27/06/2019

Andrew Smith
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Dear Andrew

ADDENDUM ECOLOGICAL ASSESSMENT FOR THE PROPOSED HIGH VOLTAGE TRANSMISSION LINE FOR THE WORIMI ECOTOURISM PROJECT

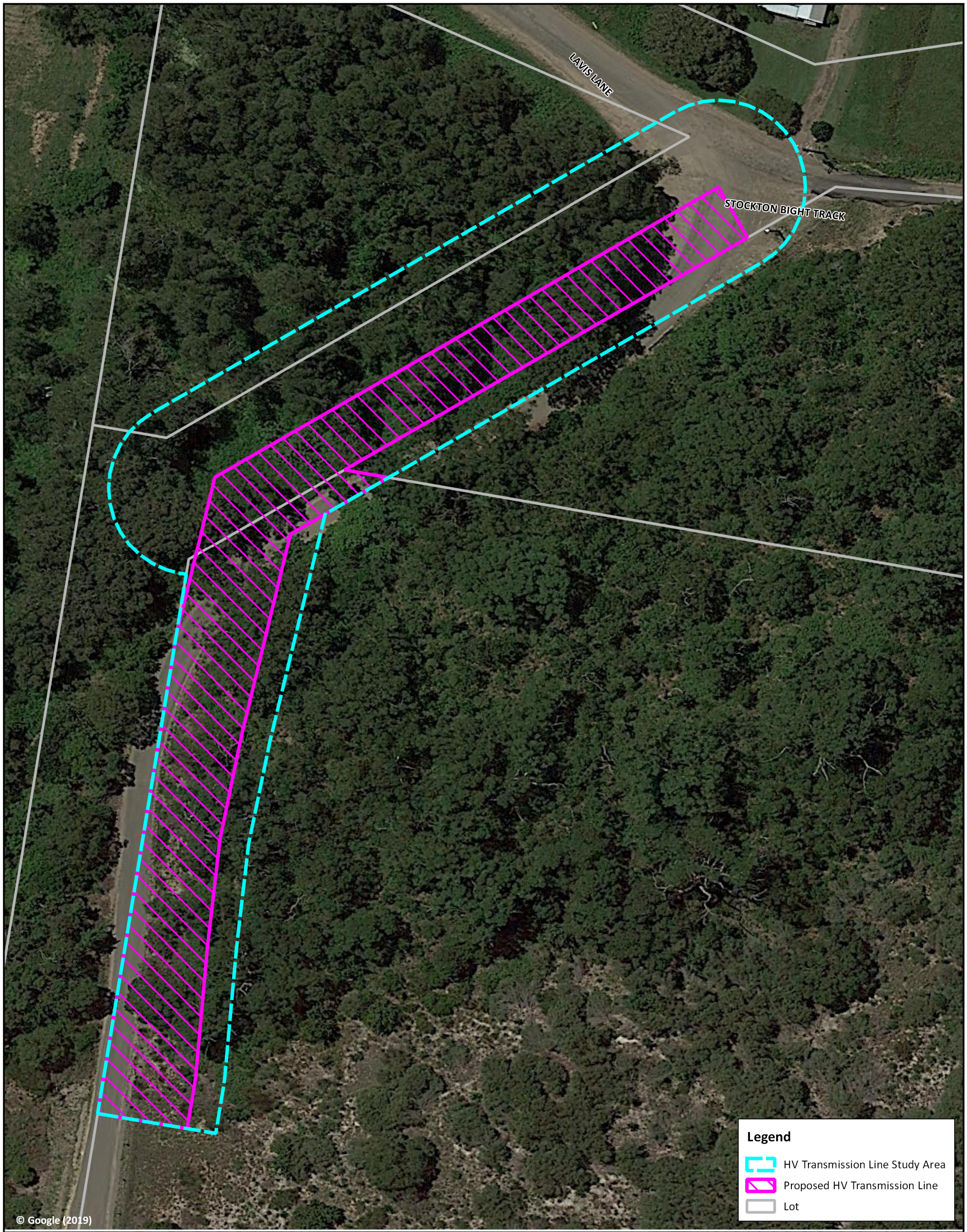
INTRODUCTION

A Development Application (DA) for the proposed eco-tourist facility to be constructed within Lot 227 DP 1097995 Lavis Lane Williamtown, was submitted to Port Stephens Council (PSC) in August 2018. An Ecological Assessment (EPS, 2018) was submitted as part of the DA which assessed the potential impact of the proposed eco-tourist facility upon biodiversity within the Ecological Assessment study area (EA study area).

Since the DA submission it was subsequently identified that a High Voltage (HV) transmission line is also required to power the facility. The proposed HV transmission line is outside of the original EA study area assessed as part of the DA. Therefore, an Addendum Ecological Assessment to determine potential additional impacts to biodiversity from the required HV transmission line is required.

This Addendum Ecological Assessment letter outlines the potential impacts to biodiversity as a result of the construction of the HV transmission line. The HV Transmission Line Study Area and proposed location of the HV transmission line (and subsequent likely area of impact) is shown in Figure 1.

This Addendum Ecological Assessment letter should be read in conjunction with the original Ecological Assessment (EPS, 2018) as it relies in part on that more detailed report that is associated with the same overall project, being the adjoining eco-tourist facility.



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A larger study area was surveyed than necessary in order to provide input into the least ecological impact option. It was determined that the least overall impact option was to run the HV transmission line alongside the existing built road wherever possible so as to avoid unnecessarily fragmenting more intact remnant native vegetation than is absolutely necessary. This approach is expanded on throughout this Addendum Ecological Assessment letter.

PERSONNEL

The field surveys and reporting completed for this ecological assessment were conducted by a qualified biodiversity team familiar with the locality, as outlined in Table 1 below.

Table 1 Personnel

Personnel	Position	Qualifications	Role
Toby Lambert	Director – Ecology	BEnvSc Accredited Biobanking and BAM Assessor	Project Management Site inspection Technical Review
Deborah Landenberger	Senior Ecologist	BSc (Hons) Accredited Biobanking Assessor	Field Surveys Reporting
Sam Wilkin	GIS specialist	DipGIS	Mapping

The field work component of this EA was conducted in accordance with a *National Parks and Wildlife Act 1974* ('NP&W Act') Section 132 (c) Scientific Licence (SL100772). The licence permits the undertaking of biodiversity assessments, Species Impact Statements, ecological surveys and abiotic sampling as part of flora and fauna survey work.

DEFINITIONS

The following definitions have been used as part of this report:

- **Project** – The proposed HV Transmission Line installation;
- **Proposed HV Transmission Line** – The area of likely direct impact as a result of the construction of the HV Transmission Line and associated easement (Figure 1);
- **HV Transmission Line Study Area** – The area studied as part of this ecological assessment (Figure 1) to assist in identifying the least-impact location and assist in considering indirect impacts; and
- **EA Study Area** – The study area of the original EA assessment conducted by EPS (2018) for the eco-tourist facility.

METHODOLOGY

DESKTOP ASSESSMENT

The Ecological Assessment report (EPS, 2018) conducted database searches in May 2018. Therefore, updated database searches were conducted as part of this report. Table 2 outlines the database searches conducted.

Table 2 Database Review

Personnel	Position	Qualifications
State Databases		
NSW BioNet Atlas	12/06/2019	10km
Threatened Species Database	12/06/2019	-
OEH vegetation information system (VIS) database	12/06/2019	-
NSW Department of Primary Industries Weed wise database	12/06/2019	Port Stephens LGA
Federal Database		
Department of Environment's Protected Matters Search Tool	12/06/2019	10km
Department of Environment Weeds of National Significance	12/06/2019	All Listings

FLORA SURVEY

The field survey was conducted on the 6th, 12th and 14th June 2019. The following methodologies were used for the flora surveys:

- Random Meander surveys were conducted in accordance with Cropper (1993). These surveys consisted of walking in a random manner recording all plant species observed across the HV Transmission Line Study Area;
- Review of the LHCCREMS mapping. This review assisted in stratifying the HV Transmission Line Study Area into preliminary vegetation types to inform the field survey design;
- Review of aerial photographs to assist in stratifying the HV Transmission Line Study Area into vegetation types;

- BioBanking floristic plots in accordance with the BioBanking Assessment methodology (Office of Environment and Heritage 2014), consistent with the methodology for the original Ecological Assessment (EPS, 2018); and
- Assigning vegetation communities into Plant Community Types (PCTs) in accordance with the Office of Environment and Heritage VIS classification database Version 2.1.

VEGETATION ZONE DELINEATION AND BIOBANKING PLOTS

A walk over of the entire HV Transmission Line Study Area was initially inspected to provide a preliminary assessment of the vegetation types and the potential number of vegetation zones and their condition in accordance with the BioBanking Assessment Methodology (Office of Environment and Heritage 2014). The vegetation was then mapped into type and condition, with each community assigned to PCTs in accordance with the VIS Classification database (2015).

Table 3 below summarises the BioBanking plot, random meanders and opportunistic survey effort. Two BioBanking plots were conducted within HV Transmission Line Study Area. The locations of the BioBanking plots are shown in Figure 2.

Biobanking Plot BBb was continued outside of the HV Transmission Study Area due to the small size of PCT 1717 Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest.

LAVIS LANE

STOCKTON BIGHT TRACK

BBa

HBTb

SAT2

SAT1

BBb

HBTa

HB72

HB73

HB75

HB71

HB70

HB69

HB68

HB60

HB61

HB65

HB59

HB62

HB63

HB66

HB64

HB58

HB57

Legend

- Biobanking Plot
- Koala Spot Assessment
- Hollow-bearing Tree (Remove)
- Hollow-bearing Tree (Retain)
- HV Transmission Line Study Area
- Lot

Vegetation Communities

PCT 1644 (HU858) Coast Tea Tree - Old Man Banksia coastal shrubland on foredunes of the Central and Lower North Coast

- Moderate to Good - moderate quality - Zone 2

PCT 1646 (HU860) Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast

- Moderate to Good - high quality - Zone 3

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

- Moderate to Good – moderate quality – Zone 4 – Endangered BC Act

PCT 1717 Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge swamp forest of the Central Coast and Lower North Coast

- Moderate to Good - moderate quality - Zone 5 - Endangered BC Act

Other

- Exotic Vegetation

EPS

0 10 20 30 m

Map Projection: GDA 1994 MGA Zone 56

Figure 2
Survey Effort and Plant Community Types

WLALC Eco-tourism | Williamtown NSW Australia

Date: 27/06/19
Author: SW
Reviewer: AT
Scale: 1:600
Job Ref/Ver: 11245/V02

20190619_11245_Figure2_V02.qgs

HOLLOW-BEARING TREE SURVEY

A comprehensive hollow bearing tree survey was conducted throughout the HV Transmission Line Study Area. All hollow-bearing trees were recorded. For each tree the following attributes were recorded:

- Location recorded on GPS;
- Each tree was tagged;
- Tree species;
- Location of the hollow as follows:
    - Broken trunk;
    - Branch;
    - Trunk;
    - Spilt; and
    - Peel back.
- Hollow size and number:
    - Small hollow <10 cm;
    - Medium hollow 10 to 20 cm;
    - Large hollow 20-30 cm; and
    - Extra-large hollows >30cm.
- Diameter at breast height in cm;
- Presence of any scratches;
- Presence of any sap feeding scars; and
- Presence of any nests.

PORT STEPHENS COUNCIL COMPREHENSIVE KOALA PLAN OF MANAGEMENT

As the HV Transmission Line Study Area is located within the Port Stephens LGA, the Port Stephens Council Comprehensive Koala Plan of Management (CKPoM) must be considered in relation to proposed works. The CKPoM is consistent with the National Koala Strategy and was prepared in accordance with State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) and supersedes the requirements of SEPP 44 in the Port Stephens LGA.

Eucalyptus robusta was recorded within the HV Transmission Line Study Area and a Port Stephens CKPoM Assessment was therefore also conducted.

KOALA SPOT ASSESSMENT TECHNIQUE

The entire HV Transmission Line Study Area was searched for any Koala feed trees listed in the (CKPoM). The methodology used was conducted in accordance with the methods set out in Phillips & Callaghan (2011):

1. Locate and mark a centre tree which meets the following criteria:

a. Tree of any species in which Koala faecal pellets have been observed and/or
b. A tree a Koala has been observed in and/or
c. Any other tree known or considered to be potentially important for the Koala, or of interest for other assessment purposes.

2. Identify the nearest 29 trees in a radius of the tree which meets the criteria above.
3. Undertake searches of Koala scats beneath each of the trees firstly on undisturbed ground within a distance of 100 centimetres, if no scats are detected, a search of leaf litter and other ground cover is conducted.

All of the Koala feed trees were searched in the above manner, however due to very dense thickets of Lantana (*Lantana camara*) access was limited in some areas.

FAUNA HABITAT ASSESSMENT

To assess the fauna habitat, present within the HV Transmission Line Study Area, habitat data was collected to determine the range of fauna that may utilise the area for roosting, breeding and/or foraging. Throughout the HV Transmission Study Area habitat searches involved opportunistic searches. The following habitat attributes were recorded:

- Presence of burrows, whitewash, owl pellets and nests/drays;
- Floristic structure of the canopy, mid stratum and ground layer;
- Depth and composition of leaf litter;
- Presence of rocks and rock shelves;
- Presence of fallen timber; and
- Aquatic habitat such as depressions.

Table 3 Survey Effort

Date	Survey Type	Approx. Person hours	Area Surveyed	Orientation of plot (degrees)	Eastings GDA56	Northings GDA56
Entire Survey Period	Initial inspection, random meanders and vegetation mapping	9	Entire HV Transmission Line Study Area	-	-	-
07/06/2019 12/09/2019	Koala SAT Surveys	1	5 Koala feed trees overall 4 Koala feed trees were located	-	-	-

			together at SAT point 1			
07/06/2019 12/09/2019	Hollow-bearing Tree Survey	4	Entire HV Transmission Line Study Area	-	-	-
07/06/2019 12/09/2019	Fauna Habitat Assessment	4	Entire HV Transmission Line Study Area	-	-	-
07/06/2019	BioBanking Plot 1	3	-	210 SW	394124	6367849
12/06/2019	BioBanking Plot 2	3	-	260 W	394068	6367813

WEATHER CONDITIONS

Table 4 provides a summary of the weather conditions encountered during the field surveys. A range of weather conditions occurred within the survey periods.

Table 4 Weather Conditions

Date	Temperate (C°)	Cloud Cover	Rain (mm)	Wind Km/hr
07/06/2019	9.3^0 to 18.7^0	1/8	1.0	S 4km/hr
12/06/2019	6.7^0 to 22.6^0	0/8	0	N 6km/hr
14/06/2019	9.4^0 to 18.7^0	7/8	0	N 7km/hr

* Records from BOM web site for the Williamtown weather station

LIMITATIONS

Field surveys are conducted over a relatively small period of time, and not all species can always be detected. These include mobile fauna species, migratory birds and fauna that utilise the resources on a seasonal basis. Flora species that are difficult to detect include cryptic, annuals and species present in the seed bank. Therefore, the results in this report are a result of the time when the field surveys were completed.

RESULTS

PLANT COMMUNITY TYPES

Four native Plant Community Types (PCTs) and one non-native vegetation of Exotic Vegetation were recorded within the HV Transmission Line Study Area (Figure 2). The field verified PCTs have been named in accordance with the VIS Classification database (2015). A summary of each of the vegetation communities is provided in the section below.

Two of the PCTs are commensurate with two Threatened Ecological Communities (TECs) listed on the BC Act (Table 5).

No TECs listed on EPBC Act were recorded within the HV Transmission Line Study Area.

The vegetation zones have been numbered to continue on from the original Ecological Assessment (EPS, 2018) vegetation zones. Refer to the Figure A1 Study Area Plant Community Types in Appendix 1 for context.

Zone 1 of PCT 1644 Coast Tea Tree – Old Man Banksia coastal shrubland in Moderate to good – high condition that was recorded as part of the EA report (EPS, 2018) was not recorded within the HV Transmission Line Study Area. Figure A1 shows the vegetation across both the HV Transmission Line Study Area and the EA Study Area.

No BBAM plots were conducted in PCT1644 Coast Tea Tree – Old Man Banksia coastal shrubland and PCT 1646 Smooth-barked Apple - Blackbutt -Old Man Banksia woodland that occur within the HV Transmission Line Study Area. These two vegetation zones formed part of the EA Study Area and the required number of BBAM plots were conducted in accordance with the BioBanking Assessment Methodology (Office of Environment and Heritage 2014) as part of the Ecological Assessment by EPS (2018).

Table 5 Summary of Vegetation Zones

Vegetation type	BC Act	EPBC Act	BioBanking Condition	Area (ha)	No of BBAM required by BBAM Methodology	BBAM Plots Completed
PCT 1644 Coast Tea Tree – Old Man Banksia coastal shrubland Zone 2	-	-	moderate to good - moderate	0.01	1	0 (already previously completed)
PCT 1646 Smooth-barked Apple - Blackbutt -Old Man Banksia woodland Zone 3	-	-	moderate to moderate - high	0.14	1	0 (already previously completed)

PCT 1232 Swamp Oak Floodplain Swamp Forest Zone 4	Endangered Swamp Oak Floodplain Forest	-	moderate to good - moderate	0.19	1	1
PCT 1717 Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest Zone 5	Endangered Swamp Sclerophyll Forest on Coastal Floodplains	-	moderate to good - moderate	0.04	1	1
Exotic Vegetation	-		-	0.04	0	0

These vegetation types are described below.

COAST TEA TREE – OLD MAN BANKSIA COASTAL SHRUBLAND ON FOREDUNES OF THE CENTRAL AND LOWER NORTH COAST - PCT 1644

This PCT is in the south of the HV Transmission Line Study Area (Figure 2) and has previously been mapped as part of the existing EA study area (Appendix 1, Figure A1). Random meanders were undertaken throughout the PCT and it was observed to be consistent with the same PCT and in the same condition of moderate to good – moderate. This condition was classified as Zone 2 in the EA report (EPS, 2018) and therefore it has been allocated as Zone 2 on Figure 2.

The description below is an extract from the EA report (EPS, 2018) which has been modified to the vegetation that was observed in the HV Transmission Study Area only. Plate 1 shows PCT 1644 within the HV Transmission Line Study Area.

This PCT is not consistent with any TEC listed under the BC Act and/or EPBC Act.

Area: 0.01ha
Vegetation Formation: Dry Sclerophyll Forest (Shrubby sub-formation).
Vegetation Class: Coastal Dune Dry Sclerophyll Forests.

- **Canopy height** ranged from 4m to 8m with percent foliage cover of 0-12%.
- **Mid stratum height** ranged from 1m to 3m with percent foliage cover of 0-40%.
- **Groundcover height** ranged from 0.1 to 1.2m with percent foliage cover of 0-30%.

Dominant species were:

- ***Canopy:*** *Leptospermum laevigatum, Monotoca elliptica* and *Banksia serrata*
- ***Mid stratum:*** *Acacia longifolia subsp. sophorae, Persoonia lanceolata, Acacia ulicifolia*
- ***Groundcover:*** *Pomax umbellata, Lomandra longifolia and Dianella caerulea var. producta, Eragrostis curvula* and Melinis repens**

Plate 1 PCT 1644 Coast Tea Tree – Old Man Banksia Coastal Shrubland – Moderate to Good – moderate condition

SMOOTH-BARKED APPLE - BLACKBUTT -OLD MAN BANKSIA WOODLAND ON COASTAL SANDS OF THE CENTRAL AND LOWER NORTH COAST – PCT 1646

This PCT is located to the east of Lavis Lane in the north of the HV Transmission Line Study Area (Figure 2) and has previously been mapped as part of the existing EA study area (Appendix 1, Figure A1). Random meanders were undertaken throughout the PCT and it was observed to be consisted with the same PCT and in the same condition of moderate to good – high. This condition class was mapped as Zone 3 within the EA report (EPS, 2018) and therefore has been identified as Zone 3 as part of this assessment (Figure 2). Biobanking Plot 21 was conducted within 50m of this PCT as part of the EA assessment (EPS, 2018). Therefore, no further BBAM plots were conducted.

The description below is an extract for the EA report, which has been modified to the vegetation that was observed in the HV Transmission Study Area.

Plate 2 shows the PCT 1646 within the HV Transmission Line Study Area.

This PCT is not consistent with any TEC listed under the BC Act and/or EPBC Act.

Area: 0.14 ha
Vegetation Formation: Dry Sclerophyll Forest (Shrubby sub-formation)
Vegetation Class: Coastal Dune Dry Sclerophyll Forests.

- **Canopy height** ranged from 14 to 24 m with percent foliage cover of 15-40%.
- **Mid stratum height** ranged from 3 to 10 m with percent foliage cover of 0-10%.
- **Groundcover height** ranged from 0 to 1.5m with percent foliage cover of 14-85%.

Dominant species are:

- ***Canopy:*** *Eucalyptus pilularis, Angophora costata* and *Banksia serrata;*
- ***Mid stratum:*** *Acacia longifolia subsp. sophorae, Persoonia lanceolata, Chrysanthemoides monilifera, Persoonia levis, Pimelea linifolia* and *Dillwynia retorta*; and
- ***Groundcover:*** *Pomax umbellata, Pteridium esculentum, Gonocarpus teucrioides, Themeda triandra, Lomandra longifolia* and *Dianella caerulea var. producta.*

Plate 2 Smooth-barked – Old Man Banksia Woodland in Moderate to Good High Condition in the HV Transmission Line Study Area

SWAMP OAK FLOODPLAIN SWAMP FOREST - PCT 1232

This PCT is in the north of the HV Transmission Line Study Area (Figure 2). One Biobanking Plot was conducted within this PCT. Plate 3 shows the PCT looking south from Lavis Lane and Plate 4 shows the Biobanking Plot vegetation.

This PCT is consistent with the TEC of Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions listed as endangered under the BC Act.

This PCT has been assessed against the EPBC Act condition criteria for the Coastal Swamp Oak (*Casuarina glauca*) Forest, listed as endangered under the EPBC Act. This assessment concluded that this PCT does not meet the condition criteria for the Coastal Swamp Oak (*Casuarina glauca*) Forest. This assessment was conducted in the Threatened Biodiversity Section later in this report.

Area: 0.19 ha
Vegetation Formation: Forested Wetlands
Vegetation Class: Coastal Swamp Forest

- **Canopy height** ranged from 15 to 20 m with percent foliage cover of 15-25%.
- **Mid stratum height** ranged from 3 to 6 m with percent foliage cover of 0-80%.
- **Groundcover height** ranged from 0 to 0.9 m with percent foliage cover of 0-85%.

Dominant species are:

- ***Canopy:*** *Casuarina glauca, Livistona australis* and *Melaleuca linearifolia;*
- ***Mid stratum:*** *Cyanea australis, Alocasia brisbanensis, Lantana camara*
- ***Groundcover:*** *Calochlaena dubia, Persicaria strigosa, Enydra woollsii.*

VEGETATION CONDITION

PCT 1232 has been classified into moderate to good moderate condition and has been allocated as Zone 4 (Figure 2). PCT 1232 is part of the updated VIS classification and does not have benchmarks from the BBAM methodology to compare with this PCT. Therefore, the PCT which has the best fits the vegetation within the HV Transmission Study Area was selected. PCT 1234 Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion was identified as being the PCT with the vegetation composition and structure meets the vegetation characteristics observed with the HV transmission Study Area. The BioBanking plot data (Table 6) from plot BBa met or were above benchmark values except for shrubs for this PCT. However, the high percentage cover of *Lantana camara* restricted the growth of the understorey and ground layer cover. The percentage cover of the other species was in some of the cleared areas and under the edges of the *Lantana camara*. Refer to Plate 4.

Table 6 Comparison of Swamp Oak Floodplain Swamp Forest against PCT 1234 benchmarks – Zone 5

Benchmark Attribute	Benchmark	Plot BB a
Plant Species Diversity	15	20
Native Over Storey % Cover	15-65	15
Native Mid Story % Cover	0-50	1
Native Ground Grasses	0-90	0
Native Ground Shrubs	1-15	0
Native Ground Other	2-90	36
Exotic Species %	-	82
Number of Trees with Hollows	0.8	0
Over Storey Regeneration	-	0
Length of Fallen Timber	10	26.2

Plate 3 PCT 1232 Swamp Oak Floodplain Swamp Forest looking south from Lavis Lane

Plate 4 PCT 1232 Swamp Oak Floodplain Swamp Forest

BROAD-LEAVED PAPERBARK – SWAMP MAHOGANY - SWAMP OAK – SAW SEDGE SWAMP FOREST - PCT 1717

This PCT is located to the south of the Swamp Oak Floodplain Swamp Forest within the HV Transmission Line Study Area (Figure 2, Plate 5). One Biobanking Plot was conducted within this PCT (Figure 2).

This PCT is commensurate with the TEC of Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions listed under the BC Act. This PCT is not commensurate with any TEC listed on the EPBC Act.

Area: 0.04 ha
Vegetation Formation: Forested Wetlands
Vegetation Class: Coastal Swamp Forest

- **Canopy height** ranged from 10 to 20 m with percent foliage cover of 0-40%.
- **Mid stratum height** ranged from 3 to 6 m with percent foliage cover of 0-80%.
- **Groundcover height** ranged from 0 to 0.9 m with percent foliage cover of 0-15%.

Dominant species are:

- ***Canopy:*** *Melaleuca quinquenervia, Eucalyptus robusta* and *Livistona australis;*
- ***Mid stratum:*** *Alocasia brisbanensis, Lantana camara*
- ***Groundcover:*** *Calochlaena dubia, Histiopteris incisa, Viola hederacea.*

VEGETATION CONDITION

PCT 1717 has been classified into moderate to good high condition and has been allocated as Zone 5 (Figure 2). Table 7 is a comparison of the benchmark condition for this against the data collected from the BioBanking Plot within the HV Transmission Line Study Area. The moderate species diversity recorded was a result of high percentage canopy cover in patches within the HV Transmission Line Study Area. High percentage cover of *Lantana camara* (Plate 6) combined with the presence of some *Livistona australis* (and fallen leaves of *Livistona australis)* restricted the growth of the understorey and ground layer cover. The percentage mid storey cover was largely due to the presence of juvenile *Livistona australis* palms. The fallen timber is likely to be higher than recorded due to the dense Lantana thicket making it difficult to see the ground. Five *Eucalyptus robusta* trees were located in this PCT.

Table 7 Comparison of Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest against PCT 1717 benchmarks – Zone 5

Benchmark Attribute	Benchmark	Plot BB a
Plant Species Diversity	24	15
Native Over Storey % Cover	15-70	34
Native Mid Story % Cover	10-60	28
Native Ground Grasses	5-50	0
Native Ground Shrubs	5-30	0
Native Ground Other	5-40	18
Exotic Species %	-	44
Number of Trees with Hollows	0.2	2
Over Storey Regeneration	-	1
Length of Fallen Timber	5	3.2

Plate 5 Plot BBb Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest

Plate 6 Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest

EXOTIC VEGETATION

The exotic vegetation consists of dense areas of *Lantana camara* with a height of 0.5-2m and percentage foliage cover of 90-100%. Some patches contained *Phragmites australis* in amongst the Lantana. This vegetation type occurs in two patches to the west of Lavis Lane (Figure 2). This community does not form part of any native vegetation community or PCT. The area of this vegetation is 0.04 ha within the HV Transmission Line Study Area. Refer to Plate 7 for an example of this vegetation type.

Plate 7 Exotic Vegetation with dominance of Lantana

FLORA SPECIES RECORDED

Seventy-six flora species were recorded during the field survey of which 51 were native and 25 were exotic. Refer to Appendix 3 for the full species list.

No threatened flora species were recorded.

Of the 25 exotic flora species recorded within the HV Transmission Line Study Area, four are listed as priority weeds on the *Biosecurity Act, 2015* (BSA Act) for the Port Stephens LGA and they are all Weeds of National Significance (WONS), as provided in Table 8 below.

Table 8 Listed Weeds Recorded

Species	NSW BS Act for Port Stephens LGA	Weed of National Significance (WONS) (Yes/-)
***Asparagus aethiopicus* (Asparagus Fern)**	Prohibition on dealings	Yes
***Chrysanthemoides monilifera subsp. rotundata* (Bitou Bush)**	Prohibition on dealings Biosecurity Zone	Yes
Lantana camara (Lantana)	Prohibition on dealings	Yes
***Senecio madagascariensis* (Fireweed)**	Prohibition on dealings	Yes

Department of Primary Industries specifies the following restrictions for priority Weeds as follows:

- **Prohibition on dealings**: must not be imported into the state or sold.
- **Biosecurity Zone**: Must be eradicated where practical, or as much of the weed destroyed as practical and any remaining suppressed. The local control authority must be notified of any new infestations of this weed within the biosecurity zone.

FAUNA HABITAT

Three habitats were recorded within the HV Transmission Line Study Area as outlined in Table 9.

Table 9 Fauna Habitats

Fauna Habitat	Corresponding PCT
Open Forest	Smooth-barked Apple – Blackbutt – Old Man Banksia Woodland on coastal sands of the Central and Lower North Coast
Swamp Forest	Swamp Oak Floodplain Forest Broad-leaved Paperbark – Swamp Mahogany - Swamp Oak – Saw Sedge Swamp Forest
Heath	Coast Tea Tree – Old Man Banksia coastal shrubland on foredunes of the Central and Lower North Coast Exotic Vegetation

Heath and open forest have previously been described in the EA assessment (EPS, 2018) and these habitats do not differ from the ones recorded within the HV Transmission Line Study Area. Therefore, they have not been further described in this report.

The swamp forest provides suitable habitat for a range of fauna, including frogs, snakes, terrestrial small passerine birds, arboreal and terrestrial mammals. and limited value for fish as well as foraging and roosting habitat for microbats. The swamp forest contains a high density of paperbark trees containing blossom and nectar resources providing foraging habitat for a range of bird and arboreal fauna species. The fallen palm leaves and timber provide foraging and sheltering habitat for ground dwelling mammals, reptiles and amphibians. The five *Eucalyptus robusta* (Swamp Mahogany) trees provide winter-flowering resources and are also listed as preferred Koala feed trees in Port Stephens in the CKPoM.

Paperbarks provide an abundance of peeling bark which several microbat species are known to utilise during the day for shelter (Lumsden et.al, 2002). The dense thickets of *Lantana camara*, provide limited habitat for fauna species, however sheltering and foraging habitat is available for small passerine birds. An Eastern Yellow Robin was recorded sheltering within the Lantana thicket. One hollow-bearing tree was recorded within this habitat providing roosting and breeding habitat for microbats and arboreal mammals.

HOLLOW-BEARING TREE SURVEY

Two additional hollow-bearing trees were recorded within the HV Transmission Line Study Area during the current field surveys. These two trees contained a total of 1 very small, 2 small, 4 medium and 1 large hollow.

As a result of the EA study area and the HV Transmission Line Study Area overlapping to the east of Lavis Lane, the previous ecological assessment (EPS, 2018) recorded 2 hollow-bearing trees within the HV Transmission Line Study Area (Figure 2). Therefore, a total of four hollow-bearing trees have been recorded within the HV Transmission Line Study Area (Figure 2). A total of 90 hollow-bearing trees, with 207 hollows were recorded within both the EA study area and the HV Transmission Line Study Area combined.

NSW THREATENED BIODIVERSITY

BC ACT THREATENED ECOLOGICAL COMMUNITIES

SWAMP SCLEROPHYLL FOREST ON COASTAL FLOODPLAIN

PCT 1717 Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest within the HV Transmission Line Study Area is consistent with Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions listed as Endangered under the BC Act. The PCT occurs in the Sydney Basin Bioregion on a coastal floodplain, being the Hunter River Floodplain. PCT 1717 occurs on poorly drained humic gley soils of the Hunter River (Bobs Farm Soil Landscape). The PCT 1717 is at an elevation of below 15 m and below the 1 in 100-year flood level. *Melaleuca quinquenervia* and *Eucalyptus robusta* are the dominant canopy species the shrub and ground layer are dominated by exotic species, however small patches of the community contain herbs

and ferns which commonly occur within this TEC species listed in the scientific determination. Furthermore, a search of the TEC Power Query identifies this PCT as being commensurate with Swamp Sclerophyll Forest on Coastal Floodplains. Figure 2 shows the location of this TEC.

SWAMP OAK FLOODPLAIN FOREST

PCT 1232 Swamp Oak Floodplain Swamp Forest within the HV Transmission Line Study Area is consistent with Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions listed as Endangered under the BC Act. PCT 1232 occurs in the Sydney Basin Bioregion on a coastal floodplain, being the Hunter River Floodplain. The vegetation occurs on poorly drained humic gley soils (Bobs Farm Soil Landscape) of the Hunter River. PCT 1232 is at an elevation of below 15 m and below the 1 in 100-year flood level. *Casuarina glauca* is the dominant canopy species the shrub and ground layer are dominated by exotic species, however small patches of the community contain herbs and ferns which commonly occur within this TEC species listed in the scientific determination. Furthermore, a search of the TEC Power Query identifies PCT 1232 as being commensurate with Swamp Oak Floodplain Forest. Figure 2 shows the location of this TEC.

BC ACT THREATENED FLORA SPECIES

No threatened flora were recorded during the survey.

The OEH Bionet database search identified 9 threatened flora species known and or to have potential to occur within a 10km radius of the HV Transmission Line Study Area (Appendix 2). Of these four threatened flora species were identified as having habitat within the HV Transmission Line Study Area. All these threatened flora species have previously been assessed as part of the EA assessment (EPS, 2018). Therefore, impact assessments for these threatened flora species have not been conducted as part of this report due to the small area of impact which is unlikely to result in a change to a significant impact to these threatened flora species.

BC ACT THREATENED FAUNA SPECIES

No threatened fauna were recorded during the survey.

The OEH Bionet database search identified 25 threatened fauna species known and or to have potential to occur within a 10km radius of the HV Transmission Line Study Area (Appendix 2). Of these twenty-two threatened fauna species have been assessed as having potential habitat within the HV Transmission Line Study Area (Appendix 3). Significant impact assessments for these species have been conducted as part of the EA assessment (EPS, 2018). Therefore, impact assessments for most of these threatened fauna species has not been conducted as part of this report due to the small area of impact which is unlikely to result in a significant change to impact to these threatened fauna species overall. However, an updated significance impact assessment has been completed for the Koala due to the new presence of preferred Koala feed trees within the HV Transmission Line.

COMMONWEALTH THREATENED BIODIVERSITY

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

PCT 1232 Swamp Oak Floodplain Swamp Forest, Sydney Basin and South East Corner Bioregion has the potential to meet the criteria for Coastal Swamp Oak (*Casuarina glauca*) Forest, listed as endangered under the EPBC Act. Therefore, an assessment this PCT was conducted below to determine if it meets the criteria for the federal listing of this endangered ecological community.

To meet the criteria the PCT must meet the key characteristics (Table 10) and the condition thresholds (Table 11) as outlined in the EPBC Act conservation advice for this community.

Table 10 Key Diagnostic Criteria for Coastal Swamp Oak (*Casuarina glauca*) Forest

Key Diagnostic Characteristic	Response
It occurs in South east Queensland, NSW North Coast, Sydney Basin or South East Corner Bioregion **AND**	Occurs in Sydney Basin Bioregion
It occurs in coastal catchments at elevations up to 50m ASL, on coastal flats, floodplains, drainage lines, lake margins wetlands and estuarine fringes where soils are at least occasionally saturated, water-logged or inundated. **AND**	Occurs on the Hunter River Floodplain at 15 ASL
It occurs on soils derived from unconsolidated sediments (including alluvium), typically hydrosols and sometimes organosols **AND**	The community is on the poorly drained humic gleys of the Bobs Farm soil landscape (eSpade web site)
It is an open woodland, woodland or forest, or closed forest structure with a tree canopy that has a total crown cover of at least 10 percent **AND**	The total crown cover is approximately 40%
Has a canopy dominated by *Casuarina glauca*	*Casuarina glauca* is the dominant tree species
Does the community meet the key characteristics?	Yes

Condition Classification for Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland

Table 11 is an extract from the EPBC Act conservation advice of the condition assessment for this TEC and has been considered, with conclusions provided below the table.

Table 11 Condition thresholds and categories for patches of Coastal Swamp Oak Forest – as outlined in the EPBC Act conservation advise for Coastal Swamp Oak (*Casuarina glauca)* Forest

Condition thresholds **Patch size classes★** **★ Vegetation quality classes**	Large patch **The patch is at least 5 ha**	Medium patch **The patch is at least 2 ha and less than5 ha**	Small contiguous** patch **The patch is at least 0.5 ha and less than 2 ha, and is connected to a larger area of native vegetation of at least 5 ha**	Small patch **The patch is at least 0.5 ha and less than 2 ha**
HIGH QUALITY Predominantly native understorey **Non-native species comprise** less than 20**% of total understorey vegetation cover***	**CATEGORY A** A large patch that meets **key diagnostics** and has a predominantly native understorey	**CATEGORY B** A medium patch that meets **key diagnostics** and has a predominantly native understorey OR **A small patch** that meets key diagnostics and has a predominantly native understorey and is contiguous** with another large area of native vegetation		**CATEGORY C** A small patch that meets **key diagnostics** and has a predominantly native understorey
GOOD QUALITY Mostly native understorey **Non-native species comprise** less than 50% **of total understorey vegetation cover*** AND **transformer species*** comprise** less than 30% **of total understorey**	**CATEGORY B** A large patch that meets **key diagnostics** and has a mostly native understorey	**CATEGORY C** A medium patch that **meets key diagnostics** and has a mostly native understorey OR A small patch that **meets key diagnostics** and has a mostly native understorey and is contiguous** with another large area of native vegetation		
MODERATE QUALITY **Some native understorey** **Non-native species comprise** less than 80% **of total understorey vegetation cover*** AND **transformer species*** comprise** less than 50% **of total understorey vegetation cover***	CATEGORY C **A large or medium patch that meets** key diagnostics **and has some native understorey**			

*Refers to total perennial understorey vegetation cover for the patch of the ecological community. Includes vascular plant species of all layers below the canopy with a lifecycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs and juvenile plants of canopy species, but does not include annual

plants, cryptogams, plant litter or exposed soil. Areas of little to no understorey vegetation cover (e.g. plant litter) are included if key diagnostics are met and non-native species are below thresholds.

**Contiguous means the patch is connected or in close proximity (within 30 m) to another area of native vegetation.

***Transformer species (e.g. *Chrysanthemoides monilifera, Asparagus* spp, *Pennisetum* spp, *Ipomoea* spp. Etc.) are non-native plant species with the potential to permanently change the character, condition, form or nature of patches of the ecological community. Annual weeds, such as *Symphyotrichum subulatum* (saltmarsh aster), may be seasonally very abundant and temporarily restrict the development of native species, but would not be counted as transformer weeds in determining condition.

PCT 1232 Swamp Oak Floodplain Swamp Forest does not meet the condition criteria for this TEC for the following reasons:

- The patch has a total exotic species percentage cover of 82%. (See Plot 1 data in Table 6);
- The patch has 82% cover of the transformer species *Lantana camara*.

Therefore, this PCT is not an example of the EPBC-listed form of TEC, being Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland.

EPBC ACT THREATENED FLORA

No threatened flora were recorded during the survey.

The EPBC Act Protected Matters search identified 16 threatened flora species known and or to have potential to occur within a 10km radius of the HV Transmission Line Study Area (Appendix 2). Of these three were identified as having habitat within the HV Transmission Line Study Area. These threatened flora species have previously been assessed as part of the EA report (EPS, 2018). Therefore, impact assessments for these threatened flora species has not been conducted as part of this report due to the small area of impact (0.19 ha) and the previous assessments remain valid.

EPBC ACT THREATENED FAUNA

No threatened fauna were recorded during the survey.

The EPBC Act protected matters database search identified sixteen threatened fauna species known and or to have potential to occur within a 10km radius of the HV Transmission Line Study Area (Appendix 2). Of these eight threatened fauna species were identified as having habitat within the HV Transmission Line Study Area. These threatened fauna species have previously been assessed as part of the EA report (EPS, 2018). Therefore, impact assessments for these threatened fauna species have not been conducted as part of this report due to the small area of impact (0.19 ha) and the previous assessments remain valid.

MIGRATORY SPECIES

The EPBC Act protected matters database search identified eleven migratory species with the potential to occur within the HV Transmission Line Study Area (Appendix 2). Marine species and migratory marine species have been excluded for this assessment. Of these three migratory species were identified as having habitat within the HV Transmission Line Study Area (Appendix 5).

These migratory species include:

- *Apus pacificus* Fork-tailed Swift
- *Hirundapus caudacutus* White-throated Needletail
- *Haliaeetus leucogaster* White-bellied Sea Eagle

Under the EPBC Act listed migratory species have areas of important habitat. The EPBC Act Significant impact guidelines for Matters of National Significance (2013) defines important habitat for migratory species as:

- Habitat utilised by migratory species occasionally or periodically within a region that supports ecological significant proportion of the species; and /or
- Habitat that is of critical importance to the species at particular life-cycle stages; and/or
- Habitat utilised by a migratory species which is at the limit of the species range; and/or
- Habitat in an area where the species is declining.

The Fork-tailed Swift and White-throated Needletail forage aerially for insects therefore would likely to fly over the HV Transmission Line Study Area. Foraging and nesting habitat occurs within the HV Transmission Line Study Area for the White-bellied Sea Eagle. The White-bellied Sea Eagle was recorded flying over the EA Study Area during the previous surveys. A large stick nest was also recorded which is likely to be a White-bellied Sea Eagle nest. Whilst the project will remove a small area of vegetation, large areas of habitat for this species occur within the surrounding environment of the Worimi State Conservation Area and ocean habitat to the east of the HV Transmission Line Study Area.

Therefore, the habitat within the HV Transmission Line Study Area is unlikely to be classified as important habitat under the EPBC Act significant assessment guidelines (2013) for these species.

OTHER MATTERS OF NATIONAL SIGNIFICANCE

WORLD HERITAGE

No world heritage properties or places were identified by the EPBC Act protected matters search.

RAMSAR WETLAND

The Ramsar listed Hunter Estuary Wetlands occurs approximately 5km southwest of the HV Transmission Line Study Area. This site acts as both a feeding and roosting site for a large seasonal population of shorebirds and migratory birds. In excess of 250 species of birds have been recorded within the Ramsar site. In addition, the Ramsar site provides habitat for the nationally threatened Green and Golden Bell Frog, Red Goshawk and Australasian Bittern. The project is unlikely to impact upon the Hunter Estuary Wetlands due the distance from the HV Transmission Line Study Area.

No other MNES are relevant to this project.

KOALA ASSESSMENT

Three Koala policies have been reviewed to assess the Koala as part of report, these include the following:

- Port Stephens Council Comprehensive Koala Plan of Management (CKPoM);
- NSW Recovery Plan for Koala; and
- EPBC Act Referral Guidelines for the Koala.

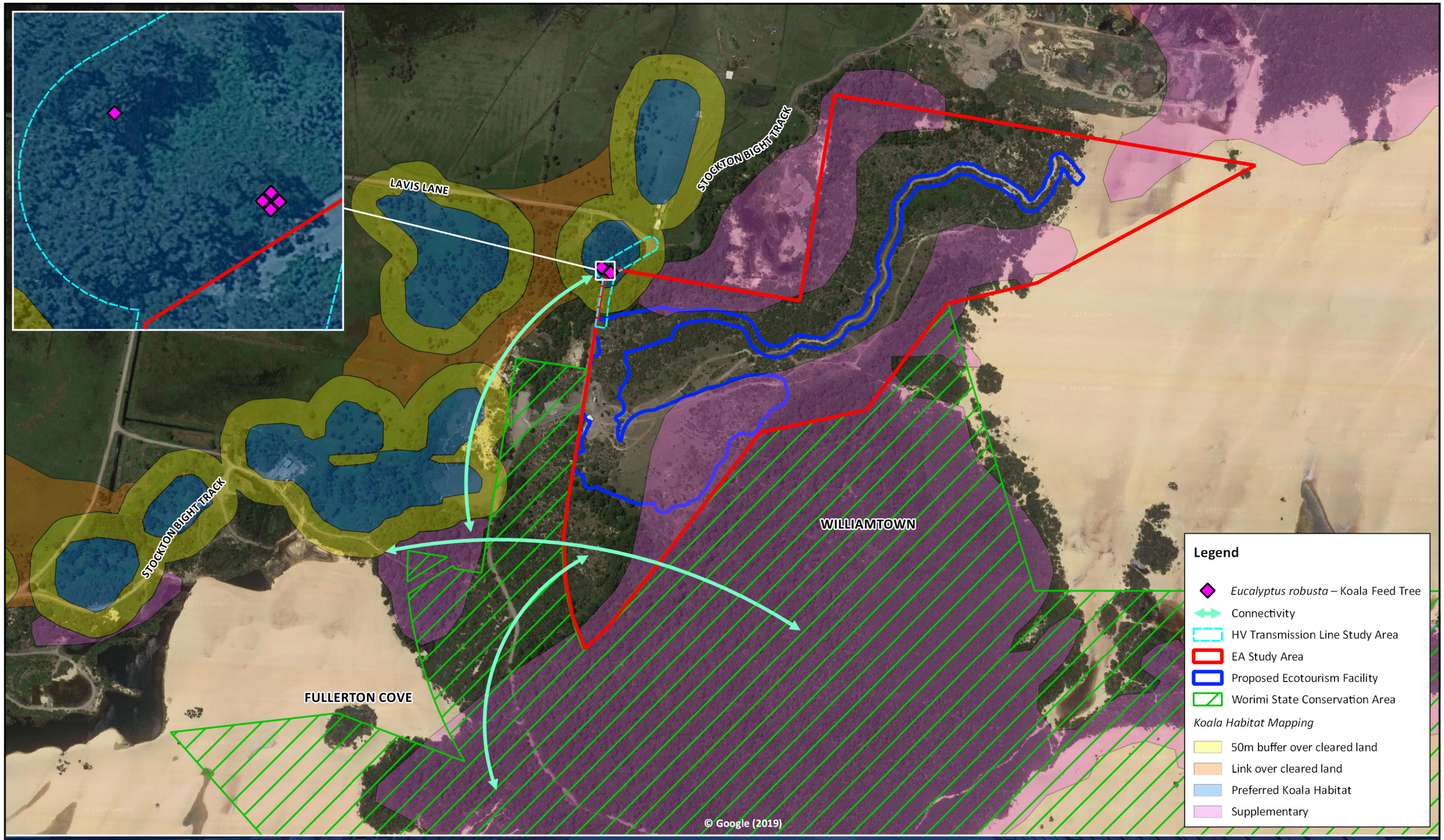
Two OEH database records of the Koala occur approximately 1 km to the east and these are greater than 10 years old. Records of Koala occur in the Worimi State Conservation Area and are also greater than ten years old.

Many recent records occur to the north of the HV Transmission Line Study Area at Williamtown and near Grahamstown Dam. Port Stephens LGA has a large Koala population and large number of BioNet database records for the overall locality.

PORT STEPHENS COUNCIL COMPREHENSIVE KOALA PLAN OF MANAGEMENT (CKPOM)

The CKPoM maps the HV Transmission Line Study Area as being within the Fullerton Cove/Stockton Bight management unit.

Refer to Figure 3 for the Koala habitat mapping from the CKPoM.



EPS

0 100 200 300 m

Map Projection: GDA94 / MGA Zone 56

Figure 3

CKPoM Koala Habitat Mapping

WLALC Eco-tourism | Williamtown NSW Australia

Date:	26/06/19
Author:	SW
Reviewer:	AT
Scale:	1:7,000
Job Ref/Ver:	11245/V01

20190619_11245_Figure3_V01.qgs

The HV Transmission Line Study Area has been mapped as preferred Koala habitat with a 50m buffer over cleared land surrounding the HV Transmission Line Study Area. A link over mostly cleared land has been mapped to the south west linking the HV Transmission Line Study Area to other areas of preferred Koala habitat. Koalas generally are considered likely to occur in low densities throughout the locality, including the adjoining Worimi State Conservation Area that has been mapped as supplementary Koala habitat.

Five *Eucalyptus robusta* (Swamp Mahogany) which are Koala feed trees, were recorded within the HV Transmission Line Study Area in two locations. Four of the *Eucalyptus robusta* trees were located within less than half a metre from each other. Therefore, one SAT assessment was conducted centred on these four trees. One *Eucalyptus robusta* tree is in the west of the HV Transmission Line Study Area, and an additional SAT assessment was undertaken centred on this tree. Due to the small size of the HV Transmission Line Study Area all the trees were searched for Koalas, scats, pock marks and scratches. No Koalas, scats, pock marks or scratches were observed during the field surveys.

The HV Transmission Line Study Area has connectivity to the south and east which would facilitate movements (Figure 3) between areas of habitat for the Koala. The five *Eucalyptus robusta* trees are likely to be removed as a result of the HV Transmission Line. The *Eucalyptus robusta* trees are small in diameter and low in numbers throughout the PCT. In the adjoining patches of the Koala habitat, *Eucalyptus robusta* trees were young and also in small numbers. The trees within the HV Transmission Line Study Area adjoined the Exotic vegetation and it is likely that the area was cleared in the recent past with these trees being regrowth.

An assessment under the CKPoM has been undertaken in Appendix 8. This assessment concluded that consent for the project should be not be withheld on Koala habitat grounds.

NSW RECOVERY PLAN FOR THE KOALA

The NSW Recovery plan for Koala identifies seven management areas (KMAs), each of these management areas lists primary, secondary and supplementary food trees for each KMA (Department of Environment and Climate Change, 2008). The HV Transmission Line Study Area is located in the North Coast KMA. One primary Koala food tree species of *Eucalyptus robusta* is present within the HV Transmission Line Study Area.

COMMONWEALTH KOALA ASSESSMENT

A small number of Koala records occur within the Worimi State Conservation Area and two have been recorded within the HV Transmission Line Study Area which are over 10 years old. A large population occurs to the north at Williamtown, and the HV Transmission Line Study Area is part of large area of Koala habitat. Therefore, an assessment under the EPBC Act referral guidelines for the Vulnerable Koala (Department of the Environment, 2014) has been undertaken. As outlined in the Koala referral guidelines impact areas that score 4 or less are not critical to the survival to the Koala. The HV Transmission Line Study Area score was 4 (Table

5-1) and therefore the HV Transmission Line Study Area is not critical to the survival of the Koala. In accordance with the flowchart on page 30 of the referral guidelines for the Koala a referral is therefore not required.

Table 12 EPBC Act Koala Habitat Assessment Tool

Attribute Score	Score	Inland	Coastal	Score
Koala Occurrence	+2 (high)	Evidence of one or more koalas within last 5 years	Evidence of one or more koalas within the last 2 years	-
	+1 (medium)	Evidence of one or more koalas within2 km of the edge of the impact area within the last 10 years.	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.	-
	0 (low)	None of the above	None of the above	0 last record was from 2004
Vegetation Composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species OR 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	Has forest or woodland with 2 or more known koala food tree species, OR 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	-
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with 1 species of known koala feed tree.	Has forest or woodland with only 1 species of known koala food tree present.	1 *Eucalyptus robusta* was recorded.
	0 (low)	None of the above	None of the above	-
Habitat Connectivity	+2 (high)	Area is part of a contiguous	Area is part of a contiguous	2 part of 600 ha connectivity

		landscape ≥ 1000 ha	landscape ≥ 500 ha.	
	+1 (medium)	Area is part of a contiguous landscape < 1000 ha, but ≥ 500 ha	Area is part of a contiguous landscape < 500 ha, but ≥ 300 ha.	-
	0 (low)	None of the above	None of the above	-
Key Existing Threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. OR Areas which score 0 for koala occurrence and have no dog or vehicle threat present		-
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, OR Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.		1 Dog tracks were observed
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the HV Transmission Line Study Area at present, OR Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.		-
Recovery Value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		-
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		-
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		0 habitat is unlikely to be important for achieving interim

			recovery objectives
Total Score			4

GROUNDWATER DEPENDANT ECOSYSTEMS

The previous ecological assessment (EPS, 2018) identified that PCTs, being Coast Tea Tree – Old Man Banksia Coastal Shrubland on foredunes and Smooth – barked Apple – Blackbutt – Old Man Banksia Woodland on Coastal Sands are classified as groundwater dependent. These two PCTs have been classified as Subsurface phreatic aquifer ecosystems on unconsolidated sand beds.

The two additional PCTs Swamp Oak Floodplain Swamp Forest and Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest are classified as groundwater dependant ecosystems. These two PCTs are also classified as Subsurface phreatic aquifer ecosystems on unconsolidated sand beds.

No groundwater drawdown is proposed as part of the project. The project is unlikely to impact substantially or significantly upon groundwater levels.

PROJECT IMPACTS

The project has the potential to impact biodiversity during both the construction and operational phases. These potential impacts include:

- Vegetation and habitat loss;
- Habitat fragmentation, edge and barrier effects;
- Fauna injury and mortality;
- Increase in spread of weeds;
- Noise, vibration and light; and
- Impact on key threatening processes.

The previous ecological assessment for the eco-tourist facility (Section 6, EPS 2018) has addressed most of the potential impacts. This project is unlikely to substantially increase these impacts due the minor area of habitat to be impacted.

However, potential additional impacts have been addressed as part of this report and include the following:

Construction Phase

- Vegetation and habitat loss;

- Impacts to Hollow-bearing trees;
- Increase in spread of weeds;

Operational Phase

- Vegetation maintenance for electricity easement

CONSTRUCTION PHASE

VEGETATION IMPACTS

The vegetation loss as a result of the construction of the HV Transmission Line is predicted to be 0.187 ha of native vegetation and 0.02 ha of non-native vegetation (Table 13). The vegetation loss resulting from the eco-tourist facility is predicted to amount to approximately 5.57 ha of native vegetation and 3.98 ha of non-native vegetation. The combined total of vegetation loss for the eco-tourist facility and the HV Transmission line is 5.757 ha of native vegetation and 4.0 ha of non-native vegetation (Table 13).

Table 13 Vegetation Removal

Plant Community Type	Zone condition	BC Act	EPBC Act	Proposed Area of removal for eco-tourist facility (ha)	Area of impact for HV Transmission Line Study Area (ha)	Total area of removal (ha)
Coast Tea Tree – Old Man Banksia coastal shrubland on foredunes of the Central and Lower North Coast – PCT 1644	Zone 1 Moderate to Good High quality	Not Listed	Not Listed	2.41	0	2.41
Coast Tea Tree – Old Man Banksia coastal shrubland on foredunes of the Central and Lower North Coast – PCT 1644	Zone 2 Moderate to Good moderate quality	Not Listed	Not Listed	2.45	0.007	2.457
Smooth-barked Apple – Blackbutt – Old Man Banksia Woodland on coastal sands of the Central and	Zone 3 Moderate to Good high quality	Not Listed	Not Listed	0.71	0.09	0.81

Lower North Coast – PCT 1643						
Swamp Oak Floodplain Swamp Forest - PCT 1232	Zone 4 moderate to good moderate quality	EEC	Does not meet the criteria for the commonwealth listing**	0	0.06	0.06
Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest - PCT 1717	Zone 5 Moderate to good moderate quality	EEC	-	0	0.02	0.02
Exotic Vegetation	-	-	-	0	0.02	0.02
Grassland with Scattered Shrubs		-	-	3.97	0	3.97
Bitou Shrubland		-	-	0.01	0	0.01
Total Native Vegetation				**5.57**	**0.177**	**5.757**
Total All Vegetation				**9.55**	**0.197**	**9.757**

*E = Endangered Ecological Community listed under the BC Act
**Does not meet the condition criteria for the Endangered ecological community of Coastal Swamp Oak (*Casuarina glauca*) Forest of NSW and South East Queensland

FAUNA HABITAT LOSS

Fauna habitat loss within the HV Transmission Line Study Area is predicted to amount to 0.197 (Table 14). When combined with the habitat loss as a result of both the construction of the HV Transmission line and the eco-tourist facility it is predicted to amount to 9.55 ha. Table 13 outlines the total fauna habitat loss as a result of the eco-tourist facility and the HV Transmission Line.

Table 14 Fauna Habitat Removal

Fauna Habitat	Corresponding PCT	Proposed Area of removal for eco-tourist facility (ha)	Proposed Area of removal of HV Transmission Line Study Area (ha)	Total area of removal (ha)
Open Forest	Smooth-barked Apple – Blackbutt – Old Man Banksia Woodland on	0.71	0.09	0.81

	coastal sands of the Central and Lower North Coast			
Swamp Forest	Swamp Oak Floodplain Forest Broad-leaved Paperbark – Swamp Mahogany - Swamp Oak – Saw Sedge Swamp Forest	0	0.08	0.08
Heath	Coast Tea Tree – Old Man Banksia coastal shrubland on foredunes of the Central and Lower North Coast Bitou Shrubland Exotic Vegetation	4.87	0.027	4.89
Grassland	Exotic Grassland with Scattered Shrubs	3.97	0	3.97
Total		**9.55**	**0.197**	**9.75**

HOLLOW-BEARING TREES

Eighty-eight (88) hollow-bearing trees, with 199 hollows were recorded within the EA study area. An additional two hollow-bearing trees were recorded within the HV Transmission Line Study Area. Combined totals for both study areas amounts to 90 hollow-bearing trees with 207 hollows.

Four hollow-bearing trees were recorded within the HV Transmission Line Study Area. Two were recorded as part of these current surveys and two as part of the EA assessment for the ecotourist facility (EPS, 2018) (Figure 2).

Of these two hollow-bearing trees with a total of 9 hollows are likely to be removed as part of the project (Figure 2). With 88 hollow-bearing trees with a total of 198 hollows to be retained. The removal of two hollow-bearing trees is unlikely to have a significant effect upon the availability of hollow resources for hollow-dependant fauna.

Proposed mitigation measures are outlined in the mitigation section below.

WEEDS

Twenty-five species of weed were recorded within the HV Transmission Line Study Area. A higher diversity of weeds was recorded within the HV Transmission Line Study Area than the EA Study Area. The majority of these were in low numbers and were recorded along the road verge of Lavis Lane.

One weed species being *Asparagus aethiopicus,* is listed as priority weeds under the BSA Act and a weed of national significance (WON) was recorded within the HV Transmission Line

Study area and was not recorded within the EA study area. The exotic vegetation community consists of large thickets of *Lantana camara*, and the understorey of the Swamp Oak Floodplain Forest is dominated by this weed.

Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. Lat) is a key threatening process under the BC Act. The project is likely to remove some areas of *Lantana camara*, which will reduce the infestation in these areas. However, project has the potential to further spread weeds throughout the HV Transmission Line Study Area and exacerbate this KTP.

OPERATIONAL PHASE

Generally, the post-construction activities will include slashing of the ground layer and canopy trimming for bushfire maintenance and to allow access for maintenance. Vehicle movements would be restricted to undertake these activities. Slashing occurring approximately every 6 months, depending upon the growth of the understorey. Trimming of canopy trees would also be as needed. A Vegetation Management Plan would be required to manage weeds for these activities to ensure further weeds are not brought within the transmission easement and spread into the surrounding threatened ecological communities.

Mitigation measures are outlined below.

MITIGATION MEASURES

Overall, construction impacts are likely to be relatively minor due to the small area of impact. Similarly, the operation phase of the project will consist of low-impact ongoing vegetation maintenance.

Mitigation measures to further reduce the residual impacts to the biodiversity values of the HV Transmission Line Study Area are outlined in Table 15 below.

Table 15 Mitigation Measures

Impact	Mitigation Measure	Responsibility	Timing
Hollow-bearing Tree Removal	It is recommended that the following mitigation measures be implemented for the removal of the hollow-bearing trees: Marking trees to be removed and preparing an inventory of trees and hollows to be removed. Pre-clearance surveys to be completed by an appropriately qualified ecologist. A qualified ecologist should be present during the removal of hollow-bearing trees to relocate any displaced fauna. If practical removal of hollow-bearing trees be undertaken outside of May – September which is the main breeding season for hollow-dependant fauna.	Construction contractor Ecologist	Pre-construction and construction
Spread of priority weeds and pathogens	Implementation of a weed management control protocol. All equipment, vehicles and machinery wheels and tracks of excavators and other tracked machinery should be cleaned so that they are completely free of soil, seeds and plant material before entering the site to prevent the introduction of further exotic plant species and pathogens. Post construction weed control should be implemented to control the spread of Lantana camara.	Construction Contractor	Construction Post construction
Biodiversity impacts during construction and operation	It is expected that a Vegetation Management Plan in accordance with Ausgrid requirements would be prepared as part of the progression of the HV Transmission Line construction and operation.	To be determined	Construction Post construction

SIGNIFICANCE ASSESSMENT SUMMARY

Tables 16 and 17 provide a summary of significance impact assessments conducted for threatened flora and fauna as part of the Ecological Assessment for the eco-tourist facility (Section 8, Appendix 7 EPS 2018). No additional threatened species of flora or fauna listed under the EPBC Act and/or the BC Act were identified has having habitat within the HV Transmission Study Area to those which were previously identified within the EA report (EPS, 2018). Therefore, it is considered that the previous 7-part tests remain valid because the impact area is only increasing by 0.19 ha. However, an updated significance impact assessment has been completed in Appendix 7 for the Koala due to the new presence of preferred Koala feed trees within the HV Transmission Line. The conclusion remains for the Koala that a significant impact is unlikely to occur.

Two additional TECs listed as endangered under the BC Act were recorded within the HV Transmission Line Study Area which were not recorded within the EA study area. Table 18 lists these two TECs. New 7-part impact assessments have been conducted in Appendix 7 for these TECs. It was concluded that no significant impact was considered likely to occur for these two TECs as a result of the construction and operation of the HV Transmission Line.

No Commonwealth MNES are considered likely to be significantly impacted by the project.

A referral to the Commonwealth is not required as no significant impact was determined for any threatened biodiversity or other MNES listed under the EPBC Act.

Table 16 Fauna Significance Assessments conducted as part of the EA assessment

Scientific Name	Common Name	BC Act	EPBC Act	Recorded (Y/N)	Significant impact likely?
Birds					
Anthochaera phrygia	Regent Honeyeater	CE	CE M	No	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	No	No
Glossopsitta pusilla	Little Lorikeet	V	-	No	No
Lathamus discolor	Swift Parrot	E	CE M	No	No
Ninox strenua	Powerful Owl	V	-	Yes	No
Tyto novaehollandiae	Masked Owl	V	-	No	No

Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	No	No
Haliaeetus leucogaster	White-bellied Sea Eagle	V	M	Yes	No
Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area		EP	-	No	No
Mammals					
Dasyurus maculatus	Spotted-tail Quoll	V	E	No	No
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	No	No
Phascolarctos cinereus	Koala	V	V	No	No
Petaurus norfolcensis	Squirrel Glider	V	-	No	No
Petauroides volans	Greater Glider	-	V	No	No
Potorous tridactylus	Long-nosed Potoroo	V		No	No
Pteropus poliocephalus	Grey-headed Flying Fox	V	V	Yes	No
Pseudomys novaehollandiae	New Holland Mouse	-	V	No	No
Bats					
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	No	No
Mormopterus norfolkensis	Eastern Freetail-bat	V	-	No	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	No	No
Austronomus australis	Little Bentwing-bat	V	-	Yes	No
Miniopterus schreibersii oceanensis	Eastern Bent wing-bat	V	-	No	No
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	No	No
Myotis macropus	Southern Myotis	V	-	No	No

Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	No	No

* EP = Endangered Population, V=Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory.

Table 17 Threatened Flora Significance Assessments

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Recorded (Y/N)	Significant impact likely?
Commersonia prostrata	Dwarf Kerrawang	E	E	No	No
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	No	No
Diuris arenaria	Sand Doubletail	E	-	No	No
Diuris praecox	Rough Doubletail	V	V	No	No

* V=Vulnerable, E = Endangered, CE = Critically Endangered

Table 18 Threatened Ecological Communities Significance Assessments

Threatened Ecological Community	BC Act Status	EPBC Act Status	Recorded (Y/N)	Significant impact likely?
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E	-	Yes	No
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E	-	Yes	No

CONCLUSIONS

Four native Plant Community Types (PCTs) and one non-native vegetation community were recorded within the HV Transmission Line Study Area and these included the following:

- Coast Tea Tree – Old Man Banksia Coastal Shrubland;
- Smooth-barked Apple – Blackbutt – Old Man Banksia Woodland;
- Swamp Oak Floodplain Forest
- Broad-leaved Paperbark – Swamp Oak – Saw Sedge Swamp Forest; and
- Exotic vegetation.

The project will involve the removal a total of 0.197 ha of native and non-native vegetation. The removal is comprised of:

- 0.007 ha of Coast Tea Tree – Old Man Banksia Coastal Shrubland;
- 0.09 ha of Smooth-barked Apple – Blackbutt – Old Man Banksia Woodland;
- 0.06 ha of Swamp Oak Floodplain Forest
- 0.02 ha of Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak – Saw Sedge Swamp Forest Exotic grassland with scattered shrubs; and
- 0.02 ha of Exotic Vegetation.

The four native vegetation communities above are groundwater dependent, however as there is no proposed draw down of groundwater and the project is unlikely to affect these GDEs.

No threatened communities listed on the EPBC Act were recorded within the HV Transmission Line Study Area.

Two threatened ecological communities listed as endangered under the BC Act were recorded within the HV Transmission Line Study Area. The project will impact upon the following endangered ecological communities:

- 0.06 ha of Swamp Oak Floodplain Forest on Coastal Floodplains; and
- 0.02 ha of Swamp Sclerophyll Forest on Coastal Floodplains;

Significance assessments for these two TECs were conducted in Appendix 7 and no significant impacts were considered likely.

No threatened flora species were recorded within the HV Transmission Line Study Area. However, four threatened species of flora listed on the BC Act and/or the EPBC Act were identified as having potential habitat within the HV Transmission Line Study Area. Significance assessments for these threatened flora species was undertaken in the EA report (EPS 2018)

and are considered to remain valid. No significant impact was considered likely as a result of the project. No 7-part tests of significance for these threatened flora species has been undertaken as part of this report as only 0.197 ha of additional vegetation will be removed. Due to the minor incremental increase in overall impacts compared to the eco-tourist facility, the previous 7-part tests remain valid.

One endangered population, Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area has the potential to occur within the HV Transmission Line Study Area. This species was not recorded within the HV Transmission Line Study Area. A significance assessment for the Emu population was undertaken as part of the EA report (EPS, 2018) and no significant impact was considered likely as a result of the project. No 7-part tests of significance for the Emu population has been undertaken as part of this report as only 0.197 ha of vegetation will be removed. Due to the minor incremental increase in overall impacts compared to the eco-tourist facility, the previous 7-part test remains valid.

25 threatened fauna species have potential habitat within the HV Transmission Line Study Area (Appendix 5). No threatened fauna species listed under the BC Act and/or the EPBC Act were recorded within the HV Transmission Line Easement. Significance assessments for these potential threatened fauna species was undertaken in the previous ecological assessment for the eco-tourism facility and no significant impacts were considered likely (EPS 2018). No 7-part tests of significance for most of these threatened fauna species has been undertaken as part of this report as only 0.197 ha of additional vegetation will be removed. Due to the minor incremental increase in overall impacts compared to the eco-tourist facility, the previous 7-part tests remain valid. However, an updated significance impact assessment has been completed for the Koala due to the new presence of preferred Koala feed trees within the HV Transmission Line and the conclusion remains that a significant impact is considered unlikely to occur.

No migratory species were recorded with three species have habitat to occur. An assessment of the impact of the project on these species was conducted in the Migratory Species section and it was determined that HV Transmission Line Study Area is not classified as important habitat for any of the migratory species that have potential to occur within the HV Transmission Line Study Area.

Four hollow-bearing trees were recorded within the HV Transmission Line Study Area. Two of these will be removed as part of the project. Of these two hollow-bearing trees, a total of 9 hollows are likely to be removed as part of the project. However, 88 hollow-bearing trees with a total of 198 hollows are to be retained overall.

No TECs or aquatic species listed under the FM Act have potential habitat within the HV Transmission Line Study Area.

No areas of outstanding biodiversity value (AOBV) listed on the BC Act (previously critical habitat under the TSC Act) occurred within the HV Transmission Line Study Area.

In conclusion, the proposed HV Transmission Line is unlikely to have a significant impact on the threatened biodiversity and as such a Species Impact Statement or referral to the Commonwealth under the EPBC Act is not required.

Regards,

Toby Lambert
Director, Ecology
EPS

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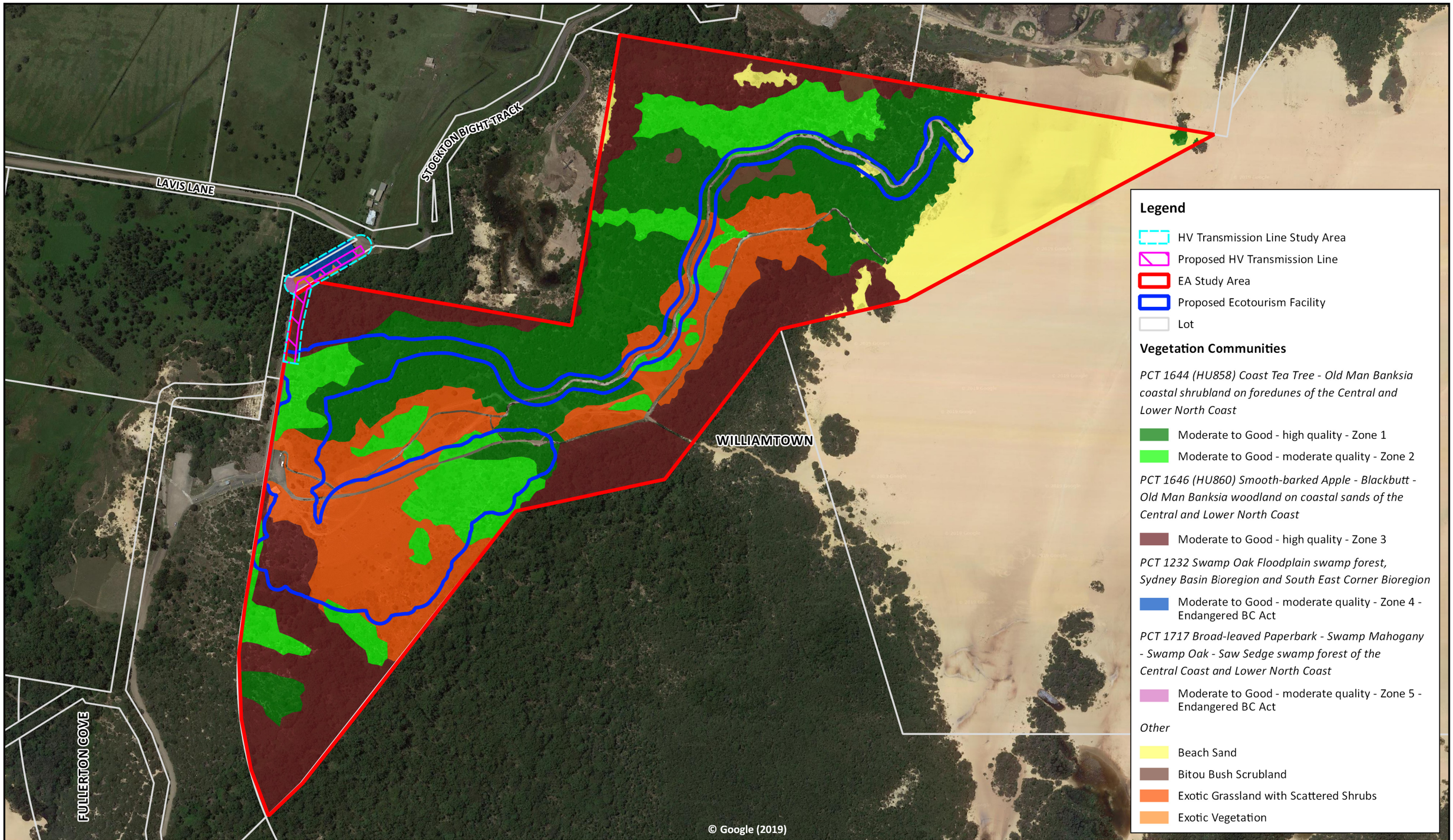
APPENDIX 1

FIGURE A1 STUDY AREA PLANT COMMUNITY TYPES



EPS

0 100 200 300 m

Map Projection: GDA94 / MGA Zone 56

Figure A1

Study Area Plant Community Types

WLALC Eco-tourism | Williamtown NSW Australia

Date: 24/06/19
Author: SW
Reviewer: AT
Scale: 1:5,000
Job Ref/Ver: 11245/V02

20190619_11245_FigureA1_V02.qgs

APPENDIX 2

DATABASE SEARCHES

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

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

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

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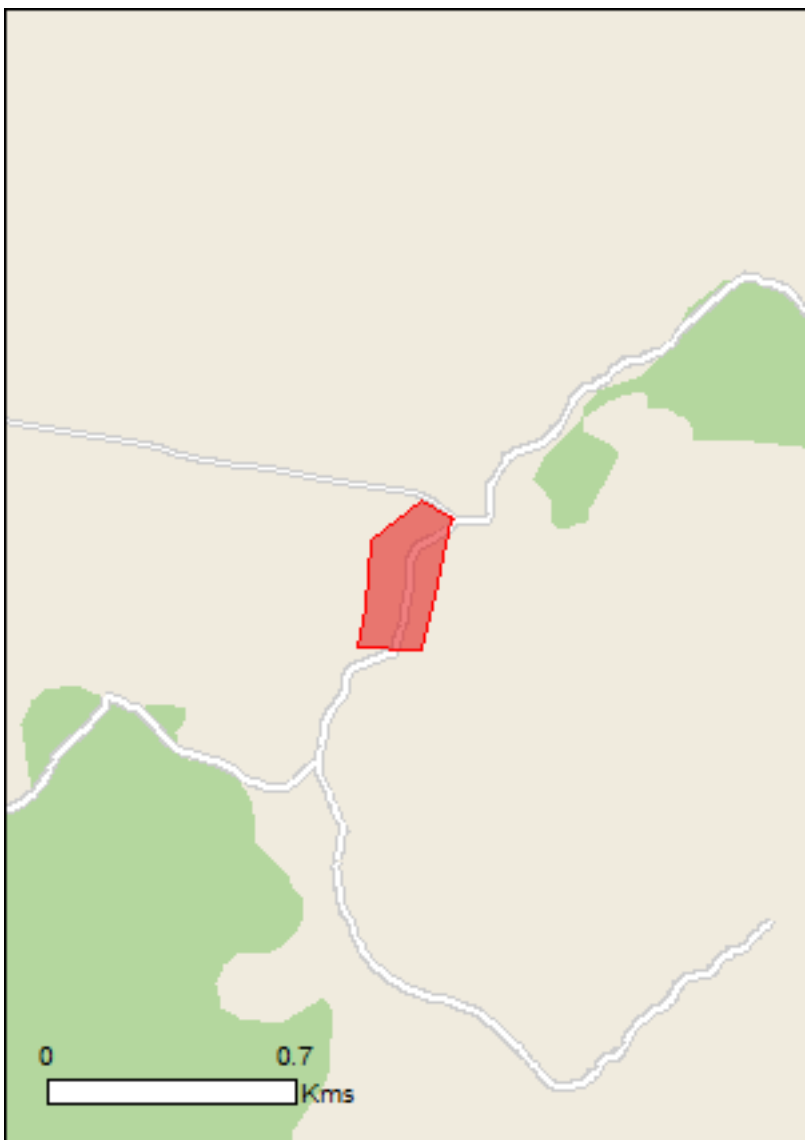

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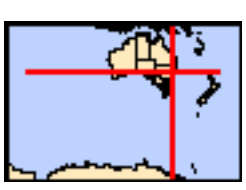

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	72
Listed Migratory Species:	74

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

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

Commonwealth Land:	6
Commonwealth Heritage Places:	2
Listed Marine Species:	98
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	8
Regional Forest Agreements:	1
Invasive Species:	44
Nationally Important Wetlands:	3
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Hunter estuary wetlands	Within Ramsar site

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea

Marine Regions [Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
Temperate East

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur

Name	Status	Type of Presence
		within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Angophora inopina		
Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area
Asperula asthenes		
Trailing Woodruff [14004]	Vulnerable	Species or species habitat may occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Commersonia prostrata		
Dwarf Kerrawang [87152]	Endangered	Species or species habitat known to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Eucalyptus camfieldii		
Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus parramattensis subsp. decadens		
Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat known to occur within area
Grevillea parviflora subsp. parviflora		
Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Melaleuca biconvexa		
Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur

Name	Threatened	Type of Presence within area
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Dugong dugon](#) Dugong [28]		Species or species habitat may occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
[Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
[Manta birostris](#) Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
[Sousa chinensis](#) Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area

Name	Threatened	Type of Presence
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Defence - RAAF BASE WILLIAMTOWN
Defence - STOCKTON RIFLE RANGE

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Fort Wallace	NSW	Listed place
Williamtown RAAF Base Group	NSW	Listed place

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Breeding may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat likely to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
[Phyllopteryx taeniolatus](#) Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
[Solegnathus spinosissimus](#) Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
[Solenostomus cyanopterus](#) Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
[Solenostomus paradoxus](#) Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
[Stigmatopora argus](#) Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
[Stigmatopora nigra](#) Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
[Syngnathoides biaculeatus](#) Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
[Trachyrhamphus bicoarctatus](#) Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
[Dugong dugon](#) Dugong [28]		Species or species habitat may occur within area
Reptiles		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus		
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis		
Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus		
Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata		
Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus		
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str.		
Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Hunter Wetlands	NSW
Medowie	NSW
Moffats Swamp	NSW
Tilligerry	NSW
Tilligerry	NSW
Worimi	NSW
Worimi	NSW
Worimi	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish		Species or species

Name	Status	Type of Presence
Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Kooragang Nature Reserve	NSW
Port Stephens Estuary	NSW
Salt Ash Air Weapons Range	NSW

Caveat

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

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

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

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

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-32.822108 151.869188,-32.822126 151.869166,-32.824867 151.868394,-32.824849 151.866806,-32.823983 151.866956,-32.822541 151.867106,-32.821729 151.868394,-32.822108 151.869188

Acknowledgements

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

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

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

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

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Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Entities in selected area [North: -32.76 West: 151.82 East: 151.92 South: -32.86] returned a total of 2,561 records of 37 species.
Report generated on 12/06/2019 4:15 PM

Kingdom	Class	Family	Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3137	*Crinia tinnula*	Wallum Froglet	V,P		46	
Animalia	Amphibia	Myobatrachidae	3932	*Uperoleia mahonyi*	Mahony's Toadlet	E1,P		1	
Animalia	Aves	Casuariidae	0001	*Dromaius novaehollandiae*	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	E2,P		5	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		4	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*	Black Bittern	V,P		1	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	C	51	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*	Square-tailed Kite	V,P,3		2	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*	Pied Oystercatcher	E1,P		5	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		1	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	Little Lorikeet	V,P		3	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*	Swift Parrot	E1,P,3	CE	5	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*	Powerful Owl	V,P,3		6	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*	Masked Owl	V,P,3		3	

Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	4	
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		3	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	V,P	V	996	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		29	
Animalia	Mammalia	Potoroidae	1175	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V	1	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	23	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		1	
Animalia	Mammalia	Molossidae	1329	*Mormopterus norfolkensis*	Eastern Freetail-bat	V,P		3	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		1	
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*	Little Bentwing-bat	V,P		18	
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V,P		8	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		3	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		9	
Animalia	Mammalia	Muridae	1455	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	9	
Animalia	Mammalia	Otariidae	1543	*Arctocephalus forsteri*	New Zealand Fur-seal	V,P		1	
Plantae	Flora	Asteraceae	9458	*Senecio spathulatus*	Coast Groundsel	E1		2	
Plantae	Flora	Juncaginaceae	3363	*Maundia triglochinoides*		V		3	
Plantae	Flora	Malvaceae	14618	*Commersonia prostrata*	Dwarf Kerrawang	E1	E	7	

Plantae	Flora	Myrtaceae	9619	*Angophora inopina*	Charmhaven Apple	V	V	6	
Plantae	Flora	Myrtaceae	4067	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V	3	
Plantae	Flora	Myrtaceae	9163	*Eucalyptus parramattensis subsp. decadens*		V	V	838	
Plantae	Flora	Orchidaceae	10765	*^Diuris arenaria*	Sand Doubletail	E1,P,2		180	
Plantae	Flora	Orchidaceae	9027	*^Diuris praecox*	Rough Doubletail	V,P,2	V	278	

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Report generated on 12/06/2019 4:30 PM

Kingdom	Class	Family	Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Casuariidae	0001	*Dromaius novaehollandiae*	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	E2,P		5	

Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Communities in selected area [North: -32.76 West: 151.82 East: 151.92 South: -32.86] returned 0 records for 21 entities.
Report generated on 12/06/2019 4:23 PM

Kingdom	Class	Family	Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Community				*Central Hunter Grey Boxâ€"Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions*	Central Hunter Grey Boxâ€"Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	E3	CE	K	
Community				*Central Hunter Ironbarkâ€"Spotted Gumâ€"Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions*	Central Hunter Ironbarkâ€"Spotted Gumâ€"Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	E3	CE	K	
Community				*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	V	P	

Community	*Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community	*Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions*	Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E3		K	
Community	*Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions*	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	E3		K	
Community	*Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion*	Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	V2	CE	K	
Community	*Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions*	Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions	E3		K	

Community	*Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion*	Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	E4B	CE	K	
Community	*Kurri Sand Swamp Woodland in the Sydney Basin Bioregion*	Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	E3		K	
Community	*Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	CE	P	
Community	*Lower Hunter Spotted Gumâ€"Ironbark Forest in the Sydney Basin Bioregion*	Lower Hunter Spotted Gumâ€"Ironbark Forest in the Sydney Basin Bioregion	E3		K	
Community	*Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions*	Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions	V2		K	
Community	*Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3	CE	K	

Community	*River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	E	K	
Community	*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community	*Sydney Freshwater Wetlands in the Sydney Basin Bioregion*	Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E3		K	
Community	*Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions*	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3		K	

Community	*Warkworth Sands Woodland in the Sydney Basin Bioregion*	Warkworth Sands Woodland in the Sydney Basin Bioregion	E3	CE	K	
Community	*White Box Yellow Box Blakelyâ€™s Red Gum Woodland*	White Box Yellow Box Blakelyâ€™s Red Gum Woodland	E3	CE	K	

APPENDIX 3

FLORA SPECIES LIST

Growth group	Growth Form	Family	*Species*	Common Name	BC Act	EPBC Act
TG	T	Casuarinaceae	*Casuarina glauca*	Swamp Oak		
TG	T	Myrtaceae	*Angophora costata*	Smooth-barked Apple	-	-
TG	T	Myrtaceae	*Eucalyptus pilularis*	Blackbutt	-	-
TG	T	Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany		
TG	T	Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark		
TG	T	Proteaceae	*Banksia serrata*	Old Man Banksia	-	-
TG	T	Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	-	-
TG	T	Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree		
SG	S	Myrtaceae	*Melaleuca linearifolia*	Prickly-leaved Paperbark		
SG	S	Fabaceae	*Acacia longifolia subsp. sophorae*	Sydney Golden Wattle	-	-
SG	S	Fabaceae	*Acacia ulicifolia*	Prickly Moses	-	-
SG	S	Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	-	-
SG	S	Fabaceae	*Dillwynia retorta*	Eggs and Bacon Pea	-	-
SG	S	Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart	-	-
SG	S	Proteaceae	*Persoonia lanceolata*	Lance Leaf Geebung	-	-
SG	S	Pittosporaceae	*Pittosporum revolutum*	Rough Fruit Pittosporum		
SG	z	Ericaceae	*Monotoca elliptica*	Tree Broom Heath	-	-
FG	F	Aizoaceae	*Carpobrotus glaucescens*	Pigface	-	-

Growth group	Growth Form	Family	*Species*	Common Name	BC Act	EPBC Act
FG	F	Araceae	*Alocasia brisbanensis*			
FG	F	Apiaceae	*Centella asiatica*			
FG	F	Asteraceae	*Enydra woollsii*			
FG	F	Convolvulaceae	*Dichondra repens*	Kidney Weed	-	-
FG	F	Phormiaceae	*Dianella caerulea var. producta*	Blue Flax-lily	-	-
FG	F	Polygonaceae	*Persicaria strigosa*			
FG	F	Polygonaceae	*Persicaria praetermissa*			
FG	F	Rubiaceae	*Pomax umbellata*	Pomax	-	-
FG	F	Campanulaceae	*Wahlenbergia stricta*	Australian Bluebell	-	-
FG	F	Solanaceae	*Solanum prinophyllum*			
FG	F	Violaceae	*Viola hederacea*			
FG	F	Zingiberaceae	*Alpinia caerulea*			
GG	G	Poaceae	*Cynodon dactylon*	Couch	-	-
GG	G	Poaceae	*Oplismenus imbecillis*	Basket Grass		
GG	G	Poaceae	*Phragmites australis*			
GG	R	Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-Rush	-	-
GG	V	Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge		
EG	E	Dennstaedtiaceae	*Histiopteris incisa*			

Growth group	Growth Form	Family	*Species*	Common Name	BC Act	EPBC Act
EG	E	Dennstaedtiaceae	*Pteridium esculentum*	Common Bracken	-	-
EG	E	Thelypteridaceae	*Cyclosorus interruptus*			
OG	P	Arecaceae	*Livistona australis*	Cabbage Tree Palm		
OG	P	Dicksoniaceae	*Calochlaena dubia*			
OG	L	Apocynaceae	*Parsonsia straminea*	Common Silkpod	-	-
OG	L	Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine	-	-
OG	L	Luzuriagaceae	*Eustrephus latifolius*			
OG	L	Fabaceae	*Glycine clandestina*	Twining Glycine	-	-
OG	L	Fabaceae	*Glycine tabacina*		-	-
OG	L	Fabaceae	*Hardenbergia violacea*	False Sarsparilla	-	-
OG	L	Fabaceae	*Kennedia rubicunda*	Dusky Coral Pea		
OG	L	Fabaceae	*Desmodium varians*			
OG	L	Menispermaceae	*Stephania japonica var. discolor*			
OG	q	Cyatheaceae	*Cyathea australis*	Tree Fern		
OG	k	Loranthaceae	*Muellerina celastroides*	Mistletoe		
HTE		Verbenaceae	*Lantana camara*	Lantana	-	-
HTE		Poaceae	*Ehrharta erecta*	Panic Veldtgrass	-	-
HTE		Poaceae	*Eragrostis curvula*	African Lovegrass	-	-

Growth group	Growth Form	Family	*Species*	Common Name	BC Act	EPBC Act
HTE		Poaceae	*Cenchrus clandestinum*	Kikuyu Grass	-	-
HTE		Cyperaceae	*Cyperus eragrostis*			
HTE		Euphorbiaceae	*Ricinus communis*	Caster Oil		
THE		Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern		-
HTE		Asteraceae	*Chrysanthemoides monilifera subsp. rotundata*	Boneseed	-	-
HTE		Asteraceae	*Senecio madagascariensis*	Fireweed	-	-
HTE		Poaceae	*Melinis repens*	Red Natal Grass	-	-
HTE		Poaceae	*Paspalum dilatatum*	Paspalum	-	-
Exotic		Araliaceae	*Hydrocotyle bonariensis*	Largeleaf Pennywort		
Exotic		Cyperaceae	*Cyperus congestus*	-	-	-
Exotic		Poaceae	*Paspalum urvelli*	Paspalum	-	-
Exotic		Poaceae	*Eleusine indica*	Crows Foot Grass	-	-
Exotic		Poaceae	*Phalaris aquatica*	Phalaris		
Exotic		Poaceae	*Panicum maximum*			
Exotic		Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	-	-
Exotic		Scrophulariaceae	*Verbascum virgatum*	Twiggy Mullein		
Exotic		Asteraceae	*Hypochaeris glabra*	Smooth Catsear	-	-
Exotic		Asteraceae	*Bidens pilosa*	Cobblers Pegs		
Exotic		Asteraceae	*Cirsium vulgare*	Scotch Thistle		

Growth group	Growth Form	Family	*Species*	Common Name	BC Act	EPBC Act
Exotic		Asteraceae	*Tagetes minuta*	Stinking Roger		
Exotic		Asteraceae	*Hypochaeris radicata*	Cats Ear or Flatweed	-	-
Exotic		Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	-	-
Exotic		Asteraceae	*Conyza canadensis*			

APPENDIX 4

HOLLOW-BEARING TREE DATA

HBT #	DBH (cm)	Species	Number & Size of Hollows					Notes
			Very Small < 5cm	Small 5 – 10cm	Medium 10 – 20cm	Large 20 – 30cm	Extra Large 30cm+	
HBTa	Trunk 1 - 1200 Trunk 2 - 70cm	*E. pilularis*	1	2	3	1	0	Recorded in this survey
HBTb	60	*Dead Stag*	0	0	1	0	0	Recorded in this survey
HB59	170	*E. pilularis*	0	0	1	0	0	Recorded as part of EA assessment
HB60	50+30	*Dead Stag*	0	1	0	1	0	Recorded as part of EA assessment
Totals			**1**	**3**	**5**	**1**	**0**	**10**

APPENDIX 5

THREATENED FLORA AND FAUNA ASSESSMENT

Species, populations and communities with a likelihood of occurrence of greater than or equal to Moderate have had potential impacts formally assessed using a 7-part test under the Environmental Planning and Assessment Act 1979. Due to the nature of the site, oceanic species have been omitted from the formal assessment.

E1 - Endangered; E2 - Endangered Population; E3 - Endangered ecological community; E4 Critically endangered; P - Protected; K - Known occurrence; PR - Predicted occurrence; V – Vulnerable

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Amphibians							
Crinia tinnula	Wallum Froglet	V	-	Occurs along the coastal margin from Litabella National Park in south east QLD to Kurnell in Sydney. Occurs in a wide range of habitat particularly with acidic swamps on coastal sand plains. Typically occur in sedgelands and wet heathlands. Can also be found along drainage lines within other vegetation communities and disturbed areas and occasionally in swamp sclerophyll forests. Breed in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are often wet or very damp and often located near the water's edge.	45	Low. No habitat within the HV Transmission Line Study Area	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Heleioporus australiacus	Giant Burrowing Frog	V	V	Distributed in south-eastern NSW and Victoria, a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except clay based. Breeding habitat is generally soaks or pools within first or second order streams.	K	Low. No habitat within the HV Transmission Line Study Area.	Low
Mixophyes balbus	Stuttering Frog	E1	V	Stuttering Frogs occur along the east coast of Australia from southern Qld to north-eastern Victoria. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor.	-	Low. Rainforest and wet, tall open forest is absent from the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Litoria aurea	Green and Golden Bell Frog	E1	V	Distributed from NSW north coast near Brunswick Heads, southwards along NSW coast to Victoria where it extends into east Gippsland. Inhabits marshes, dams and stream-sides, particularly those containing bulrushes or spikerushes. 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. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	-	Low. No habitat within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Uperoleia mahonyi	Mahony's Toadlet	E	-	Recorded almost exclusively on a substrate of leached (highly nutrient impoverished) white sand and is commonly associated with acid paperbark swamps. The typically occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. During non-breeding periods the species has been recorded up to 400 m from standing water within intact native vegetation. This species seeks shelter by burrowing into the sandy substrate. Rocks, logs and leaf litter may also be used for shelter	1	Low. No habitat within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Birds							
Dromaius novaehollandiae	Emu population in the New South Wales North Coast Bioregion and Port Stephens Local Government Area	E2	-	On the NSW north coast, Emus occur in a range of predominantly open lowland habitats, including grasslands, heathland, shrubland, open and shrubby woodlands, forest, and swamp and sedgeland communities, as well as the ecotones between these habitats. They also occur in plantations of tea-tree and open farmland, and occasionally in littoral rainforest. The population of Emus in the NSW North Coast Bioregion and Port Stephens LGA is of significant conservation value as the last known population in northern coastal NSW, and for the role that birds play in dispersing large seeds of native plant species, and over long distances.	3	Moderate. Areas of exotic grasslands may provide very marginal potential habitat for this species.	Low.
Botaurus poiciloptilus	Australasian Bittern	E1	E	Inhabits terrestrial and estuarine wetlands, generally where there is permanent water. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds.	-	Low. No habitat within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Rostratula Australia	Australian Painted Snipe	E1	E	Restricted to Australia. Most records are from the south-east, particularly the Murray Darling Basin. In NSW, many records are from the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	-	Low. No habitat within the HV Transmission Line Study Area.	Low.
Ephippiorhynchus asiaticus	Black-necked Stork	E1	-	Widespread in coastal and subcoastal northern and eastern Australia, south to central-eastern NSW. Mainly found on shallow, permanent, freshwater terrestrial wetlands, and surrounding marginal vegetation, including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters, as well as extending into adjacent grasslands, paddocks and open savannah woodlands.	4	Low. No habitat within the HV Transmission Line Study Area.	Low.
Ixobrychus flavicollis	Black Bittern	V	-	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	1	Low. No habitat within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Monarcha melanopsis	Black-faced Monarch	-	M	The Black-faced Monarch is widespread in eastern Australia. Mainly occurs in rainforest ecosystems although it can be found in gullies in mountain areas or coastal foothills, softwood scrub dominated by Brigalow (Acacia harpophylla), coastal scrub dominated by Coast Banksia (Banksia integrifolia) and Southern Mahogany.		Low. No habitat within the HV Transmission Line Study Area.	Low
Calidris ferruginea	Curlew Sandpiper	E1	CE	This species is distributed around most of the coastline of Australia. Generally occupies littoral and estuarine habitats, and in NSW is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes the inland.	-	Low. No habitat within the HV Transmission Line Study Area.	Low.
Apus pacificus	Fork-tailed Swift	-	M	In NSW, the species is recorded in all regions. Many records occur east of the Great Divide. The Fork-tailed Swift is almost exclusively aerial with them foraging and roosting aerially.	K	Moderate. This species may fly over the HV Transmission Line Study Area while foraging for insects.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Feeds almost exclusively on the seeds of *Casuarina* sp. and *Allocasuarina* sp. Open forest and woodlands up to 1000 m with feed trees present.	1	Moderate. *Casuarina* sp. and *Allocasuarina* sp. are present within the HV Transmission Line Study Area. No foraging evidence was recorded. However, forest containing hollow-bearing trees may provide potential nesting habitat for this species.	Low.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	This species habitat is within woodlands and dry sclerophyll forests dominated by Eucalypts and Mallee associations. This species feeds on insects and other invertebrates captured on the wing. Occasionally feeds on nectar, fruit and seeds. Distribution of this species is widespread in NSW from the coast to inland including the western slopes and plains.	2	Moderate. The HV Transmission Line Study Area may provide low-quality suitable habitat for this species.	Low.
Dasyornis brachypterus	Eastern Bristlebird	-	E	Habitat is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Age of habitat since fires (fire-age) is of paramount importance to this species; Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years.	K	Low. The HV Transmission Line Study Area is not generally known to be in the area of occurrence of this species.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Numenius madagascariensis	Eastern Curlew	-	CE	A large wader 55-61 cm. Have a very long curved black bill which is pink at the base. Has a prominent eye-ring. Primarily coastal distribution, species is found in all states including Tasmania. Rarely recorded inland, mainly found in estuaries such as hunter river, Port Stephens, Clarence river Richmond river.	K	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low.
Glossopsitta pusilla	Little Lorikeet	V	-	Forages in flowering eucalypts and Melaleuca sp. Riparian habitats are particularly used, due to higher soil fertility and greater productivity. Nests in tree hollows.	3	Moderate. The HV Transmission Line Study Area may provide potential foraging and nesting habitat for this species.	Low.
Tyto novaehollandiae	Masked Owl	V	-	Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100 m.	3	Moderate. The HV Transmission Line Study Area may provide potential foraging habitat for this species.	Low
Grantiella picta	Painted Honeyeater	V	V	Nomadic species 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. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	-	Low. No habitat within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Haematopus longirostris	Pied Oystercatcher	E1	M	The species is distributed around the entire Australian coastline. Favours intertidal flats of inlets and bays, open beaches and sandbanks. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas.	5	Low. No habitat within the HV Transmission Line Study Area.	Low.
Ninox strenua	Powerful Owl	V	-	Endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	6	Recorded. This species was recorded during call playback surveys within the adjacent EA study area. 23 large hollows were recorded that contain potential nesting habitat within the HV Transmission Line Study Area.	Low.
Erythrotriorchis radiatus	Red Goshawk	CE	V	Occurs sparsely through northern and eastern Australia from Western Australian Kimberley division to north eastern Queensland and south to far north-eastern NSW with scattered records in central Australia. Inhabit open woodland and forest preferring mosaic of vegetation types. Often found in riparian habitats along or near watercourses or wetlands.	K	Low. No habitat within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Anthochaera phrygia	Regent Honeyeater	CE	CE M	Dry open forest and woodland. Particularly box-ironbark woodland and riparian forests of river Sheoak. Feeds on the nectar from a wide range of eucalypts and mistletoes.	-	Moderate. The HV Transmission Line Study Area provides marginal potential foraging habitat for this species.	Low
Rhipidura rufifrons	Rufous Fantail	-	M	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. In east and south-east Australia, this species mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests.	K	Low. No habitat within the HV Transmission Line Study Area.	Low
Myiagra cyanoleuca	Satin Flycatcher	-	M	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. The Satin Flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies.	K	Low. No habitat within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Lophoictinia isura	Square-tailed Kite	V	-	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage.	2	Low. No habitat within the HV Transmission Line Study Area.	
Lathamus discolor	Swift Parrot	E1	CE M	Migrates to south-eastern mainland Mar-Oct. Winter-flowering trees such as *Eucalyptus robusta*, *Corymbia maculata*, *C. gummifera*, *E. sideroxylon* and *E. albens* are important. Breeds in Tasmania.	4	Moderate. The open forest within of the HV Transmission Line Study Area provides potential foraging habitat for this species, however, preferred winter-flowering tree species are absent from the HV Transmission Line Study Area.	Low
Monarcha trivirgatus	Spectacled Monarch		M	Inhabits dense rainforests and moist eucalypt forests of eastern and north-eastern Australia, the Spectacled Monarch sometimes also inhabits mangroves and other densely vegetated habitats.	K	Low. No habitat within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Hirundapus caudacutus	White-throated Needletail	-	M	Recorded in all coastal regions of Qld and NSW. In Australia, this species is almost exclusively aerial, almost always foraging aerially. Although it has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. Probably recorded most often above wooded areas, including open forest and rainforest.	K	Moderate. This species may fly over the HV Transmission Line Study Area while foraging for insects.	Low.
Haliaeetus leucogaster	White-bellied Sea Eagle	V	M	Distributed along the coastline of Australia, also extending inland along some larger waterways. Habitat includes large areas of open water. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland and forest. Breeding territories are close to water, mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest, closed scrub or in remnant trees on cleared land.	50	Recorded in the adjoining EA study area. A nest occurs in the southern extent of the EA study area.	Low.
Motacilla flava	Yellow Wagtail	-	M	Non-breeding habitat only: mostly well-watered open grasslands and the fringes of wetlands. Roosts in mangroves and other dense vegetation.	K	Low. No habitat within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Fish							
Epinephelus daemelii	Black Rock Cod	-	V	-	K	Low. No habitat within the HV Transmission Line Study Area.	Low
Mammals							
Dasyurus maculatus	Spotted-tailed Quoll	V	E	A variety of vegetation such as rainforest, open forest, woodland, coastal heath, inland riparian forest. Have home ranges 750 - 3500 ha. Den sites may be located in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky cliffs.	4	Moderate. The species may use the HV Transmission Line Study Area as part of a larger home range. No evidence of den or latrine sites were found within the HV Transmission Line Study Area. No individuals were recorded despite targeted trapping surveys in the EA study area.	Low
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Mostly found in dry sclerophyll open forest with sparse groundcover, east of the Great Dividing Range. However, has been recorded in heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with small entrances (2.5 - 4cm).	3	Moderate. Open forest within the HV Transmission Line Study Area provides foraging habitat for this species. Hollow bearing trees provide roosting and breeding habitat. No individuals were recorded despite trapping and spotlighting surveys in the EA study area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Phascolarctos cinereus	Koala	V	V	Found in eucalypt woodlands and forest foraging on preferred food trees.	944	Moderate. The HV Transmission Line Study Area provides potential habitat for this species; and 5 *Eucalyptus robusta* occur, a Preferred Koala Feed Tree in port Stephens LGA. Koalas may use connectivity between areas of foraging habitat.	Low
Petaurus norfolcensis	Squirrel Glider	V	-	Inhabits mature or old growth box, box-ironbark woodlands and river red gum forest west of the Great Dividing Range. Prefers mixed species stands with a shrub or Acacia midstorey. Uses tree hollows as den sites.	28	Moderate. Open forest within the HV Transmission Line Study Area provides foraging habitat for this species. Hollow bearing trees provide roosting and breeding habitat. No individuals were recorded despite trapping and spotlighting surveys in the adjoining EA study area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Petauroides volans	Greater Glider	-	V	The Greater Glider occurs in eucalypt forests and woodlands along the east coast of Australia. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows.	-	Moderate. Open forest within the HV Transmission Line Study Area provides foraging habitat for this species. Hollow bearing trees provide roosting and breeding habitat. No individuals were recorded despite trapping and spotlighting surveys in the adjoining EA study area.	Low
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	This species is generally found within 200 km of Australia's eastern coast. Generally, occurs 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 commonly found in gullies, close to water, in vegetation with a dense canopy.	18	Recorded in the adjoining EA study area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Potorous tridactylus	Long-nosed Potoroo	V	V	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or Melaleucas. A sandy loam soil is also a common feature.	1	Moderate. The heath vegetation within the HV Transmission Line Study Area provides habitat for this species. No individuals were recorded during the field surveys despite trapping and spotlighting surveys in the adjoining EA study area.	Low
Pseudomys novaehollandiae	New Holland Mouse, Pookila	-	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	9	Moderate. The HV Transmission Line Study Area provides suitable habitat for this species. No individuals were recorded during the field surveys despite trapping and spotlighting surveys in the adjoining EA study area.	Low
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Wide-ranging species found across northern and eastern Australia. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	1	Moderate. The HV Transmission Line Study Area provides foraging, roosting and breeding habitat for this species.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Mormopterus norfolkensis	Eastern Freetail-bat	V	-	The Eastern Freetail-bat is found along the east coast from south QLD to southern NSW. Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark.	3	Moderate. The HV Transmission Line Study Area provides foraging, roosting and breeding habitat for this species.	Low
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features. Also found in well-timbered areas containing gullies.	-	Moderate. The HV Transmission Line Study Area may provide potential foraging habitat for this species.	Low
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	1	Moderate. The HV Transmission Line Study Area provides foraging, roosting and breeding habitat for this species.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Austronomus australis	Little Bentwing-bat	V	-	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	18	Recorded in the adjoining EA study area.	Low
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	Forages in a range of habitat types. Roosts in caves, derelict mines, culverts and other man-made structures. Form maternity colonies that are faithful to particular caves.	8	Moderate. The HV Transmission Line Study Area may provide potential foraging habitat for this species.	Low
Myotis macropus	Southern Myotis	V	-	Forages over streams and pools catching insects and small fish by raking their feet across the water surface. Roost close to water in caves, mine shafts, tree hollows and man-made structures.	3	Low-moderate. The HV Transmission Line Study Area may provide some potential roosting habitat for this species however, water bodies are absent from the HV Transmission Line Study Area limiting foraging habitat.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. This species usually roosts in tree hollows.	9	Moderate. The HV Transmission Line Study Area may provide potential roosting, breeding and foraging habitat for this species.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Angophora inopina	Charmhaven Apple	V	V	Located in the Central Coast region of NSW. Occurs most frequently in four main vegetation communities: (i) *Eucalyptus haemastoma–Corymbia gummifera–Angophora inopina* woodland/forest; (ii) *Hakea teretifolia–Banksia oblongifolia* wet heath; (iii) *Eucalyptus resinifera–Melaleuca sieberi–Angophora inopina* sedge woodland; (iv) *Eucalyptus capitellata–Corymbia gummifera–Angophora inopina* woodland/forest.	6	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low
Asperula asthenes	Trailing Woodruff	V	V	This small herb occurs only in NSW. It is found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens/Wallis Lakes area. Habitat is in moist areas often along river banks.	K	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low
Caladenia tessellata	Thick-lipped Spider-orchid	E1	V	This species is endemic to mainland south-east Australia. Favours low, dry sclerophyll woodland with a heathy or sometimes grassy understorey on clay loams or sandy soils.	2	Low. The HV Transmission Line Study Area is outside of the distribution of this species. The northern know population is at Munmorah Nature Reserve on the Central Coast.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Callistemon linearifolius	Netted Bottle Brush	V	-	Shrub up to 3-4m tall with linear to linear-lanceolate leaves. Flowers in typical "bottlebrushes". Red and usually 9-10cm long and approximately 50mm in diameter. Recorded form the Georges River to Hawkesbury River in the Sydney area to north of Nelson Bay area of NSW, also recorded in Yengo National Park. Grows in dry Sclerophyll forests on the coast and adjacent ranges. Flowers spring-summer.	4	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low
Commersonia prostrata	Dwarf Kerrawang	E1	E	Ground hugging shrub that forms mats to more than 1m across. Occurs in the southern highlands and southern tablelands with a larger population in the Thirlmere Lakes area. On the Tomago Sands beds this species has been recorded in an area previously subject to sand mining.	6	Moderate. The HV Transmission Line Study Area is located within the Tomago sand beds and adjoins a sand mining area. The HV Transmission Line Study Area provides potential habitat for this species. It was not recorded within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum, Silvertop Ash, Red Bloodwood and Black Sheoak; appears to prefer open areas in the understorey and is often found in association with the Large Tongue Orchid and the Tartan Tongue Orchid.	-	Moderate. Potential habitat for this species occurs in the eucalypt forest for this species within the HV Transmission Line Study Area. Targeted surveys were undertaken as part of the EA report (EPS, 2017) and this species was not recorded.	Low.
Cynanchum elegans	White-flowered Wax Plant	E	E	Occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest, coastal tea tree and coastal banksia coastal scrub, forest red gum aligned open forest and woodland, spotted gum aligned open forest and woodland and bracelet honey myrtle scrub to open scrub. Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. Been recorded as far west as Merriwa in the upper Hunter river valley.	K	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Diuris arenaria	Sand Doubletail	E	-	Known to occur in the Tomaree peninsula near Newcastle NSW. Occurs in coastal heath and dry grassy eucalypt forest on sandy flats. Grows in gentle undulating country in eucalypt forest with grassy understorey on clay soil.	180	Moderate. Potential habitat for this species occurs in the coastal heath and eucalypt forest for this species within the HV Transmission Line Study Area. Targeted surveys were undertaken as part of the EA report (EPS, 2017) and this species was not recorded.	Low.
Diuris praecox	Rough Doubletail	V	V	Known to occur between Bateau Bay and Smiths Lake, growing on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year, flowering in winter.	-	Moderate. Potential habitat for this species occurs in the eucalypt forest for this species within the HV Transmission Line Study Area. Targeted surveys were undertaken as part of the EA report (EPS, 2017) and this species was not recorded.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Eucalyptus camfieldii	Camfield's Stringybark	V	V	Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace area south to Waterfall. Occurs in poor coastal country in shallow sandy soils overlying Hawkesbury sandstone coastal heath mostly on exposed sandy ridges. Small scattered stands near the boundary of tall coastal heaths and low open woodlands of slightly more fertile inland areas. Associated species include stunted species of E*. oblonga* Narrow-leaved Stringybark, *E. capitellata* Brown Stringybark and *E. haemastoma* Scribbly Gum. Flowering period irregular, poor response to fires.	2	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Eucalyptus parramattensis* subsp. *decadens	-	V	V	Two separate meta-populations, Kurri-Kurri meta-population is bordered by Cessnock – Kurri Kurri in the north and Mulbring-Aberdare in the south. Large aggregations of the subspecies is bounded by Salt Ash and Tanilba Bay in the north and Williamtown and Tomago in the south. Occupies deep, low nutrient sands often those subject to periods of inundation or where water tables are relatively high. Dry Sclerophyll woodland with dry heath understorey, also occurring as an emergent in dry or wet heathland. Flowers from November to January.	820	Low. Not recorded.	Low.
Grevillea parviflora* subsp. *parviflora	Small-flower Grevillea	V	V	Distributed sporadically in Sydney Basin and Hunter area. Found in light sandy soils over thin shales with lateritic ironstone gravels. Occurs in a wide range of vegetation types from heath and shrubby woodland to open forests.	-	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low.
Maundia triglochinoides	-	V	-	Restricted to coastal NSW and extending to southern QLD, grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30-60cm deep on heavy clay soils with low nutrients. Flowering occurs during the warmer months (Nov – Jan). Associated with wetland species.	3	Low. No water bodies or preferred heavy clay soils exists within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Melaleuca biconvexa	Biconvex Paperbark	V	V	Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	-	Low. No habitat for this species occurs within the HV Transmission Line Study Area. Not recorded.	Low.
Persicaria elatior	Tall Knotweed	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	-	Low. No habitat for this species occurs within the HV Transmission Line Study Area. Not recorded.	Low.
Phaius australis	Lesser Swamp Orchid, Southern Swamp Orchid	E1	E	Occurs in Queensland and north-east NSW as far south as Coffs Harbour. Historically, it extended farther south to Port Macquarie. Swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.	-	Low. No habitat for this species occurs within the HV Transmission Line Study Area. Not recorded.	Low.
Prasophyllum sp. **Wybong (C. Phelps ORG 5269)**		-	CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals.	K	Low. No habitat for this species occurs within the HV Transmission Line Study Area. Not recorded.	Low
Senecio spathulatus	Coast Groundsel	E1	-	Occurs in Nadgee Nature Reserve (Cape Howe) and between Kurnell in Sydney and Myall Lakes National Park. Found on frontal dunes.	2	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of Occurrence	Potential Impacts
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	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.	5	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low.
Tetratheca juncea	Black-eyed Susan	V	V	Low shrub growing in clumps of single or multiple stems. Flowers face downwards and usually have 4 petals which range from white to pink to dark purple in colour. Born singly or twos along the stem. Stems are 30 to60cm long, usually leafless with 2 to 3 narrow wings that give them an angular appearance. Confined to northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion, LGA's of Cessnock, Wyong, Lake Macquarie, Newcastle, Port Stephens and Great Lakes.	-	Low. No habitat for this species occurs within the HV Transmission Line Study Area.	Low.

APPENDIX 6

THREATENED ECOLOGICAL COMMUNITIES ASSESSMENT

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Species, populations and communities with a likelihood of occurrence of greater than Moderate have had potential impacts formally assessed using a 7-part test under the Environmental Planning and Assessment Act 1979.

E1 - Endangered; E2 - Endangered Population; E3 - Endangered ecological community; E4 Critically endangered; P - Protected; K - Known occurrence; PR - Predicted occurrence; V – Vulnerable

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Central Hunter Valley eucalypt forest and woodland	-	CE	The community occurs in the Hunter Valley regions. The canopy of the ecological community is dominated by one or more of the following four eucalypt species: *Eucalyptus crebra* (narrow-leaved ironbark), *Corymbia maculata* (spotted gum), *E. dawsonii* (Slaty gum) and *E. moluccana* (grey box). The shrub layer is likely to include *Bursaria spinosa subsp. spinosa* (native blackthorn). *A. decora A. implexa* (lightwood), *A. falcata* (sickle wattle), *Breynia oblongifolia* (coffee bush),	P	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Lowland Rainforest of Subtropical Australia	-	E	The ecological community primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales (NSW). The ecological community also includes isolated areas between the Clarence River and Hunter River such as the Bellinger and Hastings valley. The ecological community occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basalt enriched metasediments. Lowland Rainforest mostly occurs in areas <300 m above sea level.	P	Low. Not observed within the HV Transmission Line Study Area.	Low.
Subtropical and Temperate Coastal Saltmarsh	-	V	Occurs within a relatively low margin of coastline from south east Qld to Shark Bay in WA. Has regular intermittent tidal influence. Consists of salt tolerant vegetation including: grasses, herbs, sedges, rushes and shrubs.	P	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Bioregions	E3	CE	Found in the Central Hunter Valley between Singleton and Muswellbrook occurring in area of relatively low rainfall and high temperatures. Associated with Permian lithology and situated on gently undulating hills, slopes and valleys and occasionally on rocky knolls. Characterised by the presence of Narrow-leaved Ironbark (*Eucalyptus crebra*), Kurrajong (*Brachychiton populneus subsp. populneus*) and Grey Box (*Eucalyptus moluccana*). Other tree species such as Rough-barked Apple (*Angophora floribunda*) and Black Cypress Pine (*Callitris endlicheri*) may be present and occasionally dominate or co-dominate.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Central Hunter Ironbark Spotted Gum – Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregion	E3	CE	Found in the Central Hunter Valley mainly between Maitland and Muswellbrook, occurring in areas of undulating country including low rises and slopes on all aspects. Mostly occurs on clayey soils on Permian sediments, may also occur on alluvial and colluvial soils in valleys. Characterised by Narrow-leaved Ironbark (*Eucalyptus crebra*), Spotted Gum (*Corymbia maculata*) and Grey Box (*Eucalyptus moluccana*) forming an open forest. Other tree species such as Red Ironbark (*Eucalyptus fibrosa*) and Forest Red Gum (*Eucalyptus tereticornis*) may be present, and occasionally dominate or co-dominate.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Coastal Swamp Oak (Casuarina glauca) Forest of NSW and SE Qld		E	Found on the coastal floodplains of NSW occurring on the fringes of coastal estuaries on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Associated with grey-black clay-loams and sandy loams where the groundwater is saline or sub-saline. Characterised by a dense layer of *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui.	K	Low. The Swamp Oak Floodplain Forest within the HV Transmission Study area does not meet condition criteria for this TEC.	Low.
Coastal Saltmarsh in New South Wales North Coast, Sydney Basin and South East Corner Bioregion	E3	V	Coastal Saltmarsh occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. Characteristic plants include *Baumea juncea,* Sea Rush (*Juncus kraussii subsp. australiensis*), Samphire (*Sarcocornia quinqueflora subsp. quinqueflora*), Marine Couch *(Sporobolus virginicus*), streaked Arrowgrass (*Triglochin striata*), Knobby Club-rush (*Ficinia nodosa*), Creeping Brook weed (*Samolus repens*), Swamp Weed (*Selliera radicans*), Seablite (*Suaeda australis*) and Prickly Couch (*Zoysia macrantha*).	P	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Freshwater Wetlands on Coastal Floodplains of the New South wales North Coast, Sydney Basin and South East Corner Bioregions	E3	-	Associated with coastal areas subject to periodic flooding. Those that lack standing water most of the time are usually dominated by dense grassland or sedgeland vegetation, often forming a turf less than 0.5 metre tall and dominated by aquatic plants including *Paspalum distichum* (water couch), *Leersia hexandra* (swamp rice-grass), *Pseudoraphis spinescens* (mud grass) and *Carex appressa* (tussock sedge). Where they are subject to regular inundation and drying the vegetation may include large emergent sedges over 1 metre tall, such as *Baumea articulata*, *Eleocharis equisetina* and *Lepironia articulata*,	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E3	-	Found within the Central Hunter Valley geographic distribution, occurring on floodplains and floodplain rises. This community is known to contain the endangered River Red Gum population. Characterised by very tall woodland, occurring on floodplain and associated rises along the Hunter River and tributaries. Generally dominated by *Eucalyptus camaldulensis* (River Red Gum) in combinations with *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple).	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	E3	-	Found between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter. Has been recorded from the Maitland, Cessnock, Port Stephens, Muswellbrook and Singleton LGAs, but may occur elsewhere in these bioregions. Occurs on Permian sediments of the Hunter Valley floors, with much of the remaining community fragmented and disturbed. Occurs on gentle slopes and depressions and drainage flats. Common canopy tree species are *Eucalyptus tereticornis* (Forest Red Gum) and *E. punctata* (Grey Gum).	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	V2	CE	Found in the Hunter Valley from Bulga to Bylong/Goulburn River National Park and known to occur in Singleton, Muswellbrook and the Upper Hunter local government areas. Occurring on colluvial soils on exposed footslopes associated with the interface between Triassic Narrabeen sandstones and Permian sediments. Characterised by the typically dominated by *Eucalyptus dawsonii* (Slaty Gum) and/or *Eucalyptus moluccana* (Grey Box). *Acacia salicina* (Cooba) and *Allocasuarina luehmannii* (Bulloak). Other trees which may be present include *Brachychiton populneus subsp. populneus* (Kurrajong), *Callitris endlicheri* (Black Cypress Pine), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus punctata* (Grey Gum).	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions	E3	-	This community occurs strictly within the central Hunter Valley area. The canopy may include *Elaeodendron australe* (Red Olive Plum), *Geijera parviflora* (Wilga), *Notelaea microcarpa var. microcarpa* (Native Olive), *Alectryon oleifolius subsp. elongatus* (Western Rosewood), *Melia azedarach* (White Cedar) and *Brachychiton populneus subsp. populneus* (Kurrajong). Emergent eucalypts are common and include *Eucalyptus albens* (White Box), *E. dawsonii* (Slaty Box) and *E. crebra* (Narrow-leaved Ironbark). A shrub stratum is usually present and includes *Olearia elliptica subsp. elliptica* (Sticky Daisy Bush) and *Rhagodia parabolica* (Mealy Saltbush).	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	E4	CE	Typically has a dense to open tree canopy up to about 15 m tall, depending on disturbance and regrowth history. The most common tree is *Acacia pendula* (Weeping Myall), which may occur with *Eucalyptus crebra* (Narrow-leaved Ironbark), *A. salicina* (Cooba) and/or trees within the *A. homalophylla - A. melvillei* complex.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	E3	-	Occurs within the Kurri Kurri – Cessnock area in the Hunter Valley. Occurs on soils developed on poorly-drained Tertiary sand deposits that blanket Permian sediments. The overstorey is usually dominated by *Eucalyptus parramattensis subsp. decadens* (Parramatta Red Gum) and *Angophora bakeri* (Narrow-leaved Apple) while other tree species that occur less frequently include *E. racemosa* (Narrow-leaved Scribbly Gum), *E. fibrosa* (Red Ironbark), *E. sp. aff. agglomerata* and *Corymbia gummifera* (Red Bloodwood).	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Littoral Rainforest in New South Wales North Coast, Sydney Basin and South East Corner Bioregion	E3	CE	Found along the NSW east coast, this EEC is considered very rare and occurs in many small stands. Predominantly rainforest species, where the canopy is dominated by scattered emergent individuals of sclerophyll species, such as *Angophora costata*, *Banksia integrifolia*, *Eucalyptus botryoides* and *Eucalyptus tereticornis*. Several floristic variations between strands and in particular areas localised variants may be recognised.	P	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion	E3	-	Dominated by Spotted Gum *Corymbia maculata* and Broad-leaved Ironbark *Eucalyptus fibrosa*, while Grey Gum *E. punctata* and Grey Ironbark *E. crebra* occur occasionally. The understorey is marked by the tall shrub, *Acacia parvipinnula*, and by the prickly shrubs, *Daviesia ulicifolia*, *Bursaria spinosa*, *Melaleuca nodosa* and *Lissanthe strigosa*.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions	V2	-	Found in the Lower Hunter Valley, mainly occurring on the Barrington footslopes but is known to occur or have occurred in the Muswellbrook, Singleton, Dungog and Upper hunter local government areas. This community occurs on the Carboniferous sediments in gullies and on steep hillslopes with south facing aspects. Characterised by the common canopy trees, *Elaeocarpus obovatus* (Hard Quandong), *Baloghia inophylla* (Brush Bloodwood), *Streblus brunonianus* (Whalebone Tree), *Mallotus philippensis* (Red Kamala), *Capparis arborea* (Brush Caper Berry), *Olea paniculata* (Native Olive) and *Dendrocnide excelsa* (Giant Stinging Tree). Emergent trees 20 to 30m tall such as *Brachychiton populneus subsp. populneus* (Kurrajong), *Corymbia maculata* (Spotted Gum), *Brachychiton discolor* (Lacebark) and *Ficus rubiginosa* (Port Jackson Fig) are often present.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Lowland Rainforest in the New South Wales North Coast and Sydney Basin Bioregions	E3	CE	The Hawkesbury River notionally marks the southern limit of this EEC in the NSW North Coast and Sydney Basin Bioregions. This EEC is a community of subtropical rainforest and some related, structurally complex forms of dry rainforest. Lowland Rainforest in a relatively undisturbed state has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Includes palms, vines, and vascular epiphytes. In disturbed strands of this community the canopy may be broken or the canopy be smothered by exotic vines.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	-	Found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, (may exceed 40m), but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (Bangalay) and *E. elata* (river peppermint) may be common south from Sydney, *E. ovata* (swamp gum) occurs on the far south coast.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion	E3	-	Found on the coastal floodplains of NSW occurring on the fringes of coastal estuaries on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Associated with grey-black clay-loams and sandy loams where the groundwater is saline or sub-saline. Characterised by a dense layer of Casuarina glauca (swamp oak) is the dominant species northwards from Bermagui.	K	**Recorded.**	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion	E3	-	Found on humic clay loams and sandy loams on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Characterised *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt).	K	**Recorded.**	Low.
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E3	-	Found on the Warriewood and Tuggerah soil landscapes, this community is largely restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplains. Characterised by the lack of saline influence and complex vegetation types restricted of freshwater swamps in coastal areas. Species include sedges and aquatic plants such as *Baumea species*, *Eleocharis sphacelata*, *Gahnia* species, *Ludwigia peploides subsp. montevidensis* and *Persicaria* species. Areas of open water may occur where drainage conditions have been altered and there may also be patches of emergent trees and shrubs.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

Community Name	BC Act	EPBC Act	Habitat Description	Records	Likelihood of occurrence	Potential Impacts
Themeda grassland on seacliffs and coastal headlands in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	-	*Themeda triandra* is the dominant species in the Themeda Grassland on sea cliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner bioregion ecological community. *Banksia integrifolia subsp. integrifolia*, *Westringia fruticosa* and *Acacia sophorae* occurs as an emergent shrub or as a dense cover where they have recruited over grasslands.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
Warkworth Sands Woodland in the Sydney Basin Bioregion	E3	CE	Confined to a small area near Warkworth occurring on aeolian sand deposits south of Singleton. Characterised by the low woodland dominated by *Angophora floribunda* (Rough-barked Apple) and *Banksia integrifolia subsp. integrifolia* (Coast Banksia). Other tree species may be present such as *Eucalyptus tereticornis* (Forest Red Gum) and *E. glaucina* (Slaty Red Gum).	K	Low. Not observed within the HV Transmission Line Study Area.	Low.
White Box Yellow Box Blakely's Red Gum Woodland	E3	CE	Found from the Queensland border to the Victorian border along the tablelands and western slopes of NSW. Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candlebark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*), Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), Cabbage Gum (*E. amplifolia*) and others.	K	Low. Not observed within the HV Transmission Line Study Area.	Low.

APPENDIX 7

SIGNIFICANCE ASSESSMENTS

Koala – Seven part Test TSC Act	Response
Profile: The Koala is listed as Vulnerable on the BC Act/TSC Act. Found in eucalypt woodlands and forest foraging on preferred food trees. Koalas will feed almost exclusively on a small number of preferred species. The preferred tree species vary widely on a regional and local basis.	
a) In the case of a threatened species, whether an action is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	No Koalas, or any evidence of the presence of Koalas, was recorded within the study area during the field surveys. Whilst a large population of Koalas occurs within the Port Stephens LGA, minimal records have been recorded within and immediately surrounding the study area. 0.71 ha of open forest habitat will be removed as part of the project. In addition, 0.02 ha of Coastal Swamp Sclerophyll Forest will be impacted by the HV Transmission Line, which contains five Swamp Mahogany trees (Koala food trees listed by the Port Stephens Council Comprehensive Koala Plan of Management and the NSW Recovery Plan for the North Coast KMA). Such impact is considered to be minor in terms of the local context and population. An assessment under the CKPoM has been conducted in Appendix 8. This assessment concluded that the consent for the development should not be withheld on Koala habitat grounds. The project is unlikely to have an adverse effect on the lifecycle of this species such that a viable local population will be placed at risk of extinction.
(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	Not Applicable.
(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:	Not Applicable.

Koala – Seven part Test TSC Act	Response
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*	
(d) in relation to the habitat of a threatened species, population or ecological community: *(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and* *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and* *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality*	(i) 0.71 ha of open forest habitat will be removed as part of the project, pus 0.02 ha for the HV Transmission Line. (ii) Five preferred feed trees are present and the native vegetation in the south of the study area is part of a native vegetation corridor which provides connectivity for Koala movements. A majority of this vegetation will be retained post-development. The project will affect minor existing open forest habitat and five koala feed trees. However, this is unlikely to fragment or isolate habitat from other areas of habitat of this species than that which is already is occurring. (iii) Five Koala feed trees were present however these are considered unlikely to be critical for this species in the locality given there are many more in the adjoining environs and that there is no demonstrated evidence of Koala activity within the HV Transmission Line Study Area. Given the vegetation types to impacted and the extent of forested areas to be retained within the study area and locality, it is considered that habitats to be removed within the study area are of overall low importance to this species.
(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	The study area is not located near any declared areas of outstanding biodiversity value (AOBV) (previously critical habitat under the TSC Act).
(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan	The recovery plan that has been prepared for the Koala and aims to: • reverse the decline of the koala in NSW; • ensure adequate protection, management and restoration of Koala habitat; and

Koala – Seven part Test TSC Act	Response
	• maintain healthy and breeding populations of koalas are present throughout their current range. Specific objectives of the plan are to: • conserve koalas in their existing habitat; • rehabilitate and restore koala habitat and populations; • develop a better understanding of the conservation biology of koalas; • ensure that the community has access to factual information about the distribution, conservation and management of koalas at a national, state and local scale; • manage captive, sick or injured koalas and orphaned wild koalas to ensure consistent and high standards of care; and • manage over-browsing to prevent both koala starvation and ecosystem damage in discrete patches of habitat. Although the project would include removal of a small area of potential habitat for the Koala (including five feed trees), it is unlikely to affect the conservation of koalas. Future restoration by the WLALC Green Team is actually like to increase Koala habitat. Furthermore, the assessment under the CKPoM found that development should not be withheld on Koala habitat grounds.
(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process	The project has the potential to contribute to ten Key Threatened Processes. In regard, to the Koala one key threatening processes of Clearing of Native vegetation may affect this species. Five Koala feed trees will be removed as part of the project and this is considered is unlikely to exacerbate this KTP to any significant degree.
Conclusion	The project is unlikely to have a significant impact upon the Koala.

Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion – 7 part Test TSC Act	Response
Profile: Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion is listed as an Endangered Ecological Community under the TSC Act. Found on the coastal floodplains of NSW occurring on the fringes of coastal estuaries on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Associated with grey-black clay-loams and sandy loams where the groundwater is saline or sub-saline. Characterised by a sparse layer *of Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui. Other trees including Acmena smithii (lilly pilly), *Glochidion spp.* (cheese trees) and *Melaleuca spp*. (paperbarks) may be present as subordinate species. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea, Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater.	
a) In the case of a threatened species, whether an action is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Not Applicable.
(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	Not Applicable.
(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: ***(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*** ***(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***	(i) This threatened community was recorded in the northern portion of the HV Transmission Line Study Area. 0.06 ha of this community will be removed as part of this project. The project will remove most this EEC within the HV Transmission Line Study Area. However, this community is part of a larger patch of approximately and at least 0.7 ha of Swamp Oak Floodplain forest which adjoins intact swamp forest to the south west. The project is, therefore, unlikely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction. (ii) This TEC is currently highly disturbed by *Lantana camara* infestations in the understorey. The project will remove part of the *Lantana camara* and undertake weed control post construction. Therefore, it is considered that the project is unlikely substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be place at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:	
(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and	(i) 0.06 ha of this community will be removed as part of this project.
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and	(ii) The project will remove a small linear section along the western edge of Lavis Lane. This TEC is part of a larger patch of approximately 0.7 ha. This vegetation connects to a larger area of Swamp Forest that occurs to the south and west of the HV Transmission Line Study Area. The project will not substantially fragment or isolate habitat this community further, than is already occurring.
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality	(iii) Given the small extent of this threatened community to be removed, it is considered that this habitat is of low importance.
(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	The HV Transmission Line Study Area is not located near any declared areas of critical habitat.
(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan	No recovery plan exists.
(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process	The project has the potential to contribute to eight Key Threatened Processes. Given the implementation of appropriate vegetation management, it is considered that the contribution to these KTPs will be very small.
Conclusion	The project is unlikely to have a significant impact upon the endangered ecological community Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion.

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion – Seven part Test TSC Act	Response
Profile: Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion is listed as an Endangered Ecological Community under the BC Act. Found on humic clay loams and sandy loams on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Characterised by the open to dense tree layer of *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus resinifera subsp. hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (Swamp Turpentine).	
a) In the case of a threatened species, whether an action is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Not Applicable.
(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	Not Applicable.
(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: ***(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*** ***(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***	(i) This threatened community was recorded within the southern portion of the HV Transmission Line Study Area. Approximately 0.02 ha of this community is likely to be impacted upon by the project. The area of removal is comparatively small and adjoins larger area of intact Swamp Sclerophyll Forest to the west and south. Therefore, the project is unlikely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction. (ii) Given that the area of this community to be removed is small, and that appropriate measures are taken to minimise impacts, it is considered that the project is unlikely substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be place at risk of extinction.
(d) in relation to the habitat of a threatened species, population or ecological community:	

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and ***(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*** ***(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality***	(i) 0.02 ha of Swamp Sclerophyll Forest is likely to be impacted upon as part of this project. (ii) The project will remove a small linear section along the western edge of Lavis Lane. This TEC is part of a larger patch of approximately intact swamp forest vegetation south and west of the HV Transmission Line Study Area. The project will not substantially fragment or isolate habitat this community further, than is already occurring. (iii) Given the small extent of this threatened community to be removed, it is considered that this habitat is of low importance.
(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	The HV Transmission Line Study Area is not located near any declared areas of critical habitat.
(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan	No recovery plan exists.
(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process	The project has the potential to contribute to eight Key Threatened Processes. Given the implementation of appropriate vegetation management, it is considered that the contribution to these KTPs will be very small.
Conclusion	The project is unlikely to have a significant impact upon the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion

APPENDIX 8

PORT STEPHENS KOALA PLAN OF MANAGEMENT ASSESSMENT

KOALA HABITAT ASSESSMENT IN THE PORT STEPHENS LGA

The proposed HV Transmission Line Study Area has been mapped as a mixture of Preferred Koala Habitat and 50 m buffer over cleared land under the CKPoM. Refer to Figure 3.

Therefore, an assessment in accordance with the CKPoM has been conducted for the subject site. The following assessment has been conducted in accordance with Appendix 6 Guidelines for Koala Habitat Assessment of the CKPoM.

GUIDELINES FOR KOALA HABITAT ASSESSMENTS

Step 1 Preliminary Assessment

i Reference to the Koala Habitat Planning Map for the Port Stephens LGA to make a preliminary assessment of the Koala habitat on site of the proposed development and to consider the Koala habitat of the site in the broader local and regional context

Response: Koala Habitat Planning Map has mapped the middle parts of the HV Transmission Line Study Area as **Preferred Koala habitat**, with 50 m buffer over cleared land on either side of the Preferred Koala Habitat area.

ii Inspection of the site to determine whether the site contains individuals of preferred koala food trees outside areas mapped as Preferred Koala Habitat.

Response: The subject site was inspected during several field surveys on 6th, 12th and 14th June 2019.

A total of five (5) preferred koala food trees were recorded (refer to Figure 3 for the locations). At the southern point there were four *Eucalyptus robusta* (Swamp Mahogany) and at the northern point there was a single *Eucalyptus robusta* (Swamp Mahogany).

Step 2 Vegetation Mapping

i Vegetation of the site should be mapped and shows the distribution of the vegetation associations within the site.

Response: Vegetation within the HV Transmission Line Study Area has been mapped and consists of the following:

- PCT 1644 Coast Tea Tree - Old Man Banksia coastal shrubland
- PCT 1646 Smooth-barked Apple - Blackbutt -Old Man Banksia woodland
- PCT 1232 Swamp Oak Floodplain Swamp Forest
- PCT 1717 Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge Swamp Forest
- Exotic Vegetation

Figure 2 shows the vegetation mapping of the HV Transmission Line Study Area.

Lunney *et al* (1998) identified Tall Open Blackbutt and Sydney Red Gum vegetation association as Category C Koala habitat. The Lower Hunter and Central Coast Regional Environmental Management Strategy (2003) and Greater Hunter Vegetation Mapping (OEH 2012) has mapped this vegetation within the HV Transmission Line Study Area. This community is commensurate with the Smooth-barked Apple – Blackbutt – Old Man Banksia Woodland mapped by this study. The Coast Tea Tree – Old Man Banksia Coastal Shrubland mapped within as part of this report is a heath community and is classified as excluded from Koala habitat (Lunney *et al* 1998). Therefore, the vegetation within these parts of the HV Transmission Line Study Area generally aligns with the regional vegetation mapping, albeit with more refined boundaries.

However, of the area mapped as Preferred Koala Habitat by the CKPoM, the majority is actually Swamp Oak Floodplain Swamp Forest, which is not generally known to comprise Preferred Koala Habitat.

A small area of Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge Swamp Forest has also been mapped as part of this work, and it was in this area that the five preferred koala food trees (*Eucalyptus robusta* - Swamp Mahogany) were recorded and mapped.

i The locations of koala preferred Koala feed trees are to be shown on a map.

Response: The five *Eucalyptus robusta* (Swamp Mahogany) were mapped and are shown on Figure 3.

Step 3 Koala Habitat Identification

Step 3a – Realistically, the only Preferred Koala Habitat occurs where the Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge Swamp Forest occurs. The two locations of the five *Eucalyptus robusta* (Swamp Mahogany) trees are also provided (even though these are also within the Preferred Koala Habitat).

Step 3b Koala Habitat Identification

A site-specific map showing the location of individuals of preferred koala food trees, wherever they occur outside Preferred Koala Habitat, is required at this step. This has already been provided as described above. As the above work indicates that the site contains five preferred koala food trees, this assessment proceeds to Step 4 Assessment of Proposal as required under the CKPoM.

Step 4 Assessment of the Project

Step 4 requires an assessment of koala habitat utilisation on the site to be undertaken by a suitably qualified person with experience in koala surveys. The required Spot Assessment Technique (SAT) surveys were completed around the two locations of the Swamp Mahogany trees. The results were that no scats or signs of Koalas were observed (i.e. an activity level of 0%). Given the very thick Lantana in the vicinity of these locations, this is not surprising.

The project is for development of part of the HV Transmission Line Study Area to provide power to the proposed eco-tourist facility and therefore an assessment under the Appendix 4 Performance Criteria for Development Applications (excluding development applications proposing agricultural activities) is required and provided below.

CKPOM DEVELOPMENT ASSESSMENT (FROM APPENDIX 4 PORT STEPHENS CKPOM)

Proposed development (other than agricultural activities) **must:**

a. *Minimise the removal or degradation of native vegetation within Preferred Koala Habitat or Habitat Buffers.*

Response: The HV Transmission Line indicative location was selected following consideration of the survey results, including Koala habitat considerations. The actual area of Preferred Koala Habitat that will be potentially impacted is much less than the CKPoM mapping would initially indicate, and has been calculated at a maximum of 0.02ha. It is likely that a maximum of five (5) *Eucalyptus robusta* (Swamp Mahogany) will be impacted. These trees showed no signs of use by Koalas and had a 0% activity level. Despite this, it was still attempted to retain these trees as part of the design of the location of the HV Transmission Line however the most practical and least overall ecological impact route is alongside the existing access road and this is the route that has been initially selected. This route also makes maximum use of the cleared areas containing Exotic Vegetation, rather than being located further into the remnant native vegetation areas. A vast majority of remnant native vegetation and habitat connectivity will be retained post-development, including retention of larger areas of adjoining Preferred Koala Habitat.

b. *Maximise retention and minimise degradation of native vegetation within Supplementary Koala Habitat and Habitat Linking Areas;*

Response: The eco-tourist development aims are to preserve native vegetation for tourism purposes. The subject site has been placed mostly in cleared areas with minimal areas of mapped Supplementary Koala Habitat being impacted. The HV Transmission Line will not impact upon Supplementary Koala Habitat.

c. *Minimise the removal of any individuals of preferred koala food trees, wherever they occur on a development site. In the Port Stephens LGA these tree species are Swamp Mahogany (Eucalyptus robusta), Parramatta Red Gum (Eucalyptus parramattensis), and Forest Red Gum (Eucalyptus tereticornis), and hybrids of any of these species. An additional list of tree species that may be important to koalas based on anecdotal evidence is included in Appendix 8.*

Response: A maximum of five (5) preferred Koala feed trees will be removed as a result of the proposal. This is a maximum though, and some may be able to be retained at the detailed design stage. The removal of at least some of these trees is unavoidable if the HV Transmission Line is to be located in the most practical and least overall ecological impact location. Minor removal of the anecdotal Koala tree species, *Angophora costata* and *Eucalyptus pilularis* may occur as part of the project however the vast majority of these tree species will be retained post-development.

d. *Make provision, where appropriate, for restoration or rehabilitation of areas identified as Koala Habitat including Habitat Buffers and Habitat Linking Areas over Mainly Cleared Land. In instances where Council approves the removal of koala habitat (in accordance with dot points 1-4 of the above waive clause), and where circumstances permit, this is to include measures which result in a "net gain" of koala habitat on the site and/or adjacent land;*

Response: The WLALC Green Team have replanted some of the disturbed sand mine area with locally native species with the aim of regenerating the EA Study Area vegetation. The WLALC Green Team will continue their work on regeneration and rehabilitation of the Lot 227 within the wider site (i.e. outside APZ areas). The WLALC Green Team will also conduct weed removal operations and environmental education as part of the WLALC eco-tourist project.

e. *Make provision for long-term management and protection of koala habitat including both existing and restored habitat;*

Response: All areas of mapped preferred or supplementary koala habitat to be retained will be managed as part of the eco-tourist and associated HV Transmission Line development to ensure that the Koala habitat is managed for both conservation and eco-tourist purposes.

f. *Not compromise the potential for safe movement of koalas across the site. This should include maximising tree retention generally and minimising the likelihood that the proposal would result in the creation of barriers to koala movement, such as would be imposed by certain types of fencing. The preferred option for minimising restrictions to safe koala movement is that there be no fencing (of a sort that would preclude koalas) associated with dog free developments within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas. Suitable fencing for such areas could include:*

   i *fences where the bottom of the fence is a minimum of 200 mm above ground level that would allow koalas to move underneath;*
   ii *fences that facilitate easy climbing by koalas; for example, sturdy chain mesh fences, or solid style fences with timber posts on both sides at regular intervals of approximately 20m;*

   or

   iii *open post and rail or post and wire (definitely not barbed wire on the bottom strand).*

   However, where the keeping of domestic dogs has been permitted within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas, fencing of a type that would be required to contain dogs (and which may also preclude koalas) should be restricted to the designated building envelope. Fences which are intended to preclude koalas should be located away from any trees which now or in the future could allow koalas to cross the fence.

Response Connectivity: The native vegetation surrounding the HV Transmission Line Study Area will be retained and connectivity through this area will not be impacted by the project to any significant degree. This will maintain the current movement corridors for the Koala. The project has been placed as much as possible in areas of cleared and disturbed vegetation to minimise the impact on native vegetation.

Response Fencing: No permanent fencing will be required as part of the HV Transmission Line works.

g. *Be restricted to identified envelopes which contain all buildings and infrastructure and fire fuel reduction zone. Generally, there will be no clearing on the site outside these envelopes. In the case of applications for subdivision, such envelopes should be registered as a restriction on the title, pursuant to the Conveyancing Act 1919; and*

Response: No clearing will be conducted outside of the identified HV Transmission Line location, which incorporates all likely direct and indirect impacts of the project. Temporary no

go zone fencing or boundary definition will be implemented during construction works to prevent accidental clearing outside of approved clearing boundaries.

h. Include measures to effectively minimise the threat posed to koalas by dogs, motor vehicles and swimming pools by adopting the following minimum standards.

i The development must include measures that effectively abate the threat posed to koalas by dogs through prohibitions or restrictions on dog ownership. Restrictions on title may be appropriate.

Response: No dogs will be introduced as part of the HV Transmission Line works. Dogs will be prohibited as part of the eco-tourist development.

ii The development must include measures that effectively minimise the threat posed to koalas from traffic by restricting vehicle speeds, to 40kph or less.

Response: No ongoing traffic impacts are expected as a result of the HV Transmission Line. Vehicle access for the eco-tourist facilities will be restricted to parking areas for visitors of the subject site with a 20kph speed limit. Quad bike riding will be part of the eco-tourist activities and these will be limited to 10 kph.

iii The development must reduce the risk of koala mortality by drowning in backyard swimming pools. Appropriate measures could include: trailing a length of stout rope (minimum diameter of 50mm), which is secured to a stable poolside fixture, in the swimming pool at all times; designing the pool in such a way that koalas can readily escape; or enclosing the pool with a fence that precludes koalas. This last option should include locating the fence away from any trees which koalas could use to cross the fence.

Response: No swimming pools are proposed as part of the HV Transmission Line or eco-tourist development.

CONCLUSION

Based on the assessment above it is concluded that the project will not result in a substantial impact upon Koala feed trees, although may require the removal of a maximum of five Koala feed trees (Swamp Mahoganies) overall. The avoidance of these trees as part of the design was not considered to be practical, as moving the HV Transmission Line location would likely result in greater overall impacts to the remnant vegetation and habitat in the locality than would otherwise be the case with the proposed location alongside the existing road. The majority of native vegetation and connectivity will be retained in the immediate surrounds. A small area of preferred Koala habitat will be impacted upon, however this is unlikely to have a significant impact upon the potential Koala population that may utilise or adjoin the HV

Transmission Line Study Area. Therefore, it is concluded that the consent for this activity should not be withheld on Koala habitat impact grounds.