly scattered along the entire coast, with fewer than 200 breeding pairs estimated to occur in the State. Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas.	Bionet	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	Ma	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.	Bionet	Low – no suitable habitat identified within the site. May occur flying over the site whilst foraging in greater locality.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Hirundapus caudacutus	White-throated Needletail		M	Widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. It is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes.	EPBC	Low - although species may use aerial spaces above subject site is unlikely to occur within terrestrial vegetation within the site.
Lathamus discolor	Swift Parrot	E1	CE	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees 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 Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.	Bionet, EPBC	Low – marginal habitat within the site. Irregular/sporadic occurrences during seasonal movements may occur, although potential habitat is limited to a small number of planted Spotted Gums.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Limicola falcinellus	Broad-billed Sandpiper	V	M	A migratory species that breeds in the northern hemisphere between June and August. Individuals feed both on exposed mudflats and while wading in water.	Bionet, EPBC	Low – no suitable habitat identified within the site
Limosa lapponica	Bar-tailed Godwit		M	The Bar-tailed Godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria, including the offshore islands. Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	EPBC	Low – no suitable habitat identified within the site
Limosa limosa	Black-tailed Godwit	V	M	A coastal species found on tidal mudflats, swamps, shallow river margins and sewage farms. Also found inland on larger shallow fresh or brackish waters. A migratory species visiting Australia between September and May.	Bionet	Low – no suitable habitat identified within the site
Monarcha melanopsis	Black-faced Monarch		M	Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating.	EPBC	Low –marginal habitat available in the site.
Monarcha trivirgatus	Spectacled Monarch		M	Occurs in the understorey of mountain/lowland rainforests, thickly wooded gullies and waterside vegetation. Migrates to NE NSW in summer to breed.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Motacilla flava	Yellow Wagtail		M	This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams. This species migrates from Asia to Australia in spring-summer. It has been recorded in the estuarine areas of the Hunter River in Newcastle NSW and in QLD and the north of NT and WA.	EPBC	Low – no suitable habitat identified within the site
Motacilla flava	Yellow Wagtail		M	his species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams. This species migrates from Asia to Australia in spring-summer. It has been recorded in the estuarine areas of the Hunter River in Newcastle NSW and in QLD and the north of NT and WA.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Myiagra cyanoleuca	Satin Flycatcher		M	Widespread in eastern Australia. In Queensland, it is widespread but scattered in the east. In NSW, they are widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. In Victoria, the species is widespread in the south and east, in the area south of a line joining Numurkah, Maldon, the northern Grampians, Balmoral and Nelson. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests, often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest. In south-eastern Australia, they occur at elevations of up to 1400 m above sea level, and in the ACT, they occur mainly between 800 m above sea level and the treeline.	EPBC	Low – no suitable habitat identified within the site
Neochmia ruficauda	Star Finch		E	Northern Australia from Cape York Peninsular in Northern Queensland and across the top end of Australia and down into the western coast of Western Australia as far a Port Headland and the Hamersley Ranges. The Star Finch (eastern) occurs mainly in grasslands and grassy woodlands that are located close to bodies of fresh water. It also occurs in cleared or suburban areas such as along roadsides and in towns. The Star Finch (eastern) was observed on the Namoi River in New South Wales, on sloping river banks covered with grass and herbs, and amongst beds of rushes growing along the side of the river.		Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Ninox strenua	Powerful Owl	V		The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations. It inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. It requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider.	Bionet	Low – no suitable habitat identified within the site
Numenius madagascariensis	Eastern Curlew		CEM	Inhabits coastal estuaries, mangroves, mud flats and sand pits. It is a migratory shorebird which generally inhabits sea and lake shore mud flats, deltas and similar areas, where it forages for crabs and other crustaceans, clam worms and other annelids, molluscs, insects and other invertebrates. Its migration route ranges from its wintering grounds in Australia to its breeding grounds in northern China, Korea and Russia.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Numenius minutus	Little Curlew		M	On passage the species shows a preference for foraging and resting in swampy meadows near lakes and along river valleys. It overwinters on dry inland grassland, bare cultivation, dry mudflats and coastal plains of black soil with scattered shallow pools of freshwater, swamps, lakes or flooded ground. It shows a preference for short grass swards of less than 20 cm tall, and occasionally occurs in dry saltmarshes, coastal swamps, mudflats or sandflats in estuaries, or on the beaches of sheltered coasts.	EPBC	Low – no suitable habitat identified within the site
Numenius phaeopus	Whimbrel		M	Migrates to Taiwan, Philippines, PNG, and a race breeding in NE Siberia is found on the north and south-eastern coastlines of Australia. Juveniles arrive to Australia from spring to early summer. Usually only juveniles remain in Australia but very occasionally adults in breeding plumage may be seen in Australian winters.	EPBC	Low – no suitable habitat identified within the site
Pandion cristatus (syn. P. haliaetus)	Eastern Osprey	V	M	Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water.	EPBC	Low – no suitable habitat identified within the site
Pluvialis fulva	Pacific Golden Plover		M	Prefers sandy, muddy or rocky shores, estuaries and lagoons, reefs, saltmarsh, and or short grass in paddocks and crops. The species is usually coastal, including offshore islands; rarely far inland. Often observed on beaches and mudflats, sandflats and occasionally rock shelves, or where these substrates intermingle; harbours, estuaries and lagoons.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Ptilinopus superbus	Superb Fruit-Dove	V		The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya. There are records of vagrants as far south as eastern Victoria and Tasmania. Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic.	Bionet	Low – no suitable habitat identified within the site
Rhipidura rufifrons	Rufous Fantail		M	Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range.	EPBC	Low – no suitable habitat identified within the site
Rostratula australis (syn. R. benghalensis)	Australian Painted Snipe (Painted Snipe)	E1	VM	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Stagonopleura guttata	Diamond Firetail	V		Distributed through central and eastern NSW, extending north into southern and central Queensland and south through Victoria to the Eyre Peninsula, South Australia. In NSW, the species occurs predominantly west of the Great Dividing Range, although populations are known from drier coastal areas. Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and mallee. Most populations occur on the inland slopes of the dividing range. Firetails nest in trees and bushes, and forage on the ground, largely for grass seeds and other plant material, but also for insects.	Bionet	Low – no suitable habitat identified within the site
Sternula albifrons	Little Tern	E1		Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets. They nest on sand-spits, sandbanks, ridges or islets in these habitats or gently sloping sandy ocean beaches and occasionally in sand-dunes.	Bionet	Low – no suitable habitat identified within the site
Tringa brevipes (syn. Heteroscelus brevipes)	Grey-tailed Tattler		M	It is often found on sheltered coasts with reefs, rock platforms or with intertidal mudflats. It is also found at intertidal rocky, coral or stony reefs, platforms and islets that are exposed at low tide. It has also been found in embayments, estuaries and coastal lagoons, especially fringed with mangroves. It is rarely seen on open beaches and occasionally found around near-coastal wetlands, such as lagoons, lakes and ponds in sewage farms and saltworks. Inland records for the species are rare. The species forages in shallow water, hard intertidal substrates, rock pools, intertidal mudflats, mangroves, banks of seaweed and among rocks and coral rubble, over which water may surge. The species roosts in mangroves, dense stands of shrubs, snags, rocks, beaches, reefs, artificial structures (sea walls, oyster racks), occasionally in near-coastal saltworks and sewage ponds and rarely on sandy beaches or sand banks.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Tringa incana (syn. Heteroscelus incanus)	Wandering Tattler		CEM	Generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. Occasionally seen on coral reefs or beaches, and tends to avoid mudflats Foraging habitat is among rocks or shingle, or in shallow pools at edges of reefs or beaches, mainly along the tideline. Wandering Tattlers have been recorded roosting or perching on top of boulders surrounded by or close to water.	EPBC	Low – no suitable habitat identified within the site
Tringa nebularia	Common Greenshank		M	Occurs in a range of inland and coastal environments. Inland, it occurs in both permanent and temporary wetlands, billabongs, swamps, lakes floodplains, sewage farms, saltworks ponds, flooded irrigated crops. On the coast, it occurs in sheltered estuaries and bays with extensive mudflats, mangrove swamps, muddy shallows of harbours and lagoons, occasionally rocky tidal ledges. It generally prefers wet and flooded mud and clay rather than sand.	EPBC	Low – no suitable habitat identified within the site
Tringa stagnatilis	Marsh Sandpiper		M	Occurs in coastal and inland wetlands (salt or fresh water), estuarine and mangrove mudflats, beaches, shallow or swamps, lakes, billabongs, temporary floodwaters, sewage farms and saltworks ponds.	EPBC	Low – no suitable habitat identified within the site
Stictonetta naevosa	Freckled Duck	V		In most years this species appear to be nomadic between ephemeral inland wetlands. In dry years they congregate on permanent wetlands while in wet years they breed prolifically and disperse widely, generally towards the coast. In inland eastern Australia, they generally occur in brackish to hyposaline wetlands that are densely vegetated with Lignum (*Muehlenbeckia cunninghamii*) within which they build their nests.	Bionet	Low – no suitable habitat identified within the site
Xenus cinereus	Terek Sandpiper	V	M	In Australia widespread and common along north and east coasts than along south coastlines. It inhabits coastal areas, mostly saline intertidal mudflats in sheltered estuaries, embayments, harbours and lagoons; on islets, mudbanks or sandbanks and spits; often around mangroves.	Bionet, EPBC	Low – no suitable habitat identified within the site
Fish (3)						

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Epinephelus daemelii	Black Cod	V	V	Adult black cod are usually found in caves, gutters and beneath bomboras on rocky reefs. They are territorial and often occupy a particular cave for life. Small juveniles are often found in coastal rock pools, and larger juveniles around rocky shores in estuaries. Black cod are opportunistic carnivores, eating mainly other fish and crustaceans. They can change from one colour pattern to another in just a few seconds. They are usually black in estuaries and banded around clear water reefs. Black cod are apparently slow growing. Smaller fish are mostly females, but they generally change sex to become males at around 100-110 cm in length.	EPBC	Low – no suitable habitat identified within the site
Macquaria australasica	Macquarie Perch		E	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury/Nepean and Shoalhaven catchments. Macquarie Perch are found in both river and lake habitats; especially the upper reaches of rivers and their tributaries. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water).	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Prototroctes maraena	Australian Grayling		V	Occurs in streams and rivers on the eastern and southern flanks of the Great Dividing Range, from Sydney, southwards to the Otway Ranges of Victoria and in Tasmania. The species is found in fresh and brackish waters of coastal lagoons, from Shoalhaven River in NSW to Ewan Ponds in South Australia. The Australian Grayling is diadromous, spending part of its lifecycle in freshwater and at least part of the larval and/or juvenile stages in coastal seas. Adults (including pre spawning and spawning adults) inhabit cool, clear, freshwater streams with gravel substrate and areas alternating between pools and riffle zones such as the Tambo River, which is also known to have granite outcrops. The species has also been associated with clear, gravel-bottomed habitats in the Mitchell and Wonnangatta Rivers (Victoria) and in a muddy-bottomed, heavily silted habitat in the Tarwin River (Victoria). The species has been found over 100 km upstream from the sea.	EPBC	Low – no suitable habitat identified within the site
Mammals (9)						
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies.	EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Dasyurus maculatus maculatus	Spotted-Tailed Quoll	V	E	Found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	EPBC	Low – no suitable habitat identified within the site. The site highly fragmented and isolated from extensive remnant patches.
Isoodon obesulus	Southern Brown Bandicoot	E1	E	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. They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares.	EPBC	Low – no suitable habitat identified within the site
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V		Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Populations disperse within about 300 km range of maternity caves. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Bionet	Low – marginal habitat within the site. Unlikely to utilise the site on regularly basis due to lack of vegetation and floristic structure.

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Myotis macropus	Southern Myotis, Large-footed Myotis	V		The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Bionet	Low – no suitable habitat identified within the site
Petauroides volans	Greater Glider		V	The Greater Glider has a restricted distribution in eastern Australia, from the Windsor Tableland in north Queensland to central Victoria, with an elevated range from sea level to 1200m above sea level. The species is largely restricted to eucalypt forests and woodlands, feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. It is found in abundance in montane eucalypt forest with relatively old trees and an abundance of hollows. It also favours forests with a diversity of eucalypts to cater for seasonal variation in food abundance.	EPBC	Low – no suitable habitat identified within the site
Phascolarctos cinereus	Koala	V	V	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. It was briefly historically abundant in the 1890s in the Bega District on the south coast of NSW, although not elsewhere, but it now occurs in sparse and possibly disjunct populations. Koalas are also known from several sites on the southern tablelands. Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Some preferred species include Forest Red Gum, Grey Gum. In coastal areas, Tallowwood and Swamp Mahogany are important food species, while in inland areas White Box, Bimble Box and River Red Gum are favoured. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	Bionet, EPBC	Low – no suitable habitat identified within the site

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Pseudomys novaehollandiae	New Holland Mouse		V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Genetic evidence indicates that the New Holland Mouse once formed a single continuous population on mainland Australia and the distribution of recent subfossils further suggest that the species has undergone a large range contraction since European settlement. Total population size of mature individuals is now estimated to be less than 10,000 individuals although, given the number of sites from which the species is known to have disappeared between 1999 and 2009, it is likely that the species' distribution is actually smaller than current estimates. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	EPBC	Low – no suitable habitat identified within the site
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Grey-headed Flying-foxes are generally found within 200km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Can travel up to 50km from the camp to forage; commuting distances are more often <20km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.	Bionet, EPBC	Low – marginal habitat within the site. May occur as a fly-over or irregularly visit whilst foraging in greater locality.
Reptiles (1)						

SCIENTIFIC NAME	COMMON NAME	BC ACT STATUS[1]	EPBC ACT STATUS[2]	HABITAT[3]	DATA SOURCE	LIKELIHOOD OF OCCURRENCE
Hoplocephalus bungaroides	Broad-headed Snake	E1	V	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevieces or hollows in large trees within 500m of escarpments in summer.	EPBC	Low – no suitable habitat identified within the site

(1) Listed as Vulnerable (V), Endangered (E1), Endangered populations (E2) or Critically Endangered (CE) under the NSW *Biodiversity Conservation Act 2016* (BC Act).

(2) Listed as Vulnerable (V), Endangered (E) or Critically Endangered (CE) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Note: due to no marine habitat present within or adjacent to the site, marine species were not included within the likelihood of occurrence.

APPENDIX C

RECORDED FLORA

C1 RECORDED FLORA

Table C.1 Recorded flora species within the site

FAMILY	SCIENTIFIC NAME	COMMON NAME
Aizoaceae	*Carpobrotus glaucescens*	Pigface
Anacardiaceae	*Schinus ariera**	Peppercorn Tree
Apocynaceae	*Araujia sericifera**	Moth Vine
Araliaceae	*Hedera helix**	Ivy
Arecaceae	*Livistona australis*	Cabbage Palm
Arecaceae	*Phoenix canariensis**	Canary Island Date Palm
Asparagaceae	*Asparagus aethiopicus**	Asparagus Fern, Sprengeri Fern
Asteliaceae	*Cordyline australis**	Cabbage Tree
Asteraceae	*Aster subulatus**	Wild Aster
Asteraceae	*Conyza bonariensis**	Flaxleaf Fleabane
Asteraceae	*Conyza sumatrensis**	Tall fleabane
Asteraceae	*Lactuca serriola**	Prickly Lettuce
Asteraceae	*Senecio madagascariensis**	Fireweed
Asteraceae	*Sonchus oleraceus**	Common Sowthistle
Basellaceae	*Anredera cordifolia**	Madeira Vine
Blechnaceae	*Blechnum ambiguum*	-
Cannaceae	*Canna x generalis**	Canna Lily
Caryophyllaceae	*Stellaria media**	Common Chickweed
Casuarinaceae	*Casuarina cunninghamiana*	River Oak
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Chenopodiaceae	*Chenopodium album**	Fat Hen
Commelinaceae	*Commelina cyanea*	Native Wandering Jew
Davalliaceae	*Nephrolepis cordifolia**	Fishbone Fern
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Euphorbiaceae	*Euphorbia peplus**	Petty Spurge
Euphorbiaceae	*Euphorbia prostrata**	Red Caustic Weed
Euphorbiaceae	*Ricinus communis**	Castor Oil Plant
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla
Fabaceae (Mimosoideae)	*Acacia falcata*	-

FAMILY	SCIENTIFIC NAME	COMMON NAME
Fabaceae (Mimosoideae)	*Acacia longifolia*	Sydney Golden Wattle
Fabaceae (Mimosoideae)	*Acacia saligna**	Golden Wreath Wattle
Iridaceae	*Dietes robinsoniana*	Lord Howe Wedding Lily
Laminace	*Salvia* sp.*	-
Loranthaceae	*Amyema cambagei*	-
Malvaceae	*Malva parviflora**	Small-flowered Mallow
Meliaceae	*Melia azedarach*	Meliaceae
Myrtaceae	*Agonis flexuosa**	Willow Myrtle
Myrtaceae	*Callistemon* sp. (Cultivar)	-
Myrtaceae	*Corymbia maculata*	Spotted Gum
Myrtaceae	*Eucalyptus saligna*	Blue Gum
Myrtaceae	*Eucalyptus scoparia*	Wallangarra White Gum
Myrtaceae	*Kunzea ambigua*	Tick Bush
Myrtaceae	*Lophostemon confertus*	Brush Box
Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark
Oleaceae	*Olea europaea**	Common Olive
Phormiaceae	*Dianella caerulea* var. *caerulea*	Blue Flax lily
Pittosporaceae	*Bursaria spinosa* var. *spinosa*	Native Blackthorn
Platanaceae	*Platanus orientalis**	Oriental Plane
Platanaceae	*Platanus x hybrida**	London Plane Tree
Poaceae	*Cynodon dactylon*	Common Couch
Poaceae	*Ehrharta erecta**	Panic Veldtgrass
Poaceae	*Eragrostis curvula**	African Lovegrass
Poaceae	*Panicum maximum* var. *maximum**	Guinea Grass
Poaceae	*Paspalum dilatatum**	Paspalum
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
Polygonaceae	*Acetosa sagittata**	Turkey Rhubarb
Portulacaceae	*Portulaca oleracea**	Pigweed
Proteaceae	*Banksia ericifolia* subsp. *ericifolia*	Heath-leaved Banksia
Rubiaceae	*Coprosma repens**	Looking-glass Bush
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo
Solanaceae	*Cestrum parqui**	Green Cestrum
Solanaceae	*Solanum nigrum**	Black-berry Nightshade

FAMILY	SCIENTIFIC NAME	COMMON NAME
Sterculiaceae	*Brachychiton acerifolius**	Illawarra Flame Tree
Ulmaceae	*Celtis sinensis**	Chinese Nettle Tree
Urticaceae	*Parietaria judaica**	Asthma Weed

* Denotes exotic species

APPENDIX D

BAM VEGETATION INTEGRITY PLOT DATA

D1 BAM VEGETATION INTEGRITY PLOT DATA

BAM VEGETATION INTEGRITY PLOT DATA

Q1			Covers	Native	Trees	Shrubs	Grass	Forb	Fern	Other	Exotic	HighThreat
Candidate PCT 1232			# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count
Date: 7/2/19			12	1	1	0	0	0	0	0	11	3
Species	**Cover**	**Abundance**	Sum cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
			65	40	40	0	0	0	0	0	25	4
*Anredera cordifolia**	1	4	HT									1
*Araujia sericifera**	1	8	HT									1
*Casuarina glauca**	40	60	TG		40							
*Celtis australis**	2	1	EX								2	
*Cordyline australis**	2	2	EX								2	
Livistona australis (planted)	1	1	EX								1	
Melia azedarach (planted)	3	4	EX								3	
*Panicum maximum**	6	25	EX								6	
*Parietaria judaica**	5	15	EX								5	
*Phoenix canariensis**	1	1	EX								1	
*Ricinus communis**	2	8	HT									2
*Salvia sp.**	1	10	EX								1	

Easting	332292
Northing	6244450
Orientation	260
Plot size	10 x 40 x 100
BAM Attributes 20x50m plot	
Stem classes	
80+	0
50-79	0
30-49	0
20-29	Yes
10-19	Yes
5-9	Yes
<5	Yes
Hollows	0
Length logs (m)	0
BAM Attributes 1x1 plot (%)	
Litter (%)	40

APPENDIX E

BAM FIELD DATA SHEETS

E1 BAM DATA FIELD SHEETS

BAM Plot – Field Survey Form

Site Sheet no:

		Survey Name	Plot Identifier	Recorders
Date	6 2 19	quanlas	Q01	JW / MS

Zone	Datum	IBRA region	Photo #	Zone ID
56		SYD -		

Easting	Northing	Plot Dimensions (e.g. 20 x 20 in 20 x 50)	Orientation of midline from the 0 m point.
332292	6244450	10x40	260°

Likely Vegetation Class	PCT 1232 - Precautionary approach to		Confidence: H M L
Plant Community Type	suspected plantings	EEC:	Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover %		

This table may be completed after entering data into available tools. It is not required while in the field.

BAM Attribute (20 x 50 m plot) dbh	Stem Classes and Hollows: Euc*	Non Euc	Hollows†
80 + cm			0
50 – 79 cm			
30 – 49 cm	✓		Hollows 20cm+
20 – 29 cm	✓		0
10 – 19 cm	✓		
5 – 9 cm	✓		0
< 5 cm	✓		This size class records tree regeneration
Length of logs (m) (≥10 cm diameter, >50 cm in length)		total	0

Record living eucalypt* (Euc*) and living native non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For hollows count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the living tree stems only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a multi-stemmed tree, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.
Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	100	90	90	80	100	10	0	10	70	-	-	-	-	20	-					
Average of the 5 subplots																—				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code
Clearing (inc. logging)		
Cultivation (inc. pasture)		
Soil erosion		
Firewood / CWD removal		
Grazing (identify native/stock)		
Fire damage		
Storm damage		
Weediness		
Other		

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Free Text Section for brief site description

12.18 . Casuarina glauca
2.41 . phoenix

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	16 02 19	Qantas	QQ1	WN/MS

GF Code	Full species name mandatory, or a unique means of identifying separate taxa within a survey. Data from here will be used to assign growth form counts and covers.	N, E or HTE	Cover	Abund	stratum	voucher
	Casuarina glauca		40	60		
	Acacia sericea		1	8		
	Melia azedarach		3	4		
	Ricinus communis		2	8		
	Parietaria judaica - Asthma weed		5	15		
	Anredera cordifolia		1	4		
	Celtis sinensis		2	1		
	Panicum maximum		6	25		
	Salvia sp (domestic)		1	10		
	Cordyline sp (NZ)		2	2		
	Sonchus oleraceus		0.2	1		
	Livistona australis		1	1		
	Phoenix canariensis		1	1		

GF Code: see Growth Form definitions in BAM Appendix 1. Identify top 3 dominants in the veg zone. **N:** native, **E:** exotic, **HTE:** high threat exotic.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, …100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded.

Form version designed 15 September 2017 Printed 17 December 2018

PARSONS BRINCKERHOFF | **VEGETATION SURVEY PROFORMA P2** | Site ID: | 2.

Species E.Y	Cover (%)	Abundance (individuals)	Strata/ Growth	Species	Cover (%)	Abundance (individuals)	Strata/ Growth
1 Dietes				42 Blechnum			
2 Melia azedarach.				43 fishbone			
3 Eragrostis curvula				44 Chenopodium album			
4 Sonchus oleraceus				45 Hedera [illegible]			
5 Stenotaphrum secundatum				46 [illegible]			
6 Cynodon dactylon				47 Pittosporum undulata			
7 Panicum maximum				48 Casuarina [illegible]			
8 phoenix palm				49 canna lily			
9 castor oil plant				50 senecio mad.			
10 moth vine				51 Conyza sum.			
11 Cupaniopsis				52 Paspalum dilatatum			
12 asthma weed				53 [illegible] weed			
13 Cestrum parqui				54 Malva sp.			
14 Celtis sinensis				55 Commelina cyanea			
15 Aster subulatus				56			
16 Ehrharta erecta				57			
17 cabbage tree palm				58			
18 prickly lettuce				59			
19 Conyza bonariensis				60			
20 Acetosa				61			
21 fireweed				62			
22 Pigface glaucescens				63			
23 Hibbertia scandens				64			
24 Avena sp.				65			
25 Acacia saligna				66			
26 [illegible]				67			
27 Hardenbergia				68			
28 Dianella ~~long.~~ revoluta				69			
29 Aster subulata				70			
30 Kunzea ambig.				71			
31 [illegible]				72 [illegible]			
32 Acacia falcata				73			
33 Callistemon sp.				74			
34 African olive				75 kurrajong			
35 Solanum nigrum				76 [illegible]			
36 Asparagus aethiopicus				77 noisy miner			
37 [illegible]				78			
38 euphorbia peplus (milkweed)				79			
39 brachychiton acer.				80			
40 melaleuca quin.				81			
41 [illegible] (NZ [illegible])				82			

Transect Number	Number of hits (tally) / BB Transect orientation:	Total hits	%
Native over-storey cover (%)			
Native mid-story cover (%)			
Native ground cover grasses (%)			
Native ground cover shrubs (%)			
Native ground cover other (%)			
Exotic plant cover (%)			

Larger 50 X 20 m Plot	
1. Length of Woody debris >10cm wide & > 0.5 m long	
2. Proportion of canopy species regeneration	
3. Number of trees with hollows > 5 cm	

Cover abundance BioBanking Method in 20 X 20 plot		
Cover in percentage (%) for each individual species	if cover <1%	Entered as 0.4% cover
	If cover 1-5%	Record exact % cover ie 1, 2, 3, 4, 5
	If cover over 5%	Record at 5% intervals
Abundance Rating measure abundance of individuals or shoots of each species	If less than 20	Count individuals, 1,2,3,4, 5, 6, 7,8,9,10,11,12,13,14,15,16,17,18, 19,20
	If over 20 are estimates in intervals	20,50,100,500,1000
	If over 1000 enter number if required	ie 1500

PARSONS BRINCKERHOFF

VEGETATION SURVEY PROFORMA P1

Date: 1.

Site ID: 2.
both sides of proforma

Survey type: 3.
Include quadrate size, search area, transect length etc.

Recorders: AC, DL, TB, PR, KL, SL, MS, SH, AR 4.

Stratification and patch ID: 5.

Location details: Property name, Lot Plan #, Road Name, Side of Road, land tenure

Photo number:

Location recorded with GPS # or Tablet: 7 1:100,000 MAP NAME: 8.

Unique Point ID #: ZONE EASTING NORTHING 9.

		0	
		0	

GPS accuracy: ± metres 10.

Note: All waypoints should be recorded in map datum WGS 84

Habitat Assessment & other site description notes:

Slope: Gentle, Mod, Steep Aspect:

Landform (Transect) : crest, ridge, upper slope, mid slope, down slope, gully, flat, Depression, watercourse, escarpment, terrace

Geology: basalt, granite, conglomerate, sandstone, siltstone, mudstone, shale, alluvium, Limestone, metamorphic, gravel, ?

Nearest Drainage line / catchment:

Soil: sand, loam, clay organic, skeletal?

Evidence of disturbance:

Community age estimate:

11. Ground Cover %: 12.

Weeds %:	
Canopy	Bare soil
Sub-canopy	Litter
Shrub	Timber
Ground	Rock (type)
	Vegetation (type)
	Total 100%

Vegetation community: 13.

Mapped community:

Field Community:

Structure and composition ❖ : 14.

Strata[I]:	Height: range & median	% foliage cover*:	Dominant spp. and dominance¤:

❖ Community structure should be described as per Specht et al 1995
I: Emergent (E), >8m - tree layers (T1, T2...Tn), <8m - shrub layers (S1, S2...Sn), ground cover (gc)
* 100-70%(4), 70-30%(3), 30-10% (2), <10% (1)
¤ Dominant (d), Associated (a), co-dominant (cd), supressed (s) or combination

PARSONS BRINCKERHOFF

APPENDIX F

BAM CREDIT REPORT

F1 BAM CREDIT REPORT

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00014222/BAAS18097/19/00014223	Qantas Flight Training Centre	04/01/2019
Assessor Name	**Report Created**	**BAM Data version ***
Mark Stables	20/02/2019	6
Assessor Number	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BAAS18097		

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAII	Ecosystem credits
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion								
1	1232_Poor	10.6	0.1	0.25	High Sensitivity to Potential Gain	2.50		0
							Subtotal	**0**
							Total	**0**

BAM Credit Summary Report

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Candidate SAII	Species credits

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00014222/BAAS18097/19/00014223	Qantas Flight Training Centre	04/01/2019
Assessor Name	**Report Created**	**BAM Data version ***
Mark Stables	20/02/2019	6
Assessor Number	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BAAS18097		

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Eastern Bentwing-bat	Miniopterus schreibersii oceanensis	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Eastern Freetail-bat	Mormopterus norfolkensis	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Little Bentwing-bat	Miniopterus australis	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Little Lorikeet	Glossopsitta pusilla	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

Threatened species not within the area of these PCT's

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Australian Painted Snipe	Rostratula australis	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Eastern Osprey	Pandion cristatus	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

Regent Honeyeater	Anthochaera phrygia	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Swift Parrot	Lathamus discolor	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00014222/BAAS18097/19/00014223	Qantas Flight Training Centre	04/01/2019
Assessor Name	**Report Created**	**BAM Data version ***
Mark Stables	20/02/2019	6
Assessor Number	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BAAS18097		

List of Species Requiring Survey

Name	Presence	Survey Months

List of Species Not On Site

Name
Calyptorhynchus lathami Glossy Black-Cockatoo
Lathamus discolor Swift Parrot
Litoria aurea Green and Golden Bell Frog
Litoria brevipalmata Green-thighed Frog
Melaleuca biconvexa Biconvex Paperbark
Miniopterus australis Little Bentwing-bat
Miniopterus schreibersii oceanensis Eastern Bentwing-bat
Myotis macropus Southern Myotis
Pandion cristatus Eastern Osprey
Pteropus poliocephalus Grey-headed Flying-fox
Anthochaera phrygia Regent Honeyeater
Haliaeetus leucogaster White-bellied Sea-Eagle

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00014222/BAAS18097/19/00014223

Assessment name
Qantas Flight Training Centre

BAM data last updated *
04/01/2019

Assessor Name
Mark Stables

Report Created
20/02/2019

BAM Data version *
6

Assessor Number
BAAS18097

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	1232_Poor	1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Poor	0.1	1	

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00014222/BAAS18097/19/00014223

Proposal Name
Qantas Flight Training Centre

BAM data last updated *
04/01/2019

Assessor Name
Mark Stables

Assessor Number
BAAS18097

BAM Data version *
6

Proponent Names

Report Created
20/02/2019

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Candidate Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

Predicted Threatened Species Not On Site

BAM Biodiversity Credit Report (Like for like)

Name
Botaurus poiciloptilus / Australasian Bittern
Dasyurus maculatus / Spotted-tailed Quoll
Lathamus discolor / Swift Parrot
Pandion cristatus / Eastern Osprey
Rostratula australis / Australian Painted Snipe
Anthochaera phrygia / Regent Honeyeater
Glossopsitta pusilla / Little Lorikeet
Haliaeetus leucogaster / White-bellied Sea-Eagle

Ecosystem Credit Summary

PCT	TEC	Area	Credits
1232-Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Not a TEC	0.1	0.00

Credit classes for 1232	**Like-for-like options**			
	Any PCT in the below Class	And in any of below trading groups	Containing HBT	In the below IBRA subregions

	Coastal Swamp Forests (including PCT's 1232, 1723)	Coastal Swamp Forests - ≥ 90% cleared group (including Tier 2 or higher).	No	Pittwater,Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Biodiversity payment summary report

Assessment Id	Payment data version	Revision number	Report created
00014222/BAAS18097/19/00014223	45	0	20/02/2019

PCT list

Include	PCT common name	Credits
Yes	**1232 -** Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	0

Species list

Include	Species	Credits

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

IBRA sub region	PCT common name	Baseline price	Dynamic coefficient	Market coefficient	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Pittwater	**1232 -** Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion **Warning: This PCT has NO trades recorded in Pittwater**	$4,858.87	0.73047970	1.37828500	20.49%	$20.00	1.0000	$2,377.61	0	$0.00

Subtotal (excl. GST) **$0.00**

Biodiversity payment summary report

	GST	**$0.00**
	Total ecosystem credits (incl. GST)	**$0.00**

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price

No species available

	Grand total	**Contact BCT for pricing**

APPENDIX G

EPBC ACT SIGNIFICANCE ASSESSMENT

G1 GREY-HEADED FLYING-FOX EPBC SIGNIFICANCE ASSESSMENT

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act. The following assessment has been undertaken following the Matters of National Environmental Significance, Significant Impact Guidelines 1.1 (Department of the Environment 2013). Under the Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity
- at or near the limit of the species range.

Is this part of an important population?

Grey-headed Flying-foxes occur across a range of wooded habitats where their favoured food, eucalypt blossom occurs. They set up roosting camps in association with blossom availability, which are usually situated in dense vegetation and associated with water. Grey-headed Flying-foxes can migrate up to 75 km north during the winter and during this time young flying-foxes establish camps.

The study area does not contain suitable habitat for breeding camps nor does it occur within proximity to a known camp. Nearby breeding camps include those at Wolli Creek (3.5 kilometres to the west) and Centennial Park (5.5 kilometres to the north-east). Therefore, a population of Grey-headed Flying-fox in the study area is not considered to be important, as no breeding sites would be affected by the project.

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 one or more of the following:

Lead to a long-term decrease in the size of an important population of a species

Not applicable. Grey-headed Flying-fox occurring in the in the study area is not part of an important population.

Reduce the area of occupancy of an important population of the species

Not applicable. Grey-headed Flying-fox occurring in the in the study area is not part of an important population.

Fragment an existing important population into two or more populations

Not applicable. Grey-headed Flying-fox occurring in the in the study area is not part of an important population.

Adversely affect habitat critical to the survival of a species

No critical habitat is listed for this species under the EPBC Act.

Habitat critical to the survival of a species may also include areas that are not listed on the Register of Critical Habitat if they 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 (Department of Environment and Climate Change 2006)

The project will result in a negligible loss of sub-optimal foraging habitat that is limited to a small number of planted Eucalypt and Melaleuca species. As this species is highly mobile, with individuals foraging up to 50 km from camp sites, it is unlikely that the project would adversely affect habitat critical to the survival of this species.

Disrupt the breeding cycle of an important population

Not applicable. Grey-headed Flying-fox occurring in the in the study area is not part of an important population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

No. The project will result in a negligible loss of sub-optimal foraging habitat that is limited to a small number of planted Eucalypt and Melaleuca species. As this species is highly mobile, with individuals foraging up to 50 km from camp sites, it is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species´ habitat

No. It is unlikely that invasive species (such as introduced predators) that are harmful to the Grey-headed Flying-fox would become further established because of the project.

Introduce disease that may cause the species to decline

No. There are no known diseases that are likely to increase in the area because of the project.

Interfere with the recovery of the species

No. Given the project will result in a negligible loss of sub-optimal foraging habitat that is limited to a small number of planted Eucalypt and Melaleuca species it is unlikely that it would interfere with the recovery of the species.

Conclusion

The project will result in a negligible loss of sub-optimal foraging habitat that is limited to a small number of planted Eucalypt and Melaleuca species. There were no Grey-headed Flying-fox camps within the site or its vicinity, but there are camps in the wider region. The loss of this resource is unlikely to be significant to local populations in the wider locality. Therefore, habitat attributes occurring within the site are not considered important to the long-term survival of the Grey-headed Flying-fox.

APPENDIX H

SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

H1 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 10154
Project Name	Qantas Flight Training Centre
Development	Construction and operation of a flight training centre, including demolition works, construction of a multi-level car park and associated internal road works and landscaping.
Location	297 King Street, Mascot (Lots 2 & 4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 of DP 659434)
Applicant	Qantas Airways Limited
Date of Issue	29/03/2019
General Requirements	The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.* In addition, the EIS must include: • a detailed description of the development, including: - accurate history of the site, including development consents applying to the site and the 'Mascot Campus' and any parking requirements; - the need for the proposed development; - justification for the proposed development; - likely staging of the development; - likely interactions between the development and existing, approved and proposed operations in the vicinity of the site including Sydney Airport, proposed Sydney Gateway Project and Botany Rail Duplication Project; - plans of any proposed building works; and - operational management details of the development. • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment; • a detailed assessment of the key issues specified below, and 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 statutes; and - a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive

	management and/or contingency plans to manage significant risks to the environment. • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) of the development as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000, including details of all components of the CIV; • an estimate of the jobs that will be created by the development during the construction and operational phases of the development; and • certification the information provided is accurate at the date of preparation.
Key issues	The EIS must address the following specific matters: • **Strategic and Statutory Context** – including: – detailed justification for the proposal and the suitability of the site; and – demonstration the proposal is generally consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs) and justification for any inconsistencies. • **Traffic and Transport** – including: - a Traffic Impact Assessment detailing all daily and peak traffic and transport movements likely to be generated (vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development, including a description of vehicle type, access routes and the impacts on nearby intersections; - details of access to the site from the road network including intersection location, design and sight distance; - details of the likely arrival and departure times for vehicles for all components of the proposed development; - an assessment of predicted impacts on road safety and the capacity of the road network to accommodate the development; - an assessment of the implications for public and active transport, the potential for implementing a location specific sustainable travel demand management strategy and the provision of end of trip facilities to increase active transport usage to and from the site; - plans of any road upgrades or new roads required for the development, if necessary; - details of the parking provision on-site, including the existing parking provided and its users and a justification for the amount of car parking proposed, demonstrating compliance with the appropriate parking codes; - detailed plans of the proposed layout of the internal road network and parking provision on-site, in accordance with the relevant Australian Standards; and - details of any likely dangerous goods to be transported on arterial and local roads to/from the site, if any, and the preparation of an incident management strategy, if necessary.

	• **Urban Design and Visual** – including: - layout of the development including staging, gross floor area, site coverage, setbacks, proposed open space and landscaped areas and justification for any inconsistencies with the Botany Local Environmental Plan 2013 and the Botany Bay Development Control Plan 2013; - a detailed assessment and justification (including photomontages and perspectives) for the flight training centre and carparking buildings, including building height with reference to the height of surrounding buildings, building materials, architectural treatments and finishes, colour, scale, bulk and overshadowing, from nearby public receivers and significant vantage points within the broader public domain; - an options analysis for the proposed building materials, architectural treatments, finishes and colour of the buildings, prepared in consultation with nearby sensitive receivers with evidence of consultation provided; - a design report that provides an assessment of the proposal against the design excellence requirements of Clause 6.16 of the Botany Local Environmental Plan; - details regarding security requirements and features and lighting; - consideration of the obstacle limitation surface; - suitable landscaping giving preference to local native provenance tree, shrub and groundcover species; - the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks, if applicable; - proposed cut and fill works associated with the development; and - measures to minimise the extent of cut and fill. • **Noise and Vibration**– including: - a description of all potential noise and vibration sources during the construction and operational phases of the development, including on and off-site traffic noise; - a noise impact assessment, including a cumulative noise impact assessment in accordance with relevant Environment Protection Authority guidelines; - a detailed construction programme considering sensitive receivers and other nearby construction activities, with justification for any requested extended construction hours; - consideration of the operational requirements of the development in relation to surrounding noise sources such as the proposed Sydney Gateway Project and the Botany Rail Duplication Project; and - details of noise mitigation, management and monitoring measures. • **Soils and Water** – including: - a description of the water demands and a breakdown of water supplies; - a description of the measures to minimise water use; - a detailed water balance; - a description of all wastewater generated on-site; - a description of the proposed erosion and sediment controls during construction and operation; - a description of the surface and stormwater management system, including on-site detention, and measures to treat or re-use water;

	- an assessment of potential surface and groundwater impacts associated with the development; - an assessment of the impact of the development on acid sulfate soils; - an assessment of the impact of flooding on the proposed development for the full range of flood events up to the probable maximum flood; - an assessment of the impact of the proposed development on flood behaviour; and - details of impact mitigation, management and monitoring measures. • **Social and Economic** – including: – identifying and analysing the potential social impacts of the development from the point of view of the affected community and other relevant stakeholders; – assessment of the significance of positive, negative and cumulative social impacts; - mitigation measures and monitoring of likely negative social impacts; and - an analysis of any potential economic impacts of the development, including a discussion of any potential economic benefits. • **Air Quality** – including: - an assessment of the air quality impacts at private properties during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines; and - details of any mitigation, management and monitoring measures required to prevent and/or minimise emissions. • **Hazards and Risks** including: - a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (Department of Planning, 2011) with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary screening indicate that the development is "potentially hazardous", a Preliminary Hazard Analysis must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'* (Department of Planning, 2011) and *Multi-level Risk Assessment* (Department of Planning, 2011); and - a report on the consultation outcomes with all operators of high pressure dangerous goods or gas pipelines within or in vicinity of the development with regards to requirements under Australian Standard *AS 2885 Pipelines – Gas and liquid petroleum* and provide sufficient details on how these outcomes will be delivered or implemented. • **Biodiversity –** including**:** - an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted. • **Infrastructure Requirements** – including: - a detailed description of the existing infrastructure on-site; - identification of any infrastructure upgrades required to facilitate the development, and describe any arrangements to

	ensure the upgrades will be implemented in a timely manner and maintained; - a detailed description of cooling/heating systems to be installed on-site; - endorsement and/or approval from Sydney Water to ensure the development does not adversely impact on any Sydney Water Asset; - an assessment of any potential impact on the Botany Rail Line; and - preparation of an Infrastructure Management Plan, detailing the existing capacity and any augmentation and easement requirements of the development for the provision of utilities, including any staging. • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on-site; – details of waste storage, handling and disposal; and – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021*. • **Ecologically Sustainable Development** – including: – an assessment of how the development will incorporate ecologically sustainable development principles in all phases of the development; – the use of green walls, green roof and/or cool roof into the design; and – climate change projections developed for the Sydney Metropolitan area and how they are used to inform the building design and asset life of the project. • **Fire and Incident Management** – including details of the operational capability of all fire and life safety systems. • **Heritage** – including: – consideration of heritage items within the vicinity of the site and any potential heritage impacts associated with the development; and – the preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR). • **Greenhouse Gas and Energy Efficiency –** including an assessment of the energy use on-site, and demonstrate the measures proposed to ensure the development is energy efficient.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be provided as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Ausgrid; • Australian Rail and Track Corporation; • Bayside Council; • Civil Aviation Safety Authority; • Department of Industry – Crown Lands and Water; • Environment Protection Authority;

	• Jemena; • NSW Fire and Rescue; • NSW Heritage Council; • NSW Office of Environment and Heritage; • Roads and Maritime Services; • Sydney Airport Corporation Limited; • Sydney Water; • Transport for NSW; and • local residents and stakeholders. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1
Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.shop.nsw.gov.au/index.jsp
http://www.australia.gov.au/publications
http://www.epa.nsw.gov.au/
http://www.environment.nsw.gov.au/
http://www.dpi.nsw.gov.au/

Plans and Documents

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
   - the location of the land, boundary measurements, area (sqm) and north point
   - the existing levels of the land in relation to buildings and roads
   - location and height of existing structures on the site
   - location and height of adjacent buildings and private open space
   - all levels to be to Australian Height Datum (AHD).

2. Locality/context plan drawn at an appropriate scale should be submitted indicating:
   - significant local features such as heritage items
   - the location and uses of existing buildings, shopping and employment areas
   - traffic and road patterns, pedestrian routes and public transport nodes.

3. Drawings at an appropriate scale illustrating:
   - detailed plans, sections and elevations of all proposed buildings
   - detailed plans of proposed access driveways, internal roads, carparking and services infrastructure
4. Schedule of materials, colours and finishes

Documents to be Submitted

Documents to submit include:
- 1 hard copy and 1 electronic copy of all the documents and plans for review prior to exhibition
- Other copies as determined by the Department once the development application is lodged.

Policies, Guidelines & Plans

Aspect	Policy / Methodology
Traffic, Transport and Access	
	Roads Act 1993
	State Environmental Planning Policy (Infrastructure) 2007
	Guide to Traffic Generating Development (Roads and Maritime Services)
	Road Design Guide (Roads and Maritime Services)
	Austroads Guide to Traffic Management – Pt 12: Traffic Impacts of Development
	Austroads Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas
	NSW Long Term Transport Master Plan
Soils and Water	
Acid Sulfate Soils	Acid Sulfate Soil Manual (ASSMAC)
Erosion and Sediment	Managing Urban Stormwater: Soils & Construction (Landcom)
	Design Manual for Soil Conservation Works - Technical Handbook No. 5 (Soil Conservation Service of NSW)
	Soil and Landscape Issues in Environmental Impact Assessment (DLWC)
	Wind Erosion – 2nd Edition
Groundwater	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	NSW State Groundwater Policy Framework Document (DLWC)
	NSW State Groundwater Quality Protection Policy (DLWC)
	NSW State Groundwater Quantity Management Policy (DLWC) Draft
	The NSW State Groundwater Dependent Ecosystem Policy (DLWC)
	NSW Aquifer Interference Policy (NOW)
	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (NOW) 2011
	Bunding and Spill Management (EPA)
Soil	State Environmental Planning Policy No. 55 – Remediation of Land
	National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC) (amended April 2013)
	Designing Sampling Programs for Sites Potentially Contaminated by PFAS – Guidance Document (EPA, 2016)
	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)
	Managing Land Contamination - Planning Guidelines SEPP 55 – Remediation of Land (DUAP and EPA)
Stormwater	Managing Urban Stormwater: Strategic Framework. Draft (EPA)
	Managing Urban Stormwater: Council Handbook. Draft (EPA)
	Managing Urban Stormwater: Treatment Techniques (EPA)
	Managing Urban Stormwater: Source Control. Draft (EPA)
	Managing Urban Stormwater: Harvesting and Reuse (DEC)
Wastewater	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Effluent Management (ARMCANZ/ANZECC)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Use of Reclaimed Water (ARMCANZ/ANZECC)
	National Water Quality Management Strategy - Guidelines For Water Recycling: Managing Health And Environmental Risks (Phase1) (EPHC, NRMMC & AHMC)
Hazards and Risk	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DUAP)
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
	Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning (DoP 2011)
Biodiversity	
	The Biodiversity Assessment Method (OEH, 2017)
Heritage	
	Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)
	Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)
	Draft Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (Department of Planning 2005)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010)
	Heritage Act 1977
Noise and Vibration	
	Assessing Vibration: A Technical Guide (DEC, 2006)
	Noise Policy for Industry (EPA, 2017)
	Environmental Criteria for Road Traffic Noise (EPA, 1999)
	Noise Guide for Local Government (EPA, 2013)
	Interim Construction Noise Guideline (DECC, 2009)
Waste	
	Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA)
Air Quality	
	Protection of the Environment Operations (Clean Air) Regulation 2002
Air Quality	Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016)
Greenhouse Gas	AGO Factors and Methods Workbook (AGO)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
Social	
	Social Impact Assessment Guideline (Department of Planning and Environment)