28th of October 2021

Attention: CEO
Central Coast Council
Po Box 20
Wyong, NSW, 2259

ECOLOGIOCAL CONSTRAINTS ANALYSIS FOR NO 216 & 234 PACIFIC HIGHWAY CHARMHAVEN NSW

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Practicing Member of Ecological Consultants Association of NSW (ECA)

Scientific Licence No: SL100292.

Animal Research Authority: Expiry 30th of March 2022 Trim file; 10/1887 DG ACEC

Dear Ceo,

EE have been engaged by Mr Chris Smith of Interface Planning to prepare an ecological constraints letter in support of a future development over No 216 & 234 Pacific Highway Charmhaven NSW hereafter referred to as the project site.

EE were engaged specifically to identify the vegetation types and habitats within the project site to identify preliminary constraints for future development.

Site inspections were undertaken over the project site on the 18th & 25th of September and on the 2nd & 23rd of October 2021 by Mr John Whyte B.Bio.Sc (Majors Botany & Zoology).

All work was carried out under the appropriate licences, including a scientific licence as required under part 2 of the *Biodiversity Conservation Act 2016* and an Animal Research Authority issued by the Department of Industry & Investment.

1.1 Database searches and literature review

- This assessment included a review of:
- Topographic maps
- Aerial photographs
- Vegetation Mapping of the area (Bell S 2002) The natural vegetation of the Wyong Local Government Area, Central Coast, New South Wales. Wyong, Unpublished report to Wyong Shire Council, East Coast Flora Survey.
- Database searches, as summarised in Table 1.

Table 1 Database searches

Database	Search date	Area searched	Reference
Bionet Atlas of NSW Wildlife	28th of October 2021	Locality (10 km)	(Department of Planning, Industry & Environment 2021)
PlantNet Database	28th of October 2021	Locality (10 km)	(Royal Botanic Gardens 2021)
Protected Matters Search Tool	28th of October 2021	Locality (10 km)	(Department of Sustainability, Environment, Water, Population and Communities 2021)

1.1.1 Random meander surveys

Random meander surveys are a variation of the transect type survey and were completed in accordance with the technique described by Cropper (1993), whereby the recorder walks in a random manner throughout the site recording all species observed. The survey is continued until no additional species are observed within a patch. Random meander surveys also allow the boundaries between various vegetation communities and condition of vegetation to be recorded and are valuable for recording species that may not occur within quadrats including, Threatened species (Department of Environment and Conservation 2004).

Individual random meander surveys were separated whenever there was a significant change in vegetation community type or condition. For each random meander survey, the vegetation community was determined based on the dominant canopy species and the structure formation in accordance with Specht (1981) with reference to existing mapped vegetation communities. A random meander was conducted throughout the entire project site.

1.1.2 Vegetation condition

The condition of vegetation communities is an important criterion to determine suitable habitats for Threatened species and the conservation status of certain ecological communities. Vegetation in the project site was assigned to one of the following condition classes (refer Table).

Table 2 Vegetation community condition classes

Condition Class	Criteria
Good	Vegetation still retains the species complement and structural characteristics of the pre-European equivalent. Such vegetation has usually changed very little over time and displays resilience to weed invasion due to intact groundcover.
Moderate	Vegetation generally still retains its structural integrity, but has been disturbed and has lost some component of its original species complement. Weed invasion can be significant in such remnants
Poor	Vegetation that has lost most of its species and is significantly modified structurally. Often such areas now have a discontinuous canopy of the original tree cover and very few shrubs. Exotic species, such as introduced pasture grasses or weeds, replace much of the indigenous ground cover. Environmental weeds are often co dominant with the original indigenous species.

1.1.3 Fauna habitats

Fauna habitat assessments were undertaken to assess the likelihood of Threatened species of animal (those species identified from the literature and database review) to occur in the project site. Fauna habitat characteristics assessed included the:

- structure and floristics of the canopy, understorey and ground vegetation, including the presence of flowering and fruiting trees providing potential foraging resources
- presence of hollow-bearing trees providing roosting and breeding habitat for arboreal mammals, birds and reptiles
- composition of the ground cover vegetation, leaf litter, rock outcrops and fallen timber to provide protection for ground-dwelling mammals, reptiles and amphibians
- Presence of waterways (ephemeral or permanent) and water bodies.

The assessment of these fauna habitat characteristics enabled an overall assessment of fauna habitat condition within the project site (refer Table 3).

Table 3 Vegetation community condition classes

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

1.1.4 Fauna survey

The presence of faunal species in the project site was determined primarily through consideration of suitable habitats, with species of animal present on the site recorded opportunistically during the vegetation and habitat assessments and through direct survey. Although recording Threatened species during field survey can confirm their presence in an area, a lack of Threatened species records does not necessarily indicate the absence of the species from the site when suitable habitat is present. By the very nature of their rarity, Threatened species are often difficult to detect. Suitable habitat is, therefore, an important factor to consider when determining the potential presence of Threatened species.

The following fauna surveys were completed in the project site due to the presence of the ground cover vegetation, hollows, leaf litter and fallen timber and potential to provide protection for ground-dwelling mammals, reptiles and amphibians.

The assessment of these fauna habitat characteristics enabled an overall assessment of fauna habitat condition within the project site

1.2 Limitations

Within the project site varying degrees of non-uniformity of flora and fauna habitats are encountered. Hence no sampling technique can entirely eliminate the possibility that a species is present within a project site (e.g. species of plant present in the seed bank). The conclusions in this report are based upon data acquired for the project site and the environmental field surveys and are, therefore, merely indicative of the environmental condition of the project site at the time of survey, including the presence or otherwise of species. It should also be recognised that conditions of the project site, including the presence of threatened species, can change with time.

Habitat assessments were completed for all threatened fauna species identified as a result of the database searches to determine whether or not suitable habitat for threatened fauna species occurred within the site. This is a more conservative approach and is likely to include species that are difficult to detect.

1.3 Vegetation mapping

Two vegetation maps cover the project site:

- Vegetation mapping of the area (Bell S 2002). The natural vegetation of the Wyong Local Government Area, Central Coast, New South Wales. Wyong, Unpublished report to Wyong Shire Council, East Coast Flora Survey.
- Lower Hunter and Central Coast Regional Environment Management Strategy Vegetation Survey, Classification and Mapping; Lower Hunter and Central Coast Region (LHCCREMS) (Lower Hunter and Central Coast Regional Environmental Management Strategy 2000)

The vegetation within the project site was ground-truthed and was found to best represented by (Bell 2002) vegetation mapping. The other vegetation mapping project (LHCCREMS) ((Lower Hunter and Central Coast Regional Environmental Management Strategy 2000) was less consistent with the findings of the current survey.

1.4 Vegetation communities

Four vegetation communities were identified from the project site. These being Narrabeen Doyalson Coastal Woodland (NDCW), Swamp Mahogany Paperbark Forest (SMPF), Cleared Land with Scattered Trees (CST) and Landscape Gardens (LG) (Figure 4).

The SMPF community was assessed as being in moderate-good condition whilst the NDCW was assessed as being in Low-moderate condition (Table 2). The CST & LG communities were assessed as being in low condition (Table 2).

1.5 Fauna habitat types

The suitability, size and configuration of the terrestrial fauna habitats were found to correlate broadly with the structure, floristics, connectivity and quality of the local vegetation communities mentioned above. These habitats mostly comprised the NDCW, SMPF, CST & LG.

The condition class of the habitats within the CST & LG communities were community was assessed as being in poor condition (Table 2) and provided limited habitat value, whilst the NDCW community was assessed as being in Low-moderate condition. The SMPF was assessed as being in moderate-good condition is to be retained and protected. The SMPF community contained moderate-good structural integrity, including the presence of upper, mid and groundcover layers, as well as thick leaf litter and woody debris, with the fauna habitats being assessed as being in a good condition in terms of their overall structure and the presence of microhabitat features.

1.6 Threatened biodiversity

This section details the threatened biodiversity recorded or likely to occur within the project site. This is based on those species recorded or predicted to occur within the locality from database searches and the nature of the habitats observed within the vicinity of the proposed works during field surveys (Appendices A and B).

1.6.1 Threatened ecological communities

Seven endangered ecological communities were identified from desktop review to occur within the locality of the project site (Table 4).

Table 4 Endangered Ecological Communities known from the Locality

Scientific Name	Common Name
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions
Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions
Low woodland with heathland on indurated sand at Norah Head	Low woodland with heathland on indurated sand at Norah Head
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	River-Flat Eucalypt Forest on Coastal Floodplains

Scientific Name	Common Name
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Swamp sclerophyll forest on coastal floodplains
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Swamp oak floodplain forest
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	Sydney Freshwater Wetlands in the Sydney Basin Bioregion

One endangered ecological community known as Swamp Sclerophyll Forest on Coastal Floodplains (SCFCF) of the NSW North Coast, Sydney Basin and South East Corner bioregions listed under the BC Act was recorded from the project site.

The Swamp Mahogany Paperbark Forest community (Figure 4) is representative of SCFCF EEC which is to be retained and protected under a future integrated bushfire/vegetation management plan.

1.6.2 Endangered populations

Two threatened populations were identified from the desktop review to occur within the locality of the site:

- *Eucalyptus oblonga* (Narrow-leaved Stringybark) population at Bateau Bay; and
- *Eucalyptus parramattensis subsp. parramattensis* population in the Wyong and Lake Macquarie LGAs

No endangered populations were identified nor were the habitats which were identified within the project site considered to be suitable for the aforementioned populations.

1.6.3 Threatened Flora

No threatened species of plant was recorded in the project site during this investigation, despite thirty threatened flora species having been identified as a result of the database searches within the locality (Appendix B). Intensive targeted surveys were conducted throughout the project site, but despite this no threatened species of flora were recorded.

1.6.4 Threatened fauna

Seventy-nine threatened fauna species were identified as a result of the database searches as occurring or having potential to occur within the locality of the project site (Appendix D).

Based on the habitat assessment and targeted surveys there is potential habitat within the project site for eighteen threatened fauna species that may be impacted through the removal of foraging & Roosting habitat (Appendix C).

1.7 Critical habitat

Critical habitat is listed under both the *Biodiversity Conservation Act 2016* and the *Environment Protection and Biodiversity Conservation Act 1999.* Critical habitat is the whole or any part or parts of an area or areas of land comprising the habitat of an endangered species, an endangered population or an endangered ecological community that is critical to the survival of the species, population or ecological community (Department of Environment and Conservation 2004).

The Directors-Generals of both the State and Federal departments of environment (Office of Environment & Heritage and the Department of Sustainability, Environment, Water, Population and Communities respectively) maintain a register of critical habitat. Habitat that is not listed on these register, however consistent with the definition above, may also be considered as critical habitat.

No listed critical habitat occurs within the project site and no critical habitat is likely to be affected by the proposal.

2. SUMMARY OF FINDINGS

A second order watercourse is located within the south-western corner of No 216 (Figure 2). In accordance with the NSW Office of Water (NOW) guidelines and Water Management Regulation (2010) more specifically the Strahler System the watercourse has been classified as 2nd order watercourse. In accordance with setback is detailed in the regulation a 20m setback from the top of the bank has been given. The draft proposal (Figure 3) is located outside of the 20m setback.

Note: At the time of the field investigation the watercourse has been diverted to the south-west around the existing Dam (Figure 4). The location of the watercourse is further to the west than that shown on Figures 2 & 3 and will be surveyed as part of any future development application.

A number of threatened species animal are considered likely to occur or utilise the habitats within the project site (Appendices B & C) intermediately. Habitats within the project site are considered likely to support eighteen threatened species most of which are highly mobile transient species.

A number of hollow-bearing trees (Figure 5) were identified from the subject property however none of these would be suitable for large forest owls species known from the locality (Appendix C). A detailed hollow-bearing tree investigation will be undertaken with the future submission.

One endangered ecological community known as Swamp Sclerophyll Forest on Coastal Floodplains listed under the *Biodiversity Conservation Act 2016* was recorded from the south-western corner of No 216 Pacific Highway (Figure 4). The EEC is proposed to be retained in its entirety under the draft development plans (Figure 3).

No endangered populations, threatened flora were identified within the project site during the current surveys that would be directly or indirectly affected by the future proposal.

The vegetation to be removed as aa result of future development comprises of non-threatened low-moderate condition Narrabeen Doyalson Coastal Woodland (NDCW) & low condition vegetation “Cleared Land with Scattered Trees” (CST) and “Landscape Gardens” (Figure 4).

The project site contains some land mapped upon the NSW biodiversity values map as such the future development application will require the preparation of a

biodiversity development assessment report (BDAR) to be submitted with the development application.

If you would like to discuss any of the provided information further or have any queries, please do not hesitate to contact me on 0402592399.

Yours sincerely

John Whyte

Principal Ecologist

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Appendix A

Site Figures

Figure 1 Project Site

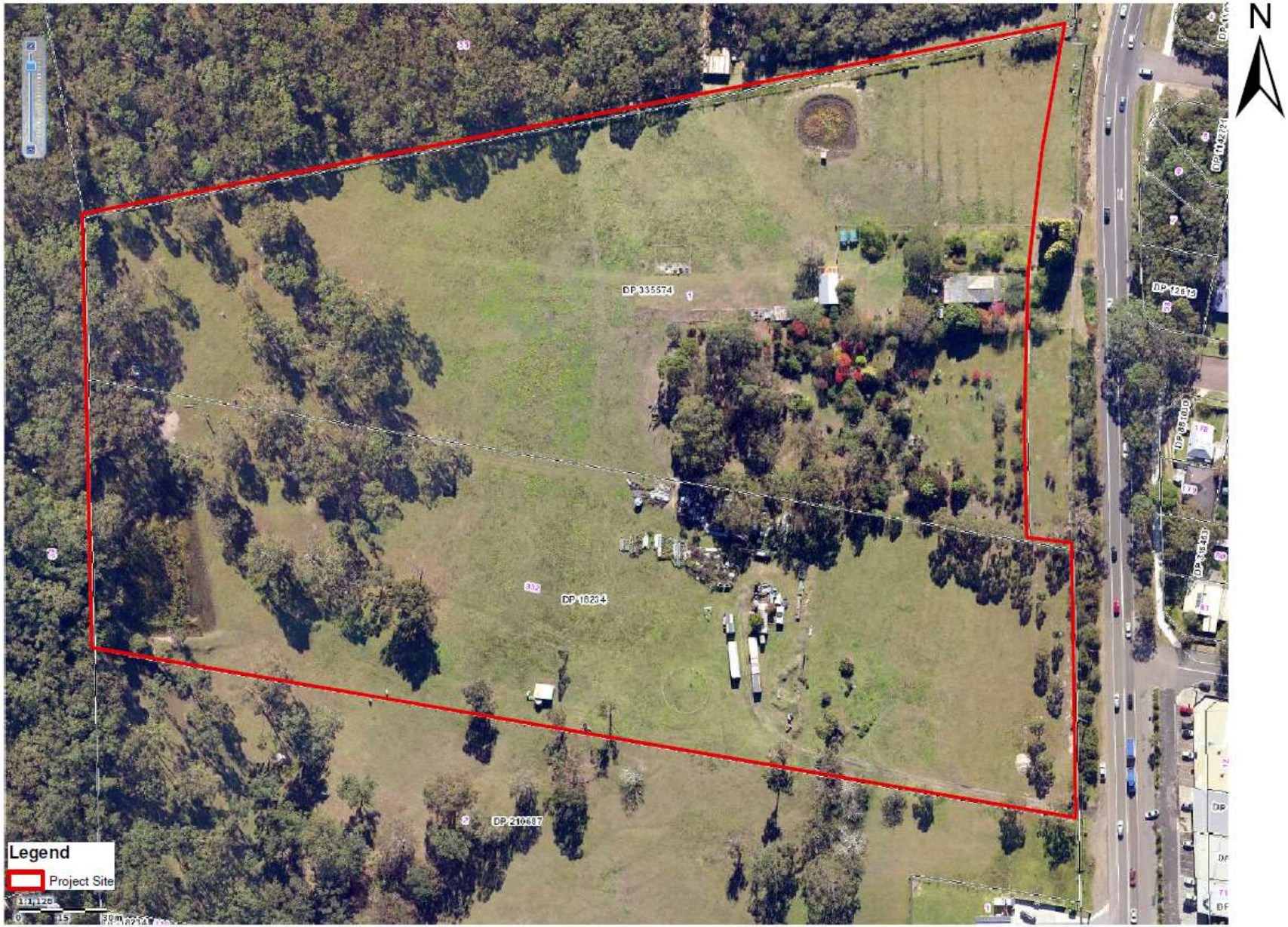


Figure 2nd order watercourse located from the south-western corner of the project site

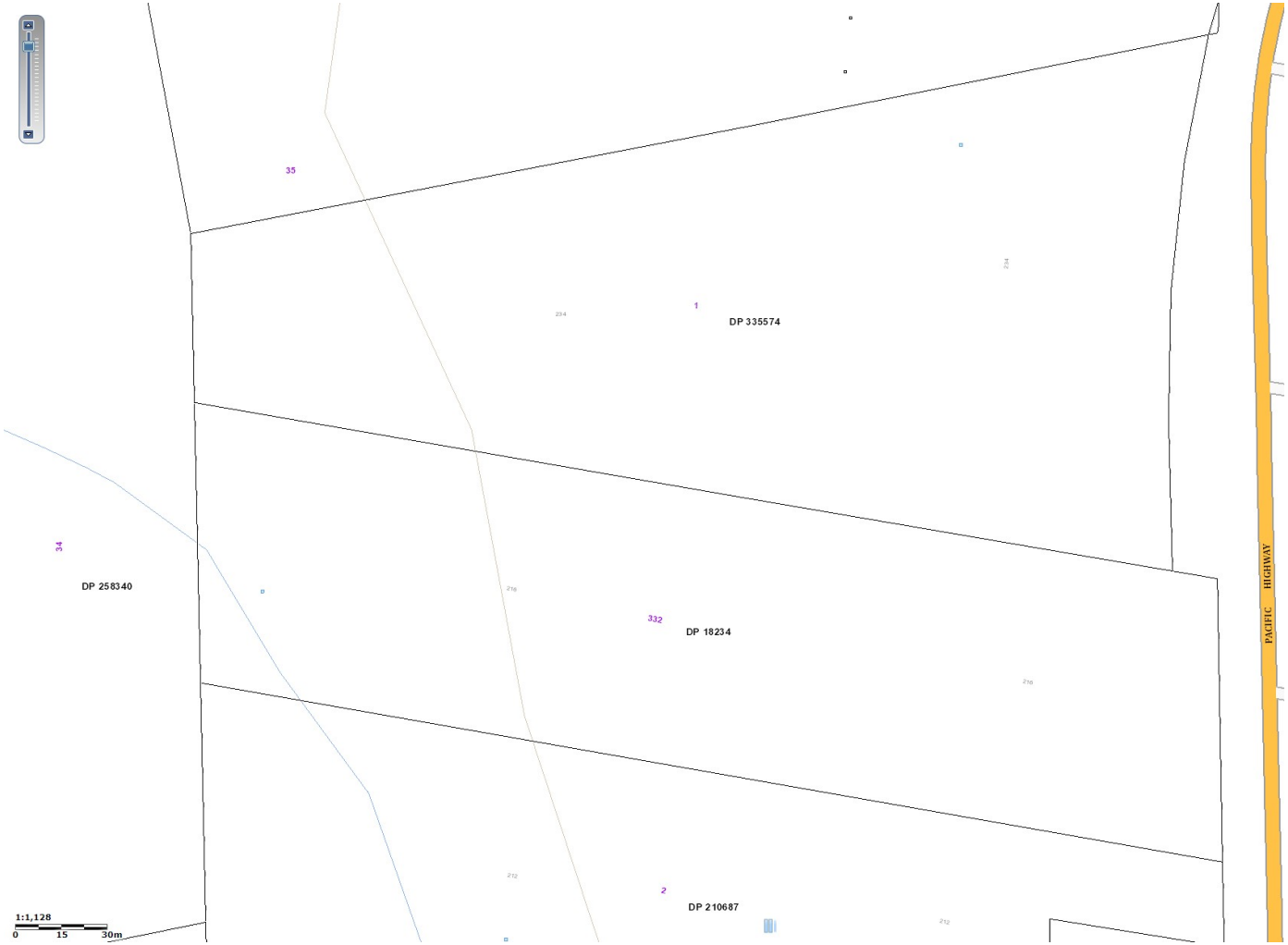


Figure 3 Preliminary development plans over the project site

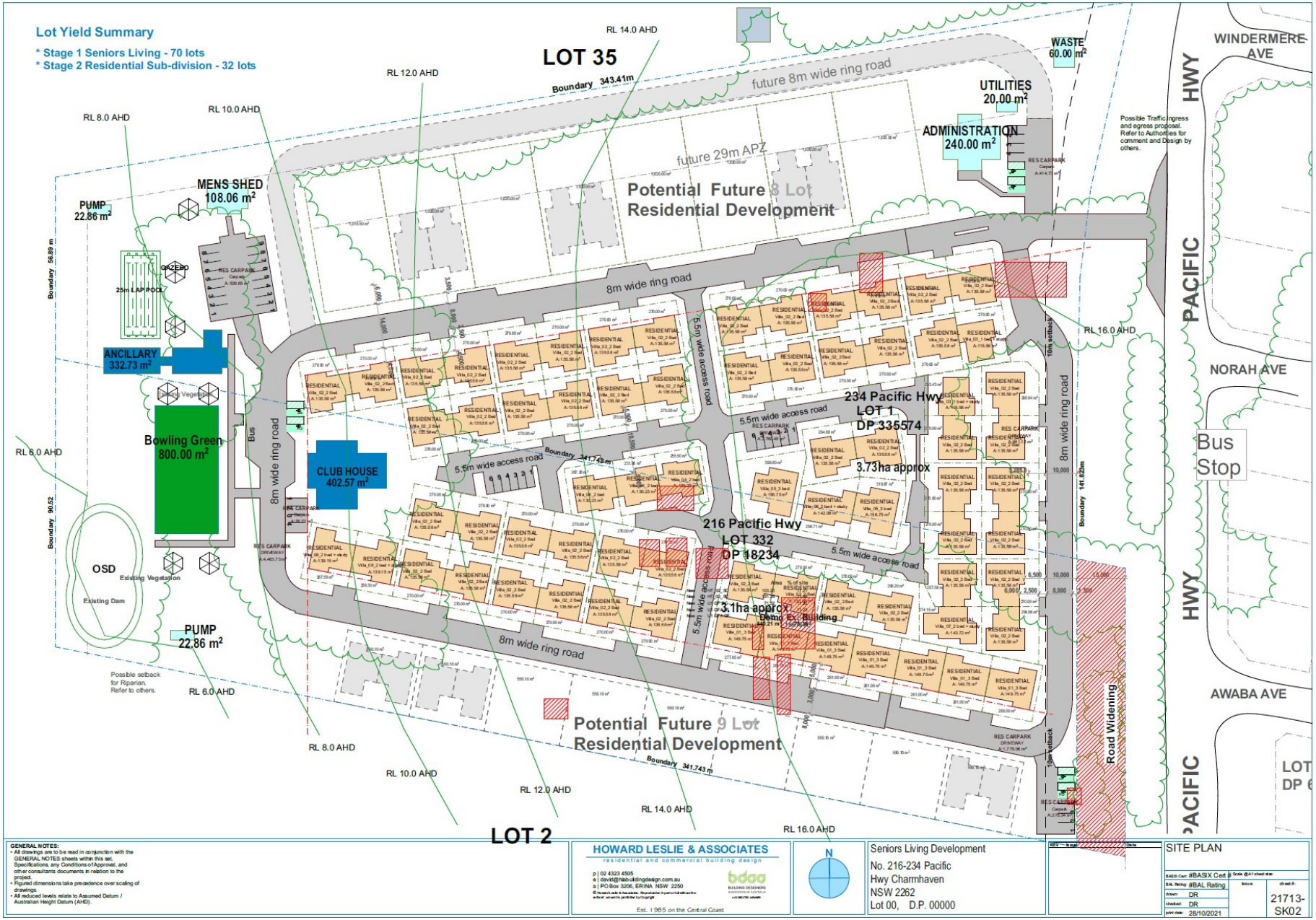


Figure 4 Field verified vegetation communities recorded from the project site

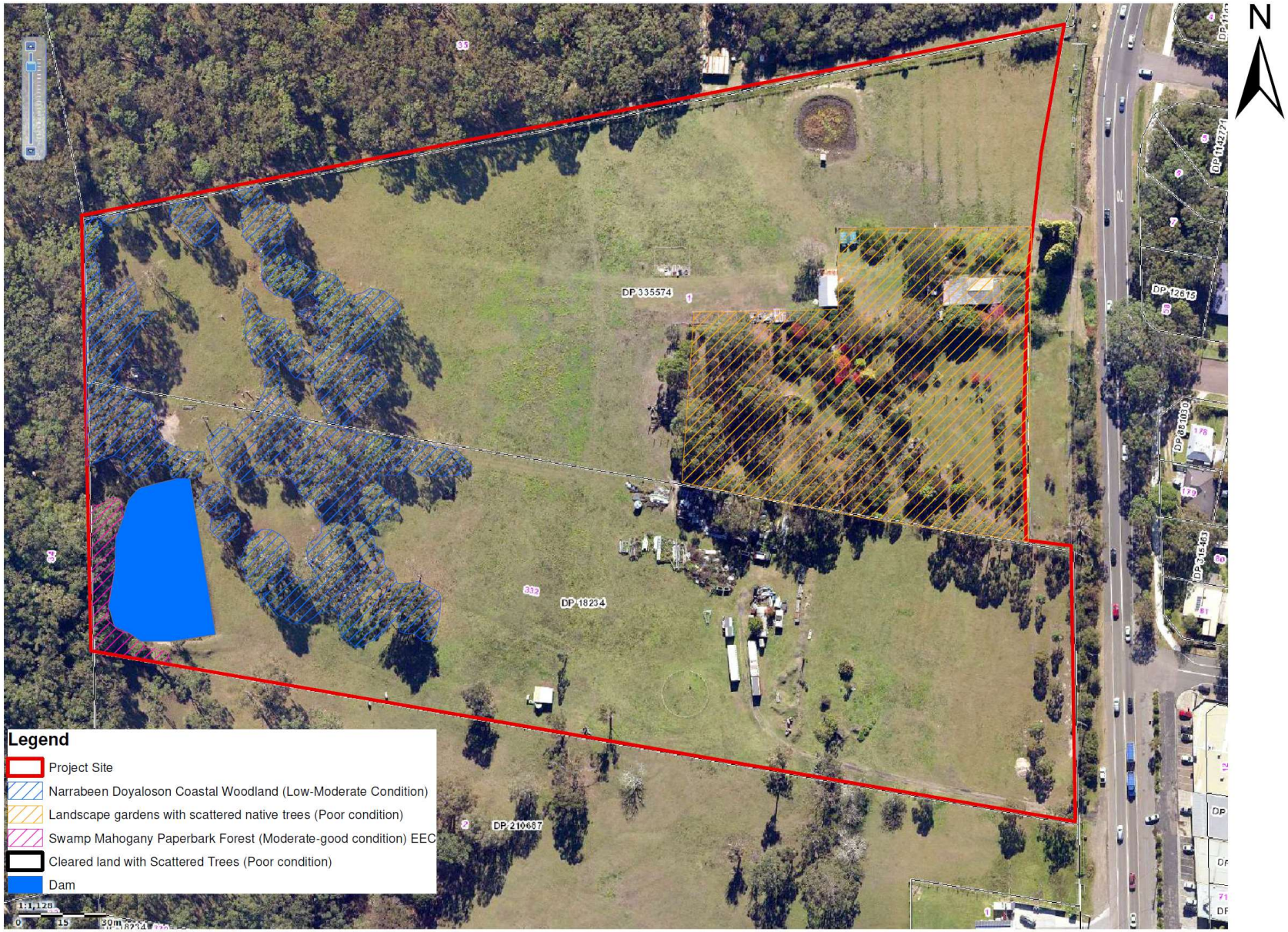
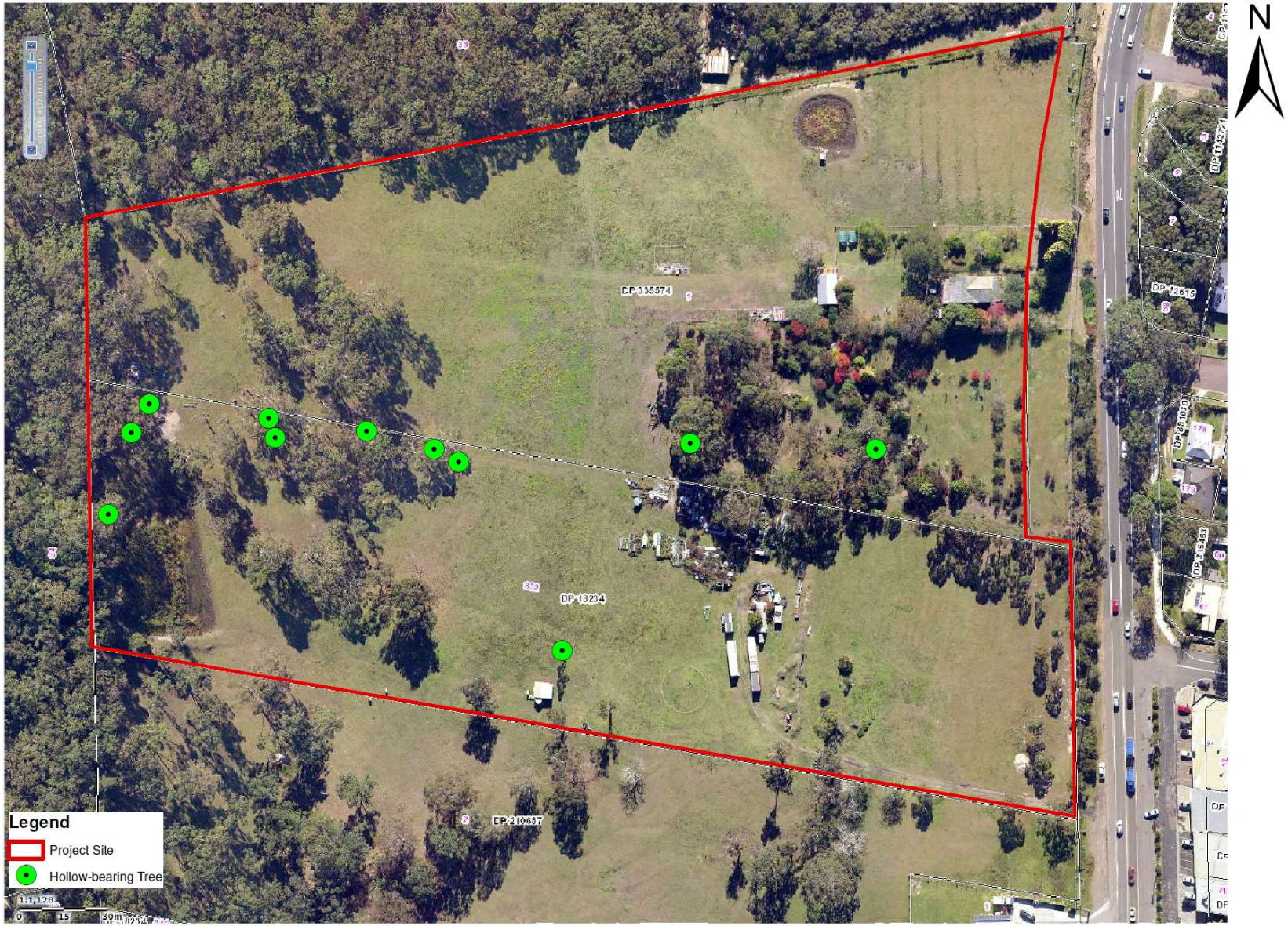


Figure 5 Hollow-bearing trees recorded from the project site



Appendix B

Threatened flora species recorded in the locality

Appendix B Threatened Flora species recorded in the locality

This appendix details the Threatened species of plant that have either been recorded in the local area based on records the Bionet *Atlas of NSW Wildlife* Department, Planning Industry & Environment, 2021 data received 28th of October 2021 and records from the Royal Botanical Gardens. Threatened species with habitat likely to occur in the locality were also considered based on records from the *EPBC Protected Matters Search Tool* Depatment of Sustainability, Environment, Water, Population and Communities 2021 data received 28th of October 2021.

Table 2-1 Threatened flora species recorded in the locality

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
Asteraceae	*Rutidosis heterogama*	Heath Wrinklewort	V	V	2Va	Occurs in coastal districts from Maclean to the Hunter Valley and inland to the Torrington region. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides (Department of Environment and Conservation 2005; Royal Botanic Gardens 2005).	**Low** Targeted surveys were undertaken within the project site for this species during the flowering period, reference population on the northern side of Railway Road/Sparks Road was inspected. Despite targeted surveys being undertaken no specimens were recorded.
Euphorbiaceae	*Chamaesyce psammogeton*	Sand Spurge	E1			Occurs in coastal regions of NSW where it grows on sand dunes near the sea (Harden 2000). Grows on fore-dunes and exposed headlands, often with Spinifex (*Spinifex sericeus*) (Department of Environment and Conservation 2005).	**Low** No suitable habitat was recorded from the project site for this species.
Fabaceae (Faboideae)	*Pultenaea maritima*		V			*Pultenaea maritima* occurs in New South Wales and Queensland and is restricted to grasslands on exposed coastal headlands. Within NSW, the species has been recorded from Newcastle north to Byron Bay.	**Low** No suitable habitat was recorded from the project site for this species.
Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E1	V	3V	Occurs south of Dora Creek-Morisset area to Berrima and the Illawarra region and west to the Blue Mountains. It grows mainly in heath and dry sclerophyll forest on sandy soils (Harden 2002). Seems to prefer open, sometimes disturbed sites such as trail margins and recently burnt areas. Typically occurs in association with *Corymbia gummifera, Eucalyptus*	**Low** Targeted surveys were undertaken within the project site for this species, despite targeted surveys being undertaken during the flowering period no specimens

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
						haemastoma, E. gummifera, E. parramattensis, E. sclerophylla, Banksia serrata and *Angophora bakeri* (NSW National Parks and Wildlife Service 1999).	were recorded.
Juncaginaceae	*Maundia triglochinoides*	-	V			Occurs north from Sydney. Grows in swamps, creeks or shallow freshwater 30 to 60 cm deep on heavy clay, low nutrients. Associated with wetland species such as *Triglochin procerum* (Harden 1993).	**Low** Targeted surveys were undertaken within the project site for this species, despite targeted surveys being undertaken no specimens were recorded.
Lamiaceae	*Prostanthera askania*	Tranquility Mintbush	E1	E	2V	Restricted to the Ourimbah--Narara area where it currently known to exist in five populations. It grows in sclerophyll forest on ridges in or adjacent to rainforest grows in sclerophyll forest on ridges in or adjacent to rainforest (Harden 1992; NSW Scientific Committee 1998).	**Low** No suitable habitat was recorded from the project site for this species.
Myrtaceae	*Angophora inopina*	Charmhaven Apple	V	V		Restricted to the Charmhaven - Wyee area where it grows in open dry sclerophyll woodland of *Eucalyptus haemastoma* and *Corymbia gummifera* with a dense shrub understorey. Occurs on deep white sandy soils over sandstone, often with some gravelly laterite (NSW Scientific Committee 1998; Harden 2002).	**Low** Targeted surveys were undertaken within the project site for this species, despite targeted surveys being undertaken no specimens were recorded.
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V		2Ri	Occurs chiefly from Georges to the Hawkesbury River where it grows in dry sclerophyll forest, open forest, scrubland or woodland on sandstone. Found in damp places, usually in gullies (Robinson 1994; Fairley and Moore 2002; Harden 2002). Within the Sydney region, recent records are limited to the Hornsby Plateau area	**Low** Targeted surveys were undertaken for this species which failed to detect this species within the

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
						near the Hawkesbury River (NSW Scientific Committee 1999).	project site.
Myrtaceae	*Eucalyptus camfieldii*	Heart-leaved Stringybark	V	V	2Vi	Occurs from Tomago to the Royal National Park where it grows in coastal shrub heath in sandy soils on sandstone (Harden 2002).	**Low** Targeted surveys were undertaken for this species which failed to detect this species within the project site.
Myrtaceae	*Eucalyptus parramattensis ssp. decadens*		V	V	2V	Locally frequent, grows in dry sclerophyll woodland on sandy soils in low, often wet sites (Harden 2002).	**Low** Targeted surveys were undertaken within the project site for this species, despite targeted surveys being undertaken no specimens were recorded.
Myrtaceae	*Eucalyptus pumila*	Pokolbin Mallee	V	V	2Vi	Now only known from a single stand near Pokolbin where it grows in sclerophyll shrubland on skeletal soil on sloping sandstone (Harden 2002). Previously recorded from Muswellbrook and Wyong {Department of Environment and Conservation, 2005 #389}.	**Low** No suitable habitat was recorded from the project site for this species.
Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V	V		Occurs as disjunct populations in coastal New South Wales from Jervis Bay to Port Macquarie, with the main concentration of records is in the Gosford/Wyong area (NSW Scientific Committee 1998). Grows in damp places, often near streams, or low-lying areas on alluvial soils of low slopes or sheltered aspects (Harden 2002; Department of Environment and Climate Change 2008).	**Low** Targeted surveys were undertaken for this species which failed to detect this species within the project site.

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	V	V	3Ri	Occurs between Buladelah and St Georges Basin where it grows in subtropical and littoral rainforest on sandy soils or stabilized dunes near the sea (Harden 2002). 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 (Department of Environment and Climate Change 2008).	**Low** Targeted surveys were undertaken for this species which failed to detect this species within the project site.
Orchidaceae	*Caladenia porphyrea*		E1			*Caladenia porphyrea* has a highly restricted geographic distribution. It has been recorded from 2 localities in the Wyong local government area c. 2 km apart (NSW Department of Environment and Conservation 2006). It grows in heath and heathy forest and woodland, sometimes on exposed headland Altitude 10-40 metres. It grows within soils that are grey to white sands and sandy loam and flowers between September-October (Gunninah Environmental Consultants 2003)	**Low** No suitable habitat was recorded from the project site for this species. No suitable habitat exists from the project site for this species.
Orchidaceae	*Caladenia tessellata*	Thick Lip Spider Orchid	E1	V	3V	Occurs south of Swansea where it grows on clay loam or sandy soils (Harden 1993). Prefers low open forest with a heathy or sometimes grassy understorey (Bishop 2000). Within NSW, currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Previously known also from Sydney and South Coast areas (NSW Scientific Committee 2002). Flowers appear between September and November (but apparently generally	**Low** No suitable habitat exists from the project site for this species. This species has not been recorded from Central Coast for over 25 years, records are located from Munmorah SCA, personal communication with Mr Borris

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
						late September or early October in extant southern populations).	Braithwaite.
Orchidaceae	*Corunastylis sp. Charmhaven*		CE			*Corunastylis sp.* Charmhaven is restricted to a single location in the Gorokan/Charmhaven area. It occurs within low woodland to heathland with a shrubby understorey and ground layer. Dominants include *Allocasuarina littoralis, Leptospermum juniperinum*, *Melaleuca nodosa, Callistemon linearis* and *Schoenus brevifolius* (NSW Scientific Committee 2012). The geographic distribution of *Corunastylis* sp. Charmhaven (NSW896673) is very highly restricted. The area of occupancy and extent of occurrence were estimated to be 4 km^2 (NSW Scientific Committee 2012).	**Low** No suitable habitat was recorded from the project site for this species.
Orchidaceae	*Cryptostylis hunteriana*	Leafless Tongue Orchid	V	V	3V	Occurs south from the Gibraltar Range, chiefly in coastal districts but also extends on to tablelands. Grows in swamp-heath and drier forest on sandy soils on granite & sandstone. Occurs in small, localised colonies most often on the flat plains close to the coast but also known from some mountainous areas growing in moist depressions and swampy habitats (Harden 1993; NSW National Parks and Wildlife Service 1999).	**Low** Targeted surveys were undertaken for this species which failed to detect this species within the project site. Reference population with Munmorah SCA was inspected on the 23rd of October 2021 with 7 plants in flower.
Orchidaceae	*Diuris praecox*	Rough Double Tail	V	V	2V	Occurs in coastal and near-coastal districts from Ourimbah to Nelson Bay where it grows in sclerophyll forest (Harden 1993) often on hilltops or slopes (Bishop 2000). It produces leaves and flowering stems in winter.	**Low** No suitable habitat exists from the project site for this species.

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
Orchidaceae	*Genoplesium insignis*		E1			This terrestrial orchid occurs between Chain Valley Bay and Wyong in Wyong local government area. It grows in heathland and forest and is associated with *Themeda australis* amongst shrubs and sedges. Typically it occurs in dry sclerophyll woodland dominated by *Eucalyptus haemastoma, Corymbia gummifera, Angophora costata* and *Allocasuarina littoralis* (Department of Environment and Climate Change 2009). Flowering period is September to October.	**Low** Sub-optimal habitat exists from the project site for this species. Targeted surveys were undertaken within the flowering period upon confirmation that a reference population of this species was in flower on the corner of Chain Valley Bay and Houston Avenue Chain Valley Bay despite this no individuals were recorded from the subject property
Orchidaceae	*Thelymitra sp. 'Adorata'* .	Wyong Sun orchid	CE	E		A hairless terrestrial orchid, dying back annually to a tuberous rootstock which flowers from September-October. The flowering stem usually emerges in September. The species habitat is woodland with a grassy understorey in well drained clay-loam or shale derived soils (Jones 2006). Occurs primarily within Dooralong Spotted Gum Ironbark Forest Map unit 30 (Gunninah Environmental Consultants 2003)	**Low** Sub-optimal habitat exists from the project site for this species. This species was in flower at the end of Mountain Street Warnervale (reference population) on the 21st of September and in bud on the 21st of October 2018. Additional surveys have been undertaken in September 2019 with reference populations in flower despite this no individuals were recorded from the project site. Pers communication with Mr Borris Braithwaite is that he has not seen this species despite over 20 years of survey within the immediate

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
							area of Arizona Road.
Proteaceae	*Grevillea parviflora ssp. parviflora*	Small-flower Grevillea	V	V		Mainly known from the Prospect area (but now extinct there) and lower Georges River to Camden, Appin and Cordeaux Dam areas, with a disjunct populations near Putty, Cessnock and Cooranbong. Grows in heath or shrubby woodland in sandy or light clay soils usually over thin shales (NSW Scientific Committee 1998; Harden 2002). Flowering has been recorded between July to December as well as April-May	**Low** Targeted surveys were undertaken during this species flowering period which failed to detect this species within the project site.
Tremandraceae	*Tetratheca glandulosa*		V	V	2V	Occurs from Mangrove Mountain to the Blue Mountains where it grows in sandy or rocky heath or scrub (Harden 1992). Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Stony lateritic fragments are also common in the soil profile on many of these ridgetops. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. Vegetation communities correspond broadly to Benson & Howell's Sydney Sandstone Ridgetop Woodland (Map Unit 10ar). Common woodland tree species include: *Corymbia gummifera, C. eximia, Eucalyptus haemastoma, E. punctata, E. racemosa,* and/or *E. sparsifolia*, with an understorey dominated by species from the families Proteaceae, Fabaceae, and Epacridaceae (Department of Environment and	**Low** No suitable habitat exists from the project site for this species.

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the project site
						Climate Change 2008).	
Tremandraceae	*Tetratheca juncea*	Black-eyed Susan	V	V	3Vi	Occurs in coastal districts from Buladelah to Port Macquarie where it grows in dry sclerophyll forest and occasionally swampy heath in sandy, (Harden 1992) low nutrient soils with a dense understorey of grasses. Specifically it is known to occur within Smooth-barked Apple Woodland and Coastal Foothills Spotted Gum Woodland {NSW National Parks and Wildlife Service, 2000 #392; NSW National Parks and Wildlife Service, 2000 #393; NSW National Parks and Wildlife Service, 2000 #344}. sporadic flowering, the flowering season between late August and the end of November (in dry years) and between August and January (in wet years).	**Low** Targeted surveys were undertaken during this species flowering period which failed to detect this species within the project site.

1) V= Vulnerable, E1 = Endangered (TSC Act) E2= Endangered Population

2) ROTAP (Rare or Threatened Australian Plants, Briggs and Leigh 1996) is a conservation rating for Australian plants.

1 = Species only known from one collection. 2 = Species with a geographic range of less than 100km in Australia. 3 = Species with a geographic range of more than 100km in Australia,

X = Species presumed extinct; no new collections for at least 50 years. E = Endangered species at risk of disappearing from the wild state if present land use and other causal factors continue to operate, V = Vulnerable species at risk of long-term disappearance through continued depletion. R = Rare, but not currently considered to be endangered. K = Poorly known species that are suspected to be threatened. C = Known to be represented within a conserved area.

a = At least 1,000 plants are known to occur within a conservation reserve(s). i = Less than 1,000 plants are known to occur within a conservation reserve(s). The reserved population size is unknown. t = The total known population is reserved. + = The species has a natural occurrence overseas.

3) V = Vulnerable, E = Endangered *(Environment Protection and Biodiversity Conservation Act 1999*).

Appendix C

Threatened fauna species recorded in the locality

Appendix C Threatened fauna species recorded in the locality

This appendix details the Threatened species of plant that have either been recorded in the local area based on records the *Atlas of NSW Wildlife* Planning Industry & Environment, 2021, data received 28th of October 2021 and records from the Royal Botanical Gardens. Threatened species with habitat likely to occur in the locality were also considered based on records from the *EPBC Protected Matters Search Tool* Department of Sustainability, Environment, Water, Population and Communities 2021, data received 28th of October 2021

Table 2-2 Threatened fauna species recorded in the locality

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
Amphibians					
Crinia tinnula	Wallum Froglet	V		Occurs along coast from south-eastern Queensland to Sydney. Mostly associated with swamps, dams and flooded roadside ditches, usually in heathland, where it is confined to acid, paperbark swamps and sedge swamps of the 'wallum' country. Males call anytime of year. Breed in late winter (Anstis 2002; NSW National Parks and Wildlife Service 2002).	**Low** All suitable habitat "Swamp Mahogany Paper Forest" community is to be retained and protected. No suitable habitat from the development area. To be assessed under a future BDAR.
Heleioporus australiacus	Giant Burrowing Frog	V	V	Appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin, from Wollemi National Park in the north and extending south to Jervis Bay; and a southern population occurring in disjunct pockets from about Narooma south into eastern Victoria. In the northern population there is a marked preference for sandstone ridgetop habitat and broader upland valleys. In these locations the frog is associated with small headwater creeklines and along slow flowing to intermittent creeklines. The vegetation is typically woodland, open woodland and heath and may be associated with 'hanging swamp' seepage lines and where small pools form from the collected water. They have also been observed occupying artificial ponded structures such as fire dams, gravel 'borrows', detention basins and box drains that have naturalised over time and are still surrounded by other undisturbed habitat. In the southern population, records from Narooma, Bega, Bombala and eastern Victoria appear to be associated with	**Low** No suitable habitat was recorded from the project site for this species.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				Devonian igneous and sedimentary formations and Ordovician metamorphic and are generally from more heavily timbered areas. However, again there appears to be an association with ridgetops, headwaters and slow flowing streams. Do not appear to inhabit areas that have been cleared for agriculture or for urban development. Breed in summer and autumn in burrows in the banks of small creeks. Often spends significant periods of time underground during unfavourable conditions and to avoid detection during the day. (Cogger 2000; NSW National Parks and Wildlife Service 2001).	
Litoria aurea	Green and Golden Bell Frog	E1	V	Has a fragmented distribution of mainly near coastal locations from Lakes Entrance (Victoria) to south of the NSW-Queensland border as far west as Bathurst in the more elevated southern tablelands and central slopes of NSW. Various types of habitat utilised has been documented. For breeding utilises a wide range of water bodies, including both natural and man-made structures, such as marshes, dams and stream sides, and ephemeral locations that are more often dry than wet. Is found in various small pockets of habitat in otherwise developed areas and has the tendency of often turning up in highly disturbed sites. Lotic situations such as fast flowing streams appear to be one of the few water bodies not utilised, at least for breeding purposes. Habitat attributes associated with the various water bodies occupied by the GGBF, and that appear to make such habitat more likely to be occupied, include that the water body is shallow, still or slow flowing, ephemeral and/or widely fluctuating, unpolluted and without heavy shading. Permanent water bodies are also known to be used and there is historical evidence of occupation of large, often deep and permanent bodies of water. There is a clear preference shown by GGBF for sites with a complexity of vegetation structure and associated terrestrial habitat attributes that appear to favour the species include extensive grassy areas and an abundance of shelter sites such as rocks, logs, tussock forming vegetation and other cover, considered to be used for foraging and shelter. Over-wintering sites may be adjacent	**Low** All suitable habitat “Swamp Mahogany Paper Forest” community is to be retained and protected. No suitable habitat from the development area.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				to or some distance away from breeding sites; such sites include the bases of dense vegetation tussocks, beneath rocks, timber, within logs or beneath ground debris, including human refuse such as sheet iron, but the full range of possible habitat used for this purpose is not yet well understood (Department of Environment and Conservation 2004; Department of Environment and Conservation 2005) .	
Litoria brevipalmata	Green Thighed Frog	V		The species inhabits coastal forest and bushland from south-east QLD to Ourimbah NSW and breeding takes place only after heavy summer rains when calling males gather around temporary or semi-permanent ponds and flooded ditches. Egg masses are often laid in temporary ponds and their survival may depend on subsequent rains around grassy semi-permanent ponds in late spring and summer (Cogger 2000).	**Low** All suitable habitat "Swamp Mahogany Paper Forest" community is to be retained and protected. No suitable habitat from the development area. To be assessed under a future BDAR
Litoria littlejohni	Heath Frog	V	V	Distributed along the eastern slopes of the Great Dividing Range from Watagan State Forest near Wyong, south to Buchan in north-eastern Victoria. It appears to be restricted to sandstone woodland and heath communities at mid to high altitude. It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer. It is not known from coastal habitats (NSW Scientific Committee 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Mixophyes balbus	Stuttering Frog	E1	V	Terrestrial species, found in rainforest, Antarctic beech forest or wet sclerophyll forest. The species depends on freshwater streams and riparian vegetation for breeding and habitation. No records are known from riparian habitat that has been disturbed (Cogger 2000; NSW Scientific Committee 2003).	**Low** No suitable habitat was recorded from the project site for this species.
Mixophyes iteratus	Giant Barred Frog	E1	E	Terrestrial species which occurs in rainforests, Antarctic beech or wet sclerophyll forests. Feeds on insects and smaller frogs (Cogger 2000). The species is associated with permanent flowing	**Low** No suitable habitat was recorded from the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				drainages, from shallow rocky rainforest streams to slow-moving rivers in lowland open forest. It is not known to utilise still water areas (NSW Scientific Committee 1999). More prevalent at lower altitudes and in larger streams than its congeners, although has been recorded up to 1000 metres asl. (NSW National Parks and Wildlife Service 1999).	project site for this species.
Pseudophryne australis	Red-crowned Toadlet	V		Occurs within 160 km of Sydney where it is restricted to Hawkesbury Sandstone. It breeds in deep grass and debris adjacent to ephemeral drainage lines. When not breeding individuals are found scattered on sandstone ridges under rocks and logs (Cogger 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Fish					
Prototroctes maraena	Australian Grayling		V	It is a mid-water, freshwater species, that occurs most commonly in clear, gravelly streams with a moderate flow. Prefers deep, slow flowing pools (NSW Fisheries 2004).	**Low** No suitable habitat was recorded from the project site for this species.
Invertebrates					
Petalura gigantea	Giant Dragonfly	E1		Found in permanent wetlands, both coastal and upland from moss Vale northwards to southern Queensland (Department of Environment and Conservation 2005).	**Low** All suitable habitat "Swamp Mahogany Paper Forest" community is to be retained and protected. No suitable habitat from the development area.
Birds					
Ardea alba	Great Egret		M	Great Egrets occur throughout most of the world. They are common throughout Australia, with the exception of the most arid areas. Great Egrets prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Great Egrets can be seen alone or in small flocks, often with other	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				egret species, and roost at night in groups. In Australia, the breeding season of the Great Egret is normally October to December in the south and March to May in the north. This species breeds in colonies, and often in association with cormorants, ibises and other egrets. (Australian Museum 2003).	proposal area as defined under the *EPBC Act 1999*.
Ardea ibis	Cattle Egret		M	Subspecies *A. i. coromanda* is found across the Indian subcontinent and Asia as far north as Korea and Japan, and in South-east Asia, Papua New Guinea and Australia (McKilligan 2005).	**Low** No suitable habitat was recorded from the project site for this species.
Botaurus poiciloptilus	Australasian Bittern	V		Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spike-rushes. When breeding, pairs are found in areas with a mixture of tall and short sedges but will also feed in more open territory. (Garnett and Crowley 2000; NSW National Parks and Wildlife Service 2002).	**Low** No suitable habitat was recorded from the project site for this species.
Calidris acuminata	Sharp-tailed Sandpiper		M	Occurs in a variety of habitats: tidal mudflat, mangrove swamps, salt marshes, shallow fresh, brackish, salt inland swamps and lakes; flooded and irrigated paddocks, sewage farms and commercial salt fields (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Calidris alba	Sanderling	V	M	A coastal species found on low and open sand beaches exposed to open sea-swells. A migratory species, it has been recorded in NSW from September to May (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. The project site contains suitable foraging and nesting habitat but despite this no

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
					individuals were detected during targeted surveys.
Calidris canutus	Red Knot		M	Red Knots gather in large flocks on the coast in sandy estuaries with tidal mudflats.	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Calidris ferruginea	Curlew Sandpiper		M	Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes (Morcombe 2003).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Calidris ruficollis	Red-necked Stint		M	In Australia, Red-necked Stints are found on the coast, in sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores. They may also be seen in salt works, sewage farms, saltmarsh, shallow wetlands including lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in salt flats, flooded paddocks or damp grasslands. They are often in dense flocks, feeding or roosting.	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Calidris tenuirostris	Great Knot	V	M	Generally a coastal species found on tidal mudflats and sandy ocean shores. A migratory species visiting Australian waters between September and March (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC*

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
					Act 1999.
Callocephalon fimbriatum	Gang-gang Cockatoo	V		Occurs in wetter forests and woodland from sea level to an altitude over 2000 metres, timbered foothills and valleys, coastal scrubs, farmlands and suburban gardens (Pizzey and Knight 1997).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Calonectris leucomelas	Streaked Shearwater		M	Habitat largely restricted to pelagic seas, shelf waters and further out. Unusual inshore (Morcombe 2003).	**Low** No suitable habitat was recorded from the project site for this species.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		Occurs in eucalypt woodland and forest with *Casuarina/Allocasuarina spp*. Characteristically inhabits forests on sites with low soil nutrient status, reflecting the distribution of key *Allocasuarina species*. The drier forest types with intact and less rugged landscapes are preferred by the species. Nests in tree hollows (NSW National Parks and Wildlife Service 1999; Garnett and Crowley 2000).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Charadrius bicinctus	Double-banded Plover		M	The Double-banded Plover is found on coastal beaches, mudflats, sewage farms, river banks, fields, dunes, upland tussock grasses and shingle.	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Charadrius leschenaultii	Greater Sand Plover	V	M	Entirely coastal in NSW foraging on intertidal sand and mudflats in estuaries, and roosting during high tide on sand beaches or rocky shores. A migratory species it is found in New South Wales generally during the summer months (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC*

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
					Act 1999.
Charadrius mongolus	Lesser Sand Plover	V	M	Migratory bird that migrates from the northern hemisphere to coastal areas of northern and east coast of Australia (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Climacteris picumnus	Brown Treecreeper	V		Occurs in eucalypt woodland and adjoining vegetation. Feeds on ants, beetles and larvae on trees and from fallen timber and leaf litter. Usually nests in hollows (Garnett and Crowley 2000).	**Low** A targeted bird survey was conducted within the project site which failed to detect this species
Diomedea amsterdamensis	Amsterdam Albatross		EM	Breeding on Amsterdam Island and foraging mainly in the surrounding Indian Ocean, but possibly occurring as far afield as Tasmania and New Zealand. Breed biennially in colonies among grass tussocks (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Diomedea antipedensis	Antipodean Albatross	V	VM	A nomadic marine species that occasionally breeds off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Diomedea dabbena	Tristan Albatross		E	Breeding range now restricted to Inaccessible and Gough Island., having been eliminated from the main island of Tristan de Cunha by 1907. Current global population estimated to contain about 1,000	**Low** No suitable habitat was recorded from the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				breeding pairs. There is only one record from Australian waters. Breed biennially in colonies among grass tussocks on isolated sub-Antarctic islands and feed pelagic on squid, fish and crustaceans (Garnett and Crowley 2000).	project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Diomedea exulans	Wandering Albatross	E1	VM	Nomadic marine species, that breeds in small loose colonies among grass tussocks, using a large mud nets, sometimes off the coast of NSW (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Diomedea gibsoni	Gibson's Albatross	V	VM	A nomadic marine species that forages off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Ephippiorhynchus asiaticus	Black-necked Stork	E1		Feed in shallow water up to 0.5 m deep on fish, reptiles and frogs. Build nests in trees close to feeding sites (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species. The project site contains suitable foraging and nesting habitat but despite this no individuals were detected during targeted surveys.
Gallinago hardwickii	Latham's Snipe		M	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Glossopsitta pusilla	Little Lorikeet	V		Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				mistletoe, and only rarely in orchards Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries.	
Grantiella picta	Painted Honeyeater	V		Lives in dry forests and woodlands. Primary food is the mistletoes in the genus Amyema, though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees. Less likely to be found in strips of remnant box-ironbark woodlands, such as occur along roadsides and in windbreaks, than in wider blocks (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Haematopus fuliginosus	Sooty Oystercatcher	V		Found on rocky shorelines where it forages on intertidal flats (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Haematopus longirostris	Pied Oystercatcher	V		Occurs in undisturbed beaches, sandpits, sandbars, tidal mudflats, estuaries and coastal islands. Occasionally found on rocky reefs, shores, rock stacks, brackish or saline wetlands and also in grassy paddocks, golf courses or parks near coast. Eggs are laid in shallow scrape in sand on open beach or among low growth behind beach (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	M	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. Builds a huge nest of sticks in tall trees near water, on the ground on islands or on remote coastal cliffs (Pizzey and Knight 1997).	**Low** Sub-optimal habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Hirundapus caudacutus	White-throated Needletail		M	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
Irediparra gallinacea	Comb-crested Jacana	V		Occurs in floating vegetation of permanent well-vegetated wetlands and dams. Walks on floating plants. Occasionally feeds along muddy wetland margins on east coast of NSW (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Ixobrychus flavicollis	Black Bittern	V		Usually found in dense vegetation in and fringing streams, swamps, tidal creeks and mudflats, particularly amongst swamp she-oaks and mangroves. Feeds on aquatic fauna along streams, in estuaries and beside billabongs and pools. Breeding occurs in summer in secluded places in densely vegetated wetlands. It nests in trees that overhang the water (Garnett and Crowley 2000; NSW National Parks and Wildlife Service 2002).	**Low** No suitable habitat was recorded from the project site for this species.
Lathamus discolor	Swift Parrot	E1	E	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, over-wintering, particularly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. Until recently it was believed that in New South Wales, swift parrots forage mostly in the western slopes region along the inland slopes of the Great Dividing Range but are patchily distributed along the north and south coast including the Sydney region, but new evidence indicates that the forests on the coastal plains from southern to northern NSW are also extremely important. In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering *Acacia pycnantha*, is indicated. Sites used vary from year to year. (Garnett and Crowley 2000),(Swift Parrot Recovery Team 2001).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Limicola falcinellus	Broad-billed Sandpiper	V	M	A migratory species that breeds in the northern hemisphere between June and August. Individuals feed both on exposed mudflats and while wading in water (NSW National Parks and	**Low** No suitable habitat was recorded from the project site for this species.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				Wildlife Service 1999).	No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Limosa lapponica	Bar-tailed Godwit		M	Occurs in coastal mudflats, sandbars, shores of estuaries, salt marsh and sewage ponds (Morcombe 2003).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Limosa limosa	Black-tailed Godwit	V	M	A coastal species found on tidal mudflats, swamps, shallow river margins and sewage farms. Also found inland on larger shallow fresh or brackish waters. A migratory species visiting Australia between September and May (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Macronectes giganteus	Southern Giant-Petrel	E1	EM	A partly nomadic marine species that forages off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Macronectes halli	Northern Giant-Petrel	V	VM	Nomadic marine species, that nests as dispersed pairs, often admist tussocks in dense vegetation. Forages in shores waters of southern Australia and occasionally visits the coast of NSW (Garnett and Crowley 2000).	**Low** No suitable habitat for this species within the project site. No important habitat for this species in the proposal area as defined under the *EPBC*

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
					Act 1999.
Merops ornatus	Rainbow Bee-eater		M	Usually occur in open or lightly timbered areas, often near water. Breed in open areas with friable, often sandy soil, good visibility, convenient perches and often near wetlands. Nests in embankments including creeks, rivers and sand dunes. Insectivorous, most foraging is aerial, in clearings (Higgins 1999).	**Low** Suitable foraging habitat for this species was recorded from the project site. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*
Monarcha melanopsis	Black-faced Monarch		M	Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species.
Myiagra cyanoleuca	Satin Flycatcher		M	Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Neophema pulchella	Turquoise Parrot	V		Occurs in the foothills of the great dividing range in eucalypt woodlands and forests with a grassy or sparsely shrubby understorey. Nests in hollows in trees, stumps or even fence posts. It feeds on seeds of both native and introduced grass and herb species (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Ninox connivens	Barking Owl	V		Occurs in dry sclerophyll woodland. In the south west it is often associated with riparian vegetation while in the south east it generally occurs on forest edges. It nests in large hollows in live eucalypts, often near open country. It feeds on insects in the non-breeding season and on birds and mammals in the breeding	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				season (Garnett and Crowley 2000).	
Ninox strenua	Powerful Owl	V		A sedentary species with a home range of approximately 1000 hectares it occurs within open eucalypt, casuarina or callitris pine forest and woodland. It often roosts in dense vegetation including rainforest of exotic pine plantations. Generally feeds on medium-sized mammals such as possums and gliders but will also eat birds, flying-foxes, rats and insects. Prey are generally hollow dwelling and require a shrub layer and owls are more often found in areas with more old trees and hollows than average stands (Garnett and Crowley 2000).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Numenius madagascariensis	Eastern Curlew		M	Inhabits coastal estuaries, mangroves, mud flats and sand pits. It is a migratory shorebird which generally inhabits sea and lake shore mud flats, deltas and similar areas, where it forages for crabs and other crustaceans, clam worms and other annelids, molluscs, insects and whatever else it can dig out of the mud with its long, downward-turned bill. Its migration route ranges from its wintering grounds in Australia to its breeding grounds in northern China, Korea and Russia (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Numenius minutus	Little Curlew		M	Little Curlews may gather in large flocks on coastal and inland grasslands and black soil plains in northern Australia, near swamps and flooded areas. They also feed on playing fields, paddocks and urban lawns.	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Numenius phaeopus	Whimbrel		M	Migrates to Taiwan, Philippines, PNG, and a race breeding in NE Siberia is found on the north and south-eastern coastlines of Australia. Juveniles arrive to Australia from spring to early summer. Usually only juveniles remain in Australia but very occasionally adults in breeding plumage may be seen in Australian winters	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC*

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				(Pizzey and Knight 1997).	*Act 1999*.
Oxyura australis	Blue-billed Duck	V		Relatively sparse throughout species range. Regularly found breeding in south-east Queensland, north-east South Australia and throughout New South Wales. Found on temperate, fresh to saline, terrestrial wetlands, and occupies artificial wetlands. Prefers deep permanent open water, within or near dense vegetation. Nest in rushes, sedge, Lignum *Muehlenbeckia cunnighamii* and paperbark Melaleuca (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Pluvialis fulva	Pacific Golden Plover		M	Prefers sandy, muddy or rocky shores, estuaries and lagoons, reefs, saltmarsh, and or short grass in paddocks and crops. The species is usually coastal, including offshore islands; rarely far inland. Often observed on beaches and mudflats, sand flats and occasionally rock shelves, or where these substrates intermingle; harbours, estuaries and lagoons (Marchant and Higgins 1993).	**Low** No suitable habitat was recorded from the project site for this species.
Pluvialis squatarola	Grey Plover		M	The Grey Plover is almost entirely coastal, being found mainly on marine shores, inlets, estuaries and lagoons with large tidal mudflats or sand flats for feeding, sandy beaches for roosting, and also on rocky coasts.	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Pomatostomus temporalis	Grey-crowned Babbler	V		Found throughout western slopes and plains, southern and central tablelands and occurring in Northern Rivers area, mid-north coast and the Hunter Valley of NSW. Lives in open forest and woodland, acacia shrubland and adjoining farmland. Large stick dome nest with spout-like entrance (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species.
Pterodroma leucoptera	Gould's Petrel	E1	EM	A marine species, it nests on islands among rocks and debris of Cabbage Tree Palms. It feeds on fish, cephalopods and other marine animals (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
					project site for this species.
Pterodroma neglecta	Kermadec Petrel		V	An oceanic species that forages in the tropical and subtropical pacific ocean (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Ptilinopus superbus	Superb Fruit-Dove	V		Occurs in rainforests and fringes, scrubs, mangroves and wooded stream-margins, lantana thickets, isolated figs, pittosporums, lilly pillies and blackberries (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species.
Puffinus assimilis	Little Shearwater	V		A marine species that occurs over the Tasman Sea and possibly the Coral Sea. The species breeds on island in burrows dug in soft soil among mats of succulents or among loose rocks and they forage far out to sea (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Puffinus griseus	Sooty Shearwater		M	A nomadic marine species that occasionally breeds off the coast of New South Wales .The sooty shearwater returns from the North Pacific Ocean and Southern Ocean to breed in small numbers on islands south of Port Stephens (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Puffinus pacificus	Wedge-tailed Shearwater		M	Return from the North Pacific to their burrows on islands off the coast of NSW. Marine nomadic species that visits land to breed. Known breeding colony at Mutton-bird island near Coffs Harbour (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Puffinus tenuirostris	Short-tailed Shearwater		M	Nomadic marine species that breeds on islands along the eastern and southern coastlines of Australia, from the central coast of NSW to Western Australia {Garnett, 2000 #21.	**Low** No suitable habitat was recorded from the project site for this species.
Pyrrholaemus sagittatus	Speckled Warbler	V		Occurs in a wide range of eucalypt dominated vegetation with a grassy understorey and is often found on rocky ridges or in gullies. It feeds on seeds and insects and builds domed nests on the	**Low** No suitable habitat was recorded from the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				ground (Garnett and Crowley 2000).	project site for this species.
Rhipidura rufifrons	Rufous Fantail		M	Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species. No important habitat for this species in the proposal area as defined under the *EPBC Act 1999*.
Rostratula benghalensis	Painted Snipe	E1	VM	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as *Eucalyptus camaldulensis* (River Red Gum), *E. populnea* (Poplar Box) or shrubs such as *Muehlenbeckia florulenta* (Lignum) or *Sarcocornia quinqueflora* (Samphire). Feeds at the water's edge and on mudflats on seeds and invertebrates, including insects, worms, molluscs and crustaceans. Males incubate eggs in a shallow scrape nest (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Stagonopleura guttata	Diamond Firetail	V		Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and mallee. Most populations occur on the inland slopes of the dividing range. Feed on seeds, mostly of grasses (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Sterna albifrons	Little Tern	E1	M	A coastal species found along the coast of New South Wales. They nest between the high tide mark and shore vegetation on undisturbed and un-vegetated sites near estuaries and adjacent freshwater lakes. They feed on fish taken from inshore waters (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Sula dactylatra	Masked Booby	V	M	Seabird throughout tropical and subtropical seas, with a breeding population on Lord Howe Island (Department of Environment and Climate Change 2007).	**Low** No suitable habitat was recorded from the project site for this species.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
Thalassarche bullei	Buller's Albatross		VM	An oceanic species that has been recorded off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Thalassarche cauta	Shy Albatross	V	VM	An oceanic species that has been recorded off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Thalassarche melanorphis	Black-browed Albatross	V	VM	Nomadic marine species that breeds on subantarctic island outside Australian waters, but moves northwards in non-breeding seasons. The waters off southern Australia between Brisbane and Perth are the principal feeding area of birds (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Thalassarche salvini	Salvin's Albatross		VM	An oceanic species that has been recorded off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Thalassarche steadi	White-capped Albatross		VM	An oceanic species that has been recorded off the coast of New South Wales (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Tringa stagnatilis	Marsh Sandpiper		M	Occurs in coastal and inland wetlands (salt or fresh water), estuarine and mangrove mudflats, beaches, shallow or swamps, lakes, billabongs, temporary floodwaters, sewage farms and salt-works ponds (Morcombe 2003).	**Low** No suitable habitat was recorded from the project site for this species.
Tyto novaehollandiae	Masked Owl	V		Occurs within a diverse range of wooded habitats including forests, remnants and almost treeless inland plains. This species requires large-hollow bearing trees for roosting and nesting and nearby open areas for foraging. They typically prey on terrestrial mammals including rodents and marsupials but will also take other species opportunistically. Also known to occasionally roost and nest in	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				caves (Garnett and Crowley 2000).	
Tyto tenebricosa	Sooty Owl	V		Occurs in wet eucalypt forest and rainforest on fertile soils with tall emergent trees. Typically found in old growth forest with a dense understorey but also occurs in younger forests if nesting trees are present nearby. It nests in large hollows within eucalypts and occasionally caves. It hunts in open and closed forest for a range of arboreal and terrestrial mammals including introduced species and sometimes birds (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Xanthomyza phrygia	Regent Honeyeater	E1	EM	Occurs mostly in box-ironbark forests and woodland and prefers the wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with *Casuarina cunninghamiana* and *Amyema cambagei* are important for feeding and breeding. Important food trees include *Eucalyptus sideroxylo*n (Mugga Ironbark), *E. albens* (White Box) , *E. melliodora* (Yellow Box) and *E. leucoxylon* (Yellow Gum) (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the project site for this species.
Xenus cinereus	Terek Sandpiper	V	M	Found on tidal mudflats and estuaries and on shores and reefs of offshore islands (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the project site for this species.
Mammals					
Aepyprymnus rufescens	Rufous Bettong	V		Distribution: From Cooktown in north Queensland, to north-east NSW, where it occurs east of the Dividing Range. In Queensland, it still occurs on both sides of the Great Divide. Macro-habitat: Found in a variety of forest types from wet sclerophyll to dry open woodland, where grass tussocks or fallen timber are present. Also known to occupy a mosaic of open forest and grasslands. Microhabitat: It appears to prefer a more open forest structure, with a sparse shrub layer and a diverse ground cover. Builds nests in grass tussocks and under logs. Strongly associated with dry sclerophyll forest particularly those dominated by Spotted Gum	**Low** No suitable habitat was recorded from the project site for this species.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				(NSW National Parks and Wildlife Service 1999).	
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Occurs in moderately wooded habitats and roosts in caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. Thought to forage below the forest canopy for small flying insects (Churchill 1998).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Occurs from the Bundaberg area in south-east Queensland, south through NSW to western Victoria and Tasmania. In NSW, it occurs on both sides of the Great Dividing Range and north-east NSW represents a national stronghold (NSW National Parks and Wildlife Service 1999). Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large un-fragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees. Feeds on a variety of prey including birds, terrestrial and arboreal mammals, small macropods, reptiles and arthropods (NSW National Parks and Wildlife Service 1999; NSW National Parks and Wildlife Service 1999).	**Low** No suitable habitat was recorded from the project site for this species.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		Usually roosts in tree hollows in higher rainfall forests. Sometimes found in caves (Jenolan area) and abandoned buildings. Forages within the canopy of dry sclerophyll forest. It prefers wet habitats where trees are more than 20 metres high (Churchill 1998).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Isoodon obesulus	Southern Brown Bandicoot	E1	E	Occurs in a variety of habitats in south-eastern Australia, including heathland, shrubland, dry sclerophyll forest with heathy understorey, sedgeland and woodland. Many of the habitats are prone to fire (NSW National Parks and Wildlife Service 1999).	**Low** No suitable habitat was recorded from the project site for this species.
Kerivoula papuensis	Golden-tipped Bat	V		Predominantly distributed throughout Indonesia, New Guinea and	**Low/Medium**

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				the Philippines, the species has been observed on the east coast of NSW and Victoria. Prefers moist dense vegetation in coastal forests, near to where wet and dry forests meet and often in the vicinity of creeks. Possibly prefers ecotonal habitats (such as creek lines) for feeding and passage and an ability to manoeuvre in dense vegetation (Strahan 1995).	Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Miniopterus australis	Little Bent-wing Bat	V		Feeds on small insects beneath the canopy of well timbered habitats including rainforest, Melaleuca swamps and dry sclerophyll forests. Roosts in caves and tunnels and has specific requirements for nursery sites. Distribution becomes coastal towards the southern limit of its range in NSW. Nesting sites are in areas where limestone mining is preferred (Strahan 1995).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Miniopterus schreibersii	Eastern Bent-wing Bat	V		Usually found in well timbered valleys where it forages on small insects above the canopy. Roosts in caves, old mines, stormwater channels and sometimes buildings and often return to a particular nursery cave each year (Churchill 1998).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Mormopterus norfolkensis	Eastern Freetail-bat	V		Thought to live in sclerophyll forest and woodland. Small colonies have been found in tree hollows or under loose bark. It feeds on insects above the forest canopy or in clearings at the forest edge (Churchill 1998).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Myotis adversus	Large-footed Myotis	V		Colonies occur in caves, mines, tunnels, under bridges and buildings. Colonies always occur close to bodies of water where this species feeds on aquatic insects (Churchill 1998).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Petaurus australis	Yellow-bellied Glider	V		Restricted to tall, mature eucalypt forest in high rainfall areas of temperate to sub-tropical eastern Australia. Feeds on nectar, pollen, the sap of eucalypts and sometimes insects. Preferred habitats are productive, tall open sclerophyll forests where mature	**Low** No suitable habitat was recorded from the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				trees provide shelter and nesting hollows and year round food resources are available from a mixture of eucalypt species (NSW National Parks and Wildlife Service 1999; NSW National Parks and Wildlife Service 2003).	project site for this species.
Petaurus norfolcensis	Squirrel Glider	V		Found in dry sclerophyll forest and woodland but not found in dense coastal ranges. Nests in hollows and feeds on gum of acacias, eucalypt sap and invertebrates (NSW National Parks and Wildlife Service 1999).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	Occurs in inland and sub-coastal south eastern Australia where it inhabits rock slopes. It has a preference for rocks which receive sunlight for a considerable part of the day. Windblown caves, rock cracks or tumbled boulders are used for shelter. Occur in small groups or "colonies" each usually separated by hundreds of metres (NSW National Parks and Wildlife Service 2003).	**Low** No suitable habitat was recorded from the project site for this species.
Phascolarctos cinereus	Koala	V		Found in sclerophyll forest. Throughout New South Wales, Koalas have been observed to feed on the leaves of approximately 70 species of eucalypt and 30 non-eucalypt species. However, in any one area, Koalas will feed almost exclusively on a small number of preferred species. The preferred tree species vary widely on a regional and local basis. Some preferred species in NSW include Forest Red Gum *Eucalyptus tereticornis*, Grey Gum *E. punctata*, and Monkey Gum *E. cypellocarpa* and Ribbon Gum *E. viminalis*. In coastal areas, Tallowwood *E. microcorys* and Swamp Mahogany *E. robusta* are important food species, while in inland areas White Box *E. albens,* Bimble Box *E. populne*a and River Red Gum *E. camaldulensis* are favoured (NSW National Parks and Wildlife Service 1999; NSW National Parks and Wildlife Service 2003).	**Low** No suitable habitat was recorded from the project site for this species.
Potorous tridactylus	Long-nosed Potoroo	V	V	Disjunct distribution along coastal south-east Australia from near Gladstone in Queensland, to south-west Victoria and in Tasmania. Found from sea level up to 1500 metres in altitude generally in	**Low** No suitable habitat was recorded from the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				areas with rainfall greater than 760 millimetres. In NSW, it is found throughout coastal and sub-coastal areas. Occurs in a range of habitats: coastal forest and woodland with a moderately dense heathy understorey, dense coastal scrubs or heath, wet and dry sclerophyll forest and sub-tropical, warm temperate and cool temperate rainforest of the eastern slopes and highlands. Often associated with gullies and forest ecotones. Open areas are used for foraging while areas of dense groundcover or understorey provide areas for shelter and protection from predators. Relatively thick ground cover is a major habitat requirement and it seems to prefer areas with light sandy soils. Feeds at dusk on roots, tubers, fungi, insects and their larvae and other soft bodied animals in the soil. Moves up and down slope as food resources become seasonally available (Johnston 1995; NSW National Parks and Wildlife Service 1999).	project site for this species.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. Feeds on the flowers and nectar of eucalypts and native fruits including lilly pillies. It roosts in the branches of large trees in forests or mangroves (Churchill 1998; NSW National Parks and Wildlife Service 2001).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V		Occurs in eucalypt forest where it feeds above the canopy and in mallee or open country where it feeds closer to the ground. Generally a solitary species but sometimes found in colonies of up to 10. It roosts in tree hollows. Thought to be a migratory species (Churchill 1998).	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be assessed under a future BDAR.
Scoteanax rueppellii	Greater Broad-nosed Bat	V		The preferred hunting areas of this species include tree-lined creeks and the ecotone of woodlands and cleared paddocks but it may also forage in rainforest. Typically it forages at a height of 3-6 metres but may fly as low as one metre above the surface of a creek. It feeds on beetles, other large, slow-flying insects and small	**Low/Medium** Suitable habitat for this species was recorded from the project site. To be

Scientific Name	Common Name	BC Act	EPBC Act	Habitat	Likelihood of occurrence within the project site
				vertebrates. It generally roosts in tree hollows but has also been found in the roof spaces of old buildings (Churchill 1998).	assessed under a future BDAR.
Vespadelus troughtoni	Eastern Cave Bat	V		A cave-dwelling species found in eastern Australia from Cape York to NSW. They inhabit tropical mixed woodland and wet sclerophyll forests on the coast and the dividing range, but extend into drier forests on the western slopes (Churchill 1998).	**Low** No suitable habitat was recorded from the project site for this species.
Reptiles					
Hoplocephalus bungaroides	Broad-headed Snake	E1	V	A nocturnal species that occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer (Webb and Shine 1994; Webb and Shine 1998).	**Low** No suitable habitat was recorded from the project site for this species.
Hoplocephalus stephensii	Stephen's Banded Snake	V		Found in coastal areas from Gosford district to southern QLD. Arboreal snake usually encountered in the wetter sclerophyll or rainforests which occur within its range (Cogger 2000).	**Low** Sub-optimal habitat for this species was recorded from the project site. To be assessed under a future BDAR.

Notes:

1. V= Vulnerable, E1 = Endangered, E2 = Endangered Population *(Biodiversity Conservation Act 2016) (Fisheries Management Act 1994)*
2. V = Vulnerable, E = Endangered, M = Migratory, C = Conservation Dependent (*Environment Protection and Biodiversity Conservation Act 1999) (Fisheries Management Act 1994)*