SHARED USER PATH (SUP)

MURRAMARANG ROAD, BAWLEY POINT TO KIOLOA

Notes

- **This Report is an Environmental Impact Assessment or Review of Environmental Factors (REF) for the Shared Users Path between Bawley Point and Kioloa as per the following plans:**
  - **Detailed design by Footprint (NSW) Pty Ltd (D21/413589) for "Stage 1" being from Racecourse Beach Nth Carpark to Shelly Beach Carpark**
  - **Preliminary Design for the entire and remaining SUP to Kioloa (D20/94200)**
- **Land acquisition or interim licence agreement must be reached with landowner of Lot 1 DP 782318 (Australian National University) prior to commencement of works within this lot.**
- **Written authorisation from the lessee of Crown Reserve Lot 130 DP 40869 must be obtained prior to commencement of works within this lot.**

1. PROPOSED ACTIVITY

1.1 Description

The proposed activity is the construction of a Shared User Path (SUP) adjacent to Murramarang Road, from Bawley Point where an existing SUP terminates in the vicinity of Racecourse Beach access carpark, through to Kioloa in the vicinity of O'Brien Street. The proposed activity would include:

- Construction of a 2m wide and approximately 3.20km long Shared User Path (SUP).
- Pathway construction will involve levelling and excavation to approximately 150mm – 200mm, with sub-base and reinforced concrete over compacted fill or natural ground.

- Extension of existing gabion wall on north side of Butler Creek bridge to stabilise bank in proximity to the creek.
- Extension of numerous stormwater culverts
- Installation of bollards for traffic management at Racecourse Beach Nth carpark
- Clearing of up to up to 1710m^2 (approx.) native vegetation (refer to section 2.2).
- Sediment and erosion controls will be installed as required to minimise sediment movement into the waterways.
- The SUP is be constructed in part over land owned by Australian National University (Lot 1 DP 782318) and Crown Land under private lease (Lot 130 DP 40869), by authorisation and agreement.

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 228 of the *Environmental Planning and Assessment Regulation 2000*. In doing so, this Review of Environmental Factors (REF) helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Location

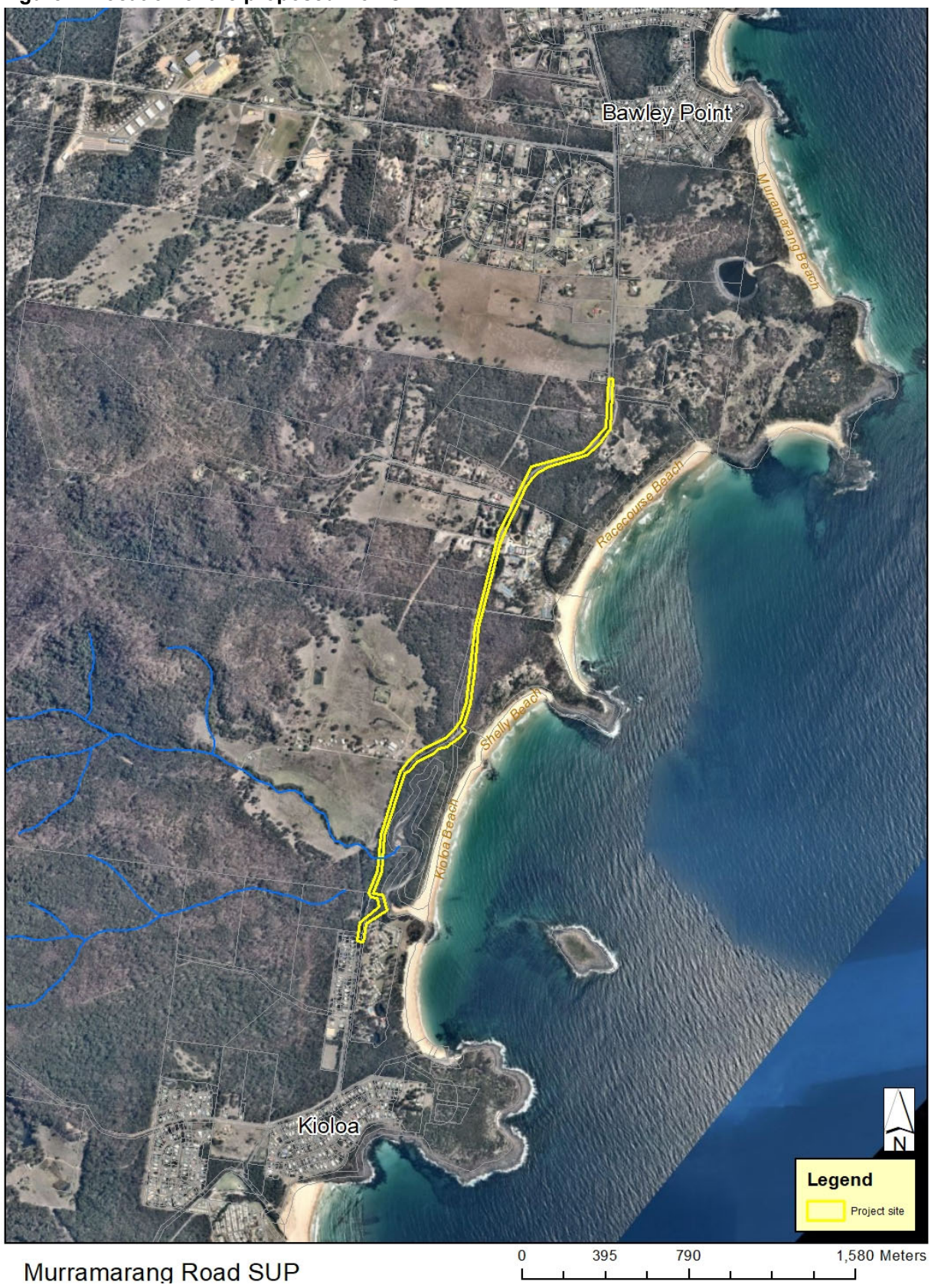
The proposed activity is to be undertaken east of and adjacent to Murramarang Road between Bawley Point and Kioloa in the vicinity of O'Brien St.

Construction of the SUP would occur over the following land:

Lot	Tenure / land manager	Comments
Murramarang Road road reserve	SCC is the road authority	
Lot 1 DP 614466	SCC owned freehold land	
Lot 1 DP 782318	Australian National University (ANU)	licence agreement exists for SUP route passing through this land
Lot 130 DP 40869	Crown Land (R96797) - under lease by Roche Group Pty Ltd	authorisation / licence agreement is required for SUP route passing through this land

Works over Lot 1 DP 782318 and Lot 130 DP 40869 are to be undertaken only subject to agreement and authorisation with relevant land owner or lease holder.

Figure 1. Location of the proposed works



1.3 Environmental safeguards and measures to minimise impacts

- Prior to works, the eastern boundary of the road reserve shall be surveyed and clearly delineated. Encroachment into the adjacent private lands, without prior authorisation, shall be prevented.
- Prior to works commencing within Lot 130 DP 40869 (Crown Land R96797 under lease by Roche Group Pty Ltd) written agreement and authorisation with relevant land owners and lease holders must be obtained. Any works undertaken within these lots is to be in accordance with relevant conditions of respective agreements.
- Any works within Lot 1 DP 782318 (Australian National University) are to be undertaken in accordance with any relevant conditions of the lease agreement between ANU and CSU (LD7730).
- All works shall be contained within the road reserve, authorised works areas and existing cleared land. No machinery, spoil or waste materials are permitted to enter or be stored within intact vegetation beyond the road verge.
- Any native vegetation to be cleared must be delineated with flagging tape, high visibility barrier fencing or similar, prior to clearing works and must be to the minimum area required for construction of the SUP.
- An Aboriginal Heritage Site Officer is to be engaged through Batemans Bay Local Aboriginal Land Council to monitor excavation works for potential Aboriginal Heritage items within Area J (as per Figure 7).
- Trees to be cleared must be felled into cleared areas carefully so as not to damage trees to be retained in or beyond the development footprint.
- No hollow-bearing trees, nests or other likely fauna refuge areas were observed during site investigations. However, in the event that any wildlife be significantly disturbed or injured during works, Council's Environmental Officers are to be contacted on 4429 3405, or if unavailable, Wildlife Rescue – South Coast should be contacted on 0418 427 214, to rescue and relocate the animal(s).
- In the event that works are being undertaken during December to February inclusive, monitoring of Green and Golden Bell Frog (GGBF) habitat in the locality, and monitoring of the site will be undertaken to avoid impact to individual dispersing frogs.
- Erosion and sediment controls in accordance with the 'Blue Book' (Landcom 2004) shall be installed and maintained to prevent the entry of sediment into the waterway i.e. water diversion, minimising disturbance, erosion control and rapid re-establishment. Erosion and sediment controls shall be maintained in good

working order for the duration of the works and subsequently until the site has been stabilised and the risk of erosion is minimal. Particular attention shall be given to ensuring that Butlers Creek is protected from any sediment run-off associated with works adjacent to the creek, including the extension of the existing gabion basket.

- The contractor shall keep an emergency spill kit on-site at all times with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment.
- To avoid the risk of pollution from machinery, refuelling shall generally be done off site, however if refuelling on site is required, due care shall be taken to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.
- No major equipment maintenance works shall be undertaken on-site.
- Physical disturbance to the embankments adjacent to Butlers Creek shall be minimised and restricted to only what is required for installation of the gabion wall extension.
- Table drains and embankments where disturbed shall be stabilised with jute mesh or similar immediately following completion of works.
- An asset form must be trimmed to file 44574E on commissioning of the assets in Accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3. Asset forms are available at: http://sccintranet/AssetsWorks/TechnicalServices/AssetStrategy/AssetForms.aspx
- This Environmental Assessment shall be reviewed when detailed plans of the remaining SUP (Shelly Beach carpark to Kioloa) become available.

2. ENVIRONMENTAL IMPACT ASSESSMENT

2.1 Existing Environment

The proposed activity would be undertaken adjacent to (and predominantly with the road easement of) Murramarang Road between Bawley Point and Kioloa (refer to Figure 1 above).

For the purpose of this assessment, the site has been divided into eleven areas, designated A through to I (refer to figures 2-7).

Much of the site is moderately disturbed as a result of past management including clearing and maintenance of the road verge, and the existence of informal walking tracks. In three areas (B, C and F), the SUP would encroach into native vegetation.

The site includes a Category 2 Riparian Buffer, associated with Butler Creek.

Photos 1 to 25 show the existing site, surrounding vegetation and other relevant features as discussed.

Habitat and Vegetation Assessment

The site was surveyed by a Council Environmental Officer on 14/01/2020 from 11:00AM until 3:00PM and on 21/01/2020 from 12:00PM to 1:30PM. It was again surveyed on the 24 September 2021 from 11:00 to 16:00 in response to the release of the detailed design plans by Footprint Pty Ltd (Appendix A). The surveys involved vegetation and habitat assessment, recording of all flora species within and immediately adjacent to the subject site, determination of vegetation communities, identification and location of endangered ecological communities (EECs) including Illawarra Lowlands Grassy Woodland EEC and Swamp Oak Floodplain Forest EEC, investigation of fauna signs (including scats), targeted survey for potentially occurring flora species and investigation of exposed soil and trees for potential Aboriginal heritage items.

Vegetation communities

The predominant vegetation type mapped as occurring over and around the site is PCT1206 (Biometric SR641) – *Spotted Gum – Blackbutt shrubby open forest on the coastal foothills, southern Sydney Basin and northern South East Corner*. This vegetation type is not associated with any Endangered Ecological Community.

Also mapped as occurring in the vicinity of the site is Biometric SR649 – *Swamp Oak – Prickly Tea Tree – Swamp Paperbark swamp forest on coastal floodplains, Sydney Basin and South East Corner*, which has no associated PCT, but is associated with Swamp Oak Floodplain Forest EEC.

Through much of the site, the vegetation is dominated by Swamp She-oak (*Casuarina glauca*), with scattered Forest Red Gum (*Eucalyptus tereticornis*) and *Eucalyptus saligna x botryoides* occurring with an often depauperate understorey containing Sweet Pittosporum (*Pittosporum undulatum*), Saw Sedge (*Gahnia* spp.), Spiny Mat-rush (*Lomandra longifolia*) and Tick-bush (*Kunzea ambigua*). At the southern end of the site, through Areas J and K, large Spotted Gum (*Corymbia maculata*) occur with Blackbutt (*E.pilularis*) and *Eucalyptus saligna x botryoides* with an understorey dominated by Sweet Pittosporum.

A full flora species list is provided in Table 1.

Habitat and targeted survey results

A meandering transect survey was undertaken through the site and adjacent vegetation to determine the presence / proximity of EECs. No threatened flora or fauna species were observed during surveys and site inspections. No suitable habitat for locally occurring threatened terrestrial orchids was observed. No glider scars were observed on trees within or in close proximity to the site.

Trees within areas to be impacted were inspected for hollows and recorded as hollow-bearing trees where present. No hollows were recorded that would provide suitable habitat for any locally occurring threatened fauna species.

Vegetation observed on site was compared with mapped EECs occurring over and in proximity to the site. Vegetation consistent with Swamp Oak Floodplain Forest occurs in proximity to some northern parts of the site. While scattered indicative tree species of Illawarra Lowland Grassy Woodland occurred occasionally, this EEC was not considered to occur within the site. Both these EECs are considered further, and vegetation present on site assessed against the NSW Scientific Committee determinations for these EECs, in Section 2.3.

Figure 2. Area overview

Figure 3. Areas A and B

Figure 4. Areas C and D

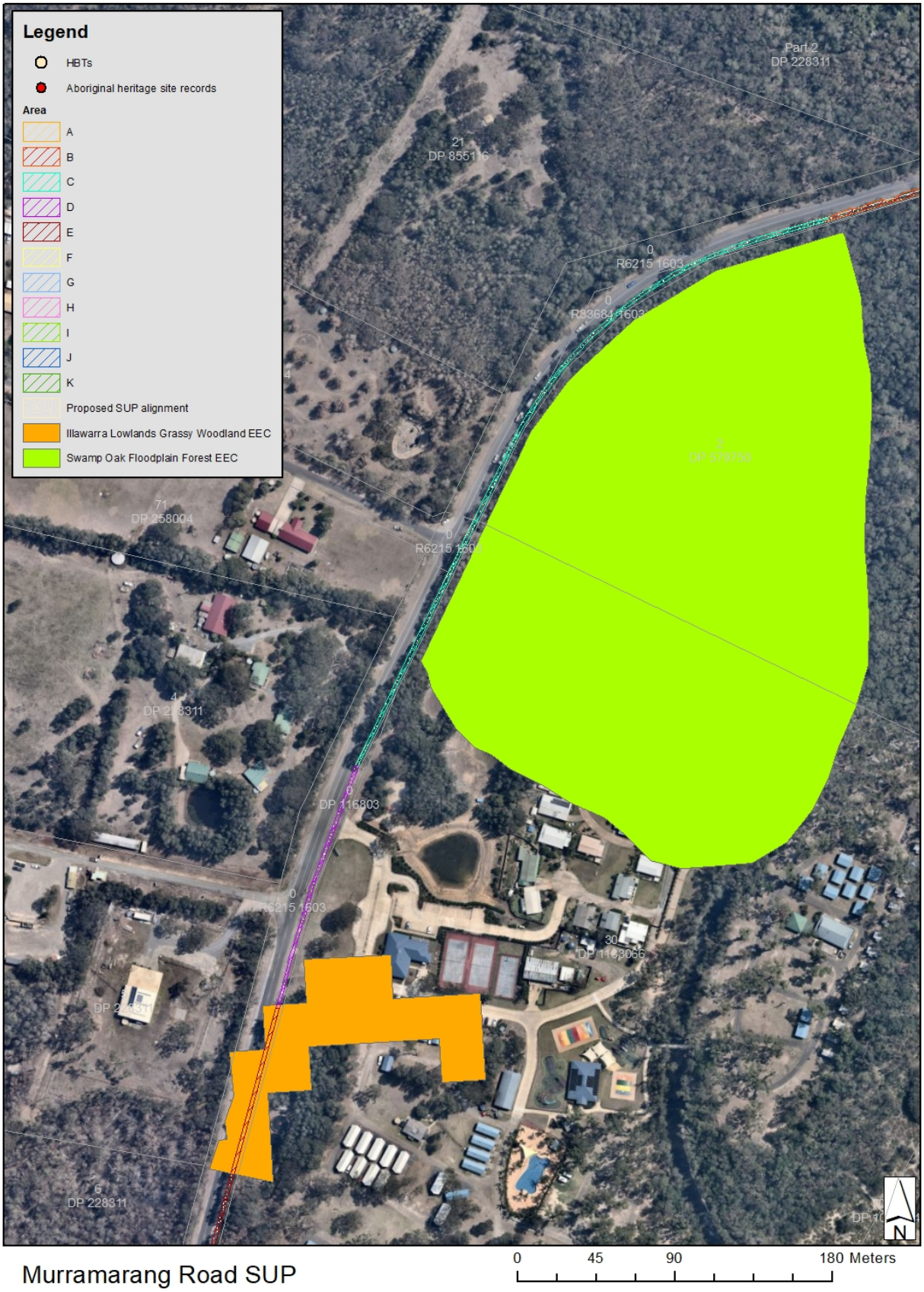


Figure 5. Area E

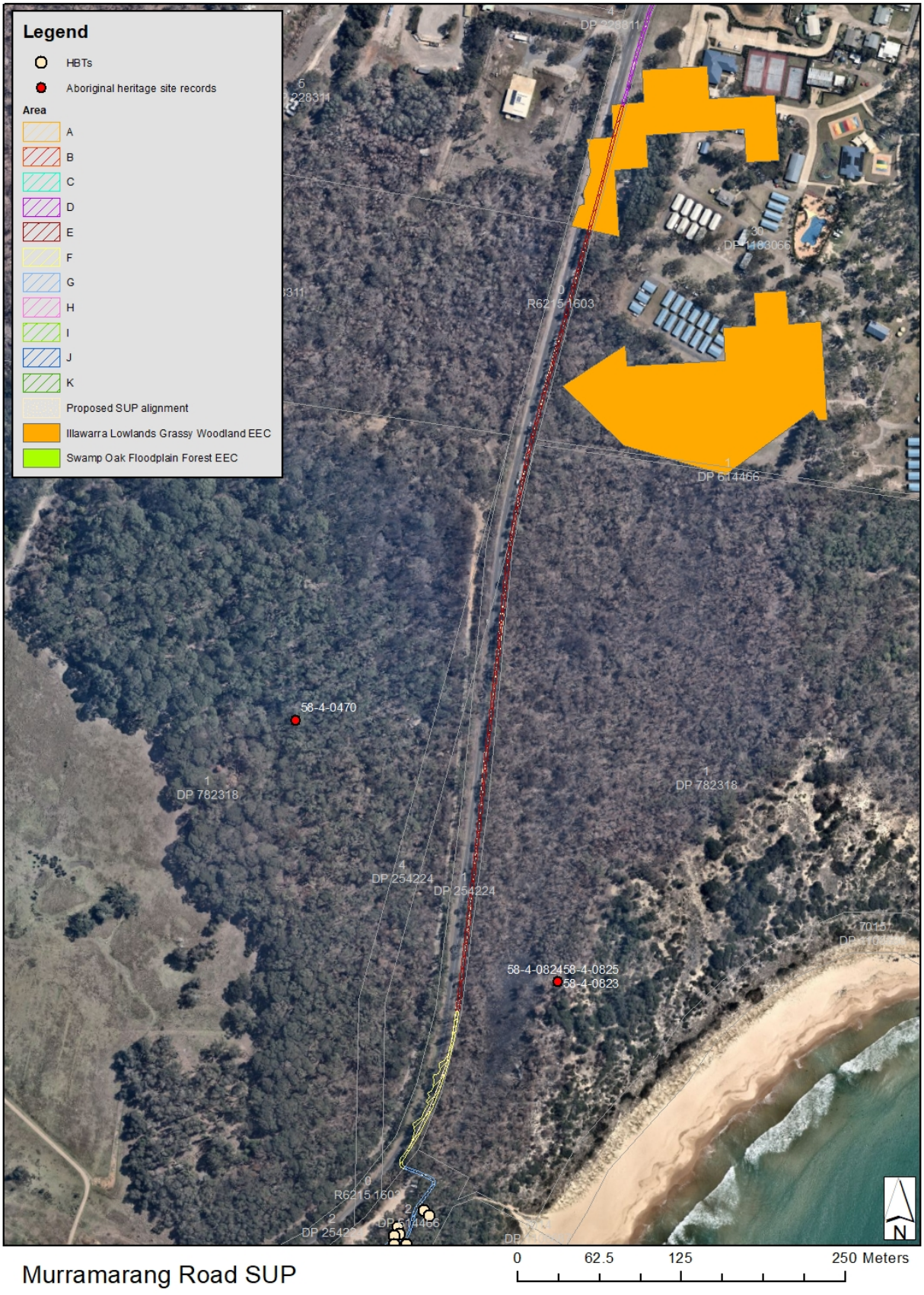


Figure 6. Areas F and G

Figure 7. Areas H, I, J and K

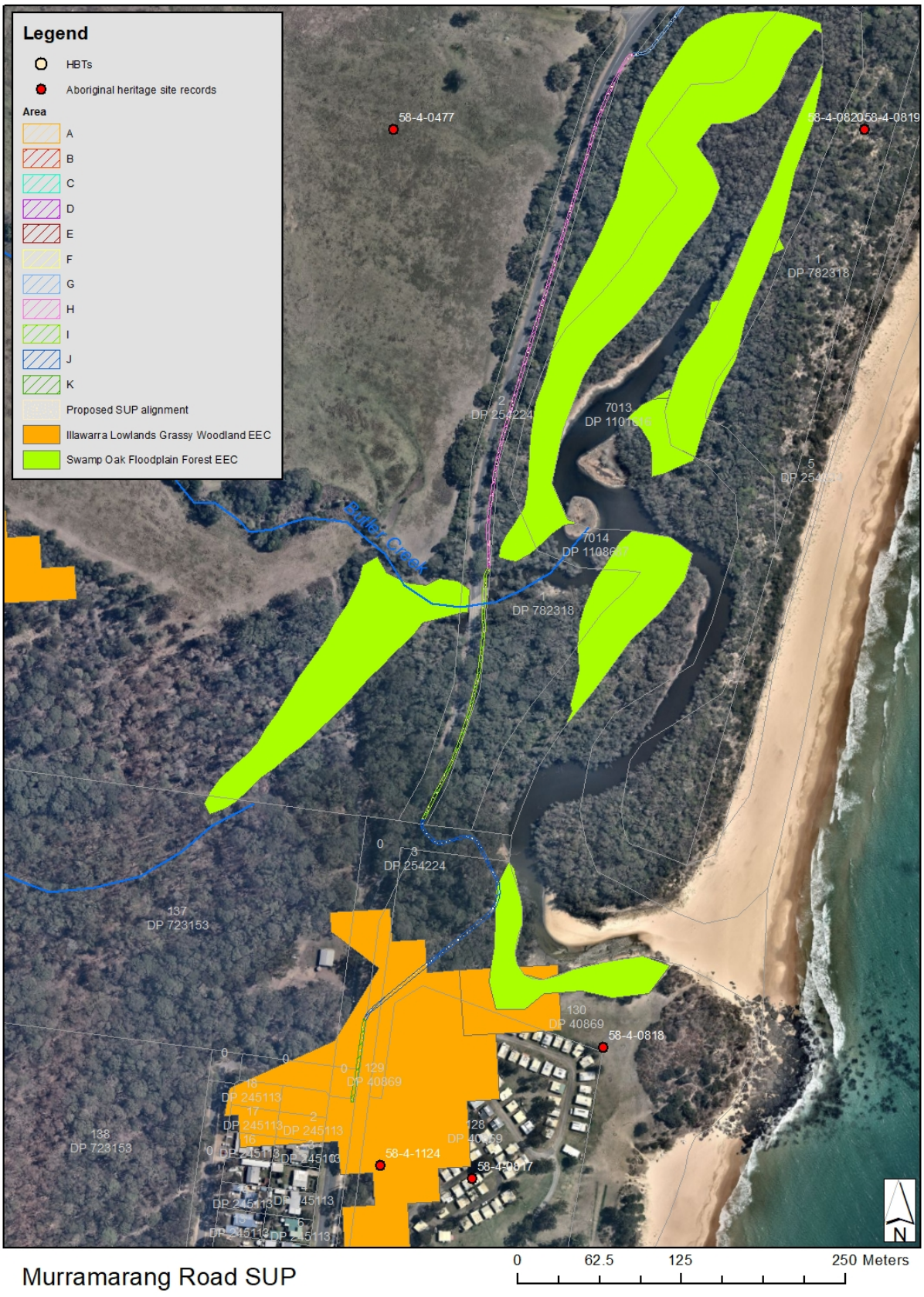


Photo 1. Existing SUP looking south to Area A

Photo 2. Area B facing south-west showing Swamp-Oak vegetation to be impacted

Photo 3. Area B (continued)

Photo 4. Area C facing south-west

Photo 5. Area C (continued)

Photo 6. Southern end of Area C and Area D (cleared)

Photo 7. Area E

Photo 8. Area E (continued)

Photo 9. Area F

Photo 10. Area G

Photo 11. Area G (continued)

Photo 12. Area G (continued)

Photo 13. Area G (continued)

Photo 14. Area G (continued)

Photo 15. Area H

Photo 16. Area I

Photo 17. Area I (continued)

Photo 18. Area I (continued)

Photo 19. Area I (continued)

Photo 20. Area J

Photo 21. Area J (continued)

Photo 22. Area J (continued)

Photo 23. Area J (continued)

Photo 24. Area J (continued)

Photo 25. Area K

Table 1. Flora species recorded within and immediately adjacent to the site

Botanical name	Common name
Trees	
Casuarina glauca	Swamp She-oak
Eucalyptus botryoides	Bangalay
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus pilularis	Blackbutt
Corymbia maculata	Spotted Gum
Pittosporum undulatum	Sweet Pittosporum
Exocarpus cupressiformis	Cherry Ballart
Shrubs	
Acacia suaveolens	Sweet Scented Wattle
Acacia longifolia subsp. sophorae	Coastal Wattle
Acacia mearnsii	Black Wattle
Pittosporum revolutum	Rough-fruited Pittosporum
Pittosporum multiflorum	Orange Thorn
Solanum stelligerum	Devil's Needles
Notelaea longifolia	Mock Olive
Kunzea ambigua	Tick Bush
Breynia oblongifolia	Coffee Bush
Synoum glandulosum	Scentless Rosewood
**Solanum pseudocapsicum*	Madeira Winter Cherry
Sedges, grasses and groundcovers	
Gahnia sieberiana	Red-fruit Saw-sedge
Gahnia melanocarpa	Black-fruit Saw-sedge
Gahnia appressa	Rough Saw-sedge
Lomandra longifolia	Spiny Mat-rush
Carex sp.	Carex
Machaerina (prev. Baumea) juncea	Bare Twig Rush
Pellaea falcata	Sickle Fern
Imperata cylindrica	Blady Grass
Poa labillardieri	Tussock Grass
Eragrostis sp.	Lovegrass
Cynodon sp.	Couch
**Sporobolus africanus*	Parramatta Grass
Vines and scramblers	
Marsdenia rostrata	Milk Vine
Parsonsia straminea	Common Silk Pod
Gynochthodes (prev. Morinda) jasminoides	Sweet Morinda

Acid Sulfate Soil Assessment

The majority of the site is within land mapped as Class 3 Acid Sulfate Soils, with the northern end of the site occurring within land mapped as Class 5 Acid Sulfate Soils (refer to Figure 8).

The Shoalhaven Local Environment Plan 2014 identifies Class 3 Acid Sulfate Soils as a risk where works will occur more than 1m below the natural ground surface, or where works will lower the water table more than 1m below the ground surface.

As works will involve excavation to a depth of only 200mm (approx.), it is unlikely that there is any risk of Acid Sulfate Soil exposure as a result of the proposed works.

There is no requirement for an Acid Sulfate Soil Management Plan or treatment of excavated material.

Figure 8. Acid Sulfate Soils mapped in the locality

Potentially contaminated land (PCL) records

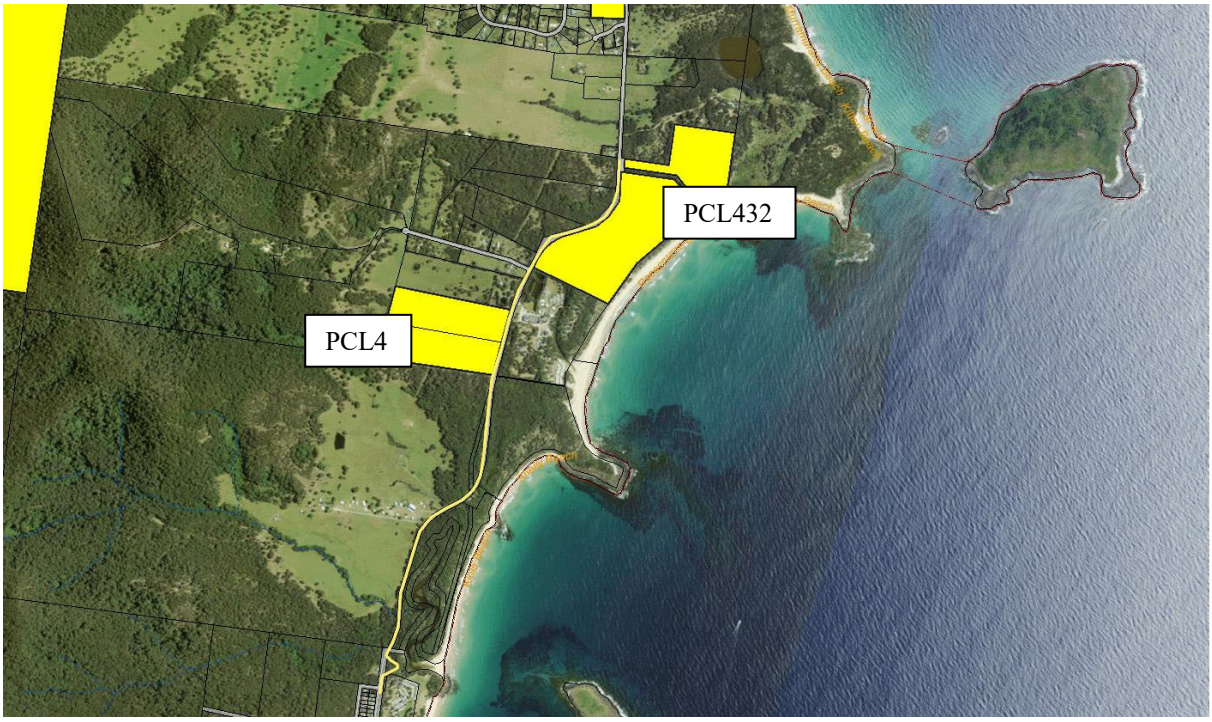
PCL432 exists over Lot 2 DP 579750. This record was for historic extraction of building sand, with a large-scale sand-mining operation occurring from 1970 to 1997 (D11/416).

> *When mineral sands are mined and processed, they result in residues of reject or unmarketable heavy minerals that contain radioactivity. These residues are normally highly insoluble and are generally associated with either the mineral monazite, which is a thorium and rare-earth phosphate, or the dense mineral zircon and other dense minerals such as rutile (titanium dioxide).*
> Source: NSW Guidance for Licensing of Mineral-sand Mining that Generates Radioactive Residues (2009)
> https://www.epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/radiation/09354MineralSand.ashx

These sand operations affected the fore- and hind-dunes of the lot which is located away from Murramarang Road. Potential contaminants are unlikely to occur within or in close proximity to the site. Excavation would only be to a depth of approximately 200mm. It is therefore unlikely that there is any risk of movement or exposure of contaminated soil or materials associated with this PCL as a result of the proposal.

PCL4 exists over Lots 4 and 5 DP 228311. This record exists for historic uncontrolled tipping and filling. Potential contaminants include heavy metals and other variable substances (D01/34870). The currently proposed SUP will occur on the opposite side of the road to this site. Further investigation is not considered warranted.

Figure 9. Potentially Contaminated Land records in the vicinity of the site



2.2 Impacts of the proposal

The inner (western) edge of the footpath would typically be located approx. 5.5-6m from the existing road centreline, except where deviation is required due to steep batters, or within areas G and J where the SUP alignment meanders through treed areas. In such locations the alignment would avoid the removal of trees.

Most of the SUP alignment requires only minor trimming of edge vegetation and minimal removal of understorey vegetation, which does not comprise any important habitat or EEC.

Three areas B, C, E and F require the removal of mature (predominantly Casuarina glauca) trees. Trees of 100mm DBH or greater were considered "mature trees" for the purpose of this assessment. Number of trees to be removed for areas B, C, E and F is 140, 15, 2 and 35 trees respectively (192 trees in total), being comprised of 159 x Swamp Oaks *Casuarina glauca*, 10 x River Red Gums *Eucalyptus tereticornis*, 20 x Bangalays *Eucalyptus botryoides,* and 3 x Cherry Ballart *Exocarpus cuppressiformis*. It is estimated that up to 1710m^2 native vegetation in total will require clearing. Note that these estimates are likely inflated, as the alignment on the ground will aim to retain as many trees as possible. No trees likely to be removed contain hollows that are suitable for locally occurring threatened species.

Details of likely impacts within each area are provided in Table 1 below.

Table 2. Likely impacts to native vegetation by Area

Area	***Approx. chainage & length***	***Impacts***
A	CH 2609.94 – CH 2700 (90m)	Existing area is highly modified and cleared. No impact to native vegetation is required.
B	CH 2700 – CH 3080 (380m)	Up to 1230m^2 native vegetation comprised of primarily of *Casuarina glauca, Lomandra longifolia, Pittosporum undulatum, Gahnia melanocarpa* and *G.sieberiana*, would be removed, including 140 x mature trees (all *C.glauca* except for 5 x *Eucalyptus tereticornis*, 1 x *Eucalyptus botryoides* and 3 Exocarpus cuppressiformis). No trees contain hollows.
C	CH 3080 – CH 3550 (470m)	Up to 150m^2 of native vegetation would be removed, including up to 15 x mature trees (10x *Casuarina glauca*, 4x *E.tereticornis* and 1 *E.botryoides*). Two *E.tereticornis* have poorly formed hollows.

Area	*Approx. chainage & length*	*Impacts*
		Extension of existing storm-water pipe at existing grade and installation of new headwall, with grading of swales away from road alignment at four locations. Clearing of approx. 14m^2 understorey vegetation including *Kunzea ambigua* and *Gahnia* sp. would be required to extend stormwater pipe. Minor trimming of vegetation along edge would be required.
D	CH 3550 – CH 3700 (150m)	Existing area is highly modified and cleared. No impact to native vegetation is required.
E	CH 3700 – CH 4400 (700m)	1 x mature *E. tereticornis* and 1 *C. glauca* would be removed. Minor trimming of vegetation along edge would be required. Extension of existing storm-water pipe at existing grade and installation of new headwall, with grading of swales away from road alignment at three locations.
F	CH 4400 – CH 4520 (120m)	Up to 480m^2 of native vegetation would be removed including up to 35 mature trees (17 x *Casuarina glauca* and 18 x *Eucalyptus botryoides*). No trees to be removed contain hollows.
G	CH 4520 – CH 4880 (~385m meandering)	Minor trimming of vegetation and disturbance to / removal of some understorey vegetation. Construction of channel crossing (options to be investigated as part of Stage 2 of proposed SUP extension)
H	CH 4880 – CH 5280 (400m)	Minor trimming of vegetation along edge would be required. Extension of existing storm-water pipe at existing grade and installation of new headwall, with grading of swales away from road alignment at one location.
I	CH 5280 – CH 5480 (200m)	Minor trimming of vegetation along edge would be required. Some removal of understorey vegetation (including 2 x *Acacia mearnsii* and 1x *Glochidion ferdinandi*) would be required for installation of gabion basket on north side of Butler Creek bridge.

Area	*Approx. chainage & length*	*Impacts*
		Extension of existing storm-water pipe at existing grade and installation of new headwall, with grading of swales away from road alignment at two locations.
J	CH 5480 – CH 5730 (~240m meandering)	Minor removal of understorey vegetation (predominantly *Pittosporum undulatum*) would be required.
K	CH 5730 – CH 5790 (60m)	Existing area is highly modified and cleared. No impact to native vegetation is required.

An assessment of impacts on threatened species and endangered ecological communities has been undertaken in Section 2.3.

In the context of this environmental assessment, the area to be affected by the proposed activity:

- is not known to contain any threatened flora or fauna listed under the NSW *Biodiversity Conservation Act 2016,* the NSW *Fisheries Management Act 1994* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- is not an Aboriginal Place in the context of the NSW *National Parks and Wildlife Act 1974,* nor is it known to contain Aboriginal artefacts (see Section 4.1)
- is not mapped or listed on any heritage registers (see Section 4.2)

2.3 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the NSW *Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

2.3.1 *NSW Biodiversity Conservation Act 2016* (Part 7)

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (see Appendix C: *NSW Threatened Species Likelihood of Occurrence Table*).

The following species and endangered ecological communities are known to occur on-site or are considered to have some potential to occur on-site or be otherwise impacted

by the proposal, and therefore required further assessment under Part 7 of the *NSW Biodiversity Conservation Act 2016*:

- Green and Golden Bell Frog
- Koala
- Spotted-tailed Quoll
- White-footed Dunnart
- Yellow-bellied Glider
- Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions

Section 7.3 of the Act provides a five-part 'test of significance' to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Each Part is addressed below:

Part 1 In the case of a threatened species, whether the proposed development or activity 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 place at risk of extinction.

Green and Golden Bell Frog

Green and Golden Bell Frog inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat for the species includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), with a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas (OEH 2017).

The species is active by day and usually breeds in summer when conditions are warm and wet. Males call while floating in water and females produce a raft of eggs that initially float before settling to the bottom, often amongst vegetation. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs (OEH 2017a).

The site does not contain any suitable breeding or refuge habitat for the Green and Golden Bell Frog. There are however, records of the species in the area, including one occurring approximately 880m upstream of Butler Creek bridge. If works were occurring during a large breeding and dispersal event, it is possible the frogs may be present within the site. It is otherwise unlikely that GGBF would occur within the site. The proposal will not affect any suitable habitat for the species.

In the event that works are being undertaken during December to February inclusive, monitoring of the site and GGBF habitat in the locality will be undertaken to avoid impact to individual dispersing frogs.

It is considered unlikely therefore that the Green and Golden Bell Frog would be impacted by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of any of these species is likely to be place at risk of extinction.

Koala

The Koala (*Phascolarctos cinereus*) is an arboreal marsupial with fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.

Koalas inhabit eucalypt woodlands and forests, feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. They are inactive for most of the day, feeding and moving mostly at night and spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.

Koalas are generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year. (OEH 2019)

The NSW *State Environmental Planning Policy (SEPP) Koala Habitat Protection 2019* now replaces *SEPP 44 – Koala Habitat Protection (SEPP 44)*. Core Koala Habitat mapping is not currently available and there is no area specific Koala plan of management for the Shoalhaven. (OEH 2019)

Schedule 2 of the NSW *State Environmental Planning Policy (Koala Habitat Protection) 2019* provides feed tree species lists by Koala management area. The overall list of tree species listed under the SEPP has been expanded from 10 to 123, across nine distinct regions of NSW. Within the *South Coast Koala management area* feed tree species list (below), there are three tree species (highlighted in green) which occur within the site, Spotted Gum, Blackbutt and Forest Red Gum.

South Coast Koala management area feed tree species list

Scientific name	Common name(s)
Allocasuarina littoralis	Black She-oak
Angophora floribunda	Rough-barked Apple

Corymbia gummifera	Red Bloodwood
Corymbia maculata	Spotted Gum
Eucalyptus agglomerata	Blue-leaved Stringybark
Eucalyptus baueriana	Blue Box
Eucalyptus bosistoana	Coast Grey Box
Eucalyptus consideniana	Yertchuk
Eucalyptus cypellocarpa	Monkey Gum
Eucalyptus elata	River Peppermint
Eucalyptus eugenioides	Narrow-leaved Stringybark
Eucalyptus fastigata	Brown Barrel
Eucalyptus globoidea	White Stringybark
Eucalyptus longifolia	Woollybutt
Eucalyptus maidenii	Maiden's Blue Gum
Eucalyptus muelleriana	Yellow Stringybark
Eucalyptus obliqua	Messmate
Eucalyptus paniculata	Grey Ironbark
Eucalyptus pilularis	Blackbutt
Eucalyptus piperita	Sydney Peppermint
Eucalyptus punctata	Grey Gum
Eucalyptus saligna	Sydney Blue Gum
Eucalyptus sclerophylla	Hard-leaved Scribbly Gum
Eucalyptus sieberi	Silvertop Ash
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus tricarpa	Mugga (Red) Ironbark
Eucalyptus viminalis	Ribbon Gum

Of the listed feed tree species occurring on site, only Forest Red Gum would be impacted, with ten trees proposed for removal over the site. Each of these trees exists immediately on the road-side and is disconnected from other suitable vegetation, which typically occurs on the western side of the road, extending toward Murramarang National Park. Site survey did not detect any signs of this species (e.g. scats). It is unlikely that Koalas would occur within the site and very unlikely that any Koala would rely on these trees as a food source.

It is considered unlikely therefore that the Koala would be impacted by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of any of these species is likely to be place at risk of extinction.

Spotted-tailed Quoll

The Spotted-tailed Quoll (*Dasyurus maculatus*) has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.

The Spotted Tail Quoll is mostly nocturnal, although it will hunt during the day. This species spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. It is a generalist predator with a preference for medium-sized (500g-5kg) mammals, consuming a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects, in addition to eating carrion and taking domestic fowl.

Spotted Tail Quolls use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. They are known to traverse their home ranges along densely vegetated creeklines. (OEH 2017b).

The site contains marginal suitable foraging habitat for Spotted-tailed Quoll. No suitable den habitat occurs within the site. Native vegetation removal as part of the proposal will be to an area up to approximately 1710m^2, primarily consisting of Swamp She-oak trees with minimal understorey. Extensive areas of optimal habitat exist to the west and south-west within Murramarang National Park and adjoining lands, exceeding 9000 ha.

It is considered unlikely therefore that the Spotted-tailed Quoll would be impacted by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of any of these species is likely to be place at risk of extinction.

Figure 10. Vegetation and habitat available in surrounds

White-footed Dunnart

The White-footed Dunnart (*Sminthopsis leucopus*) is a mouse-like marsupial carnivore with head and body length less than 10 cm. It occurs in Tasmania and along the Victorian and southern NSW coast. The Shoalhaven area is the species' northern-most limit. The White-footed Dunnart is found in a range of different habitats across its distribution, including coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. In NSW, the species seems to favour vegetation communities with an open understorey structure (contrasting with populations in Victoria which apparently prefer dense shrub and ground layers). It is patchily distributed across these habitats and, where present, typically occurs at low densities. Breeding populations have been recorded in logged forest shortly after disturbance, but these usually do not persist as regeneration proceeds and a dense ground cover of vegetation establishes. Home range and movement patterns of this species vary according to sex. Adult females usually have small, discrete home ranges, approximately 80 metres in length. Adult males have overlapping home ranges, approximately 100 metres in length, but are capable of making regular exploratory movements of up to 1 km. White-footed Dunnarts appear to have only one short breeding season during their lifetime. In NSW and Victoria, mating occurs in late July and August. From August to September, up to ten young are

born, each about 3 mm long. At two months, the young detach from the mothers' teats and are suckled in the nest for about a month before dispersing. The White-footed Dunnart is an opportunistic carnivore that feeds on a variety of ground-dwelling invertebrates and, occasionally, small lizards. They shelter in bark nests in hollows under standing or fallen timber, burrows in the ground, piles of logging debris, in the 'skirts' of grass trees (*Xanthorrhoea* spp.) and cycads (*Macrozamia* spp.) and rock crevices. (OEH 2017c).

The site contains marginal suitable foraging habitat for White-footed Dunnart. No suitable den habitat occurs within the site. Native vegetation removal as part of the proposal will be to an area up to approximately 1710m^2, primarily consisting of Swamp She-oak trees with minimal understorey. It is unlikely that the White-footed Dunnart would rely on habitat within the site. It is unlikely that White-footed Dunnart would occur within the site during construction hours.

It is considered unlikely therefore that the White-footed Dunnart would be impacted by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of any of these species is likely to be place at risk of extinction.

Yellow-bellied Glider

The Yellow-bellied Glider (*Petaurus australis*) is a large, active, sociable and vocal glider. The species occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. The species feeds primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Sap is extracted by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Yellow-bellied Gliders live in small family groups of two - six individuals and are nocturnal. The species use dens, often in family groups, in hollows of large trees. The Yellow-bellied Glider is very mobile and occupies large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources. Dispersal requires continuous habitat connectivity (gliding distance around 120m). Typically produce one young per year (in high quality habitat) but during poor conditions may only breed every second year. Key threats to the species include loss of hollows (generally >30cm) and important feed trees as a result of wildfire, in addition to landscape fragmentation. A highly vocal species with loud, high-pitched shrieks audible over 500m away. (OEH 2017d).

The site and adjacent areas may contain suitable foraging and breeding habitat for the Yellow-bellied Glider including along the road corridor. No Yellow-bellied Glider scars were observed on any potential feed trees within or in close proximity to the site, suggesting that this species is not reliant on food resources within or near the site.

No hollow-bearing trees would be removed as part of the proposal. The proposal will not result in the loss of important habitat for this species and will not result in fragmentation or significant reduction in the quality of available habitat.

It is considered unlikely therefore that the Yellow-bellied Glider would be impacted by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of any of these species is likely to be place at risk of extinction.

Part 2 - In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(a) 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

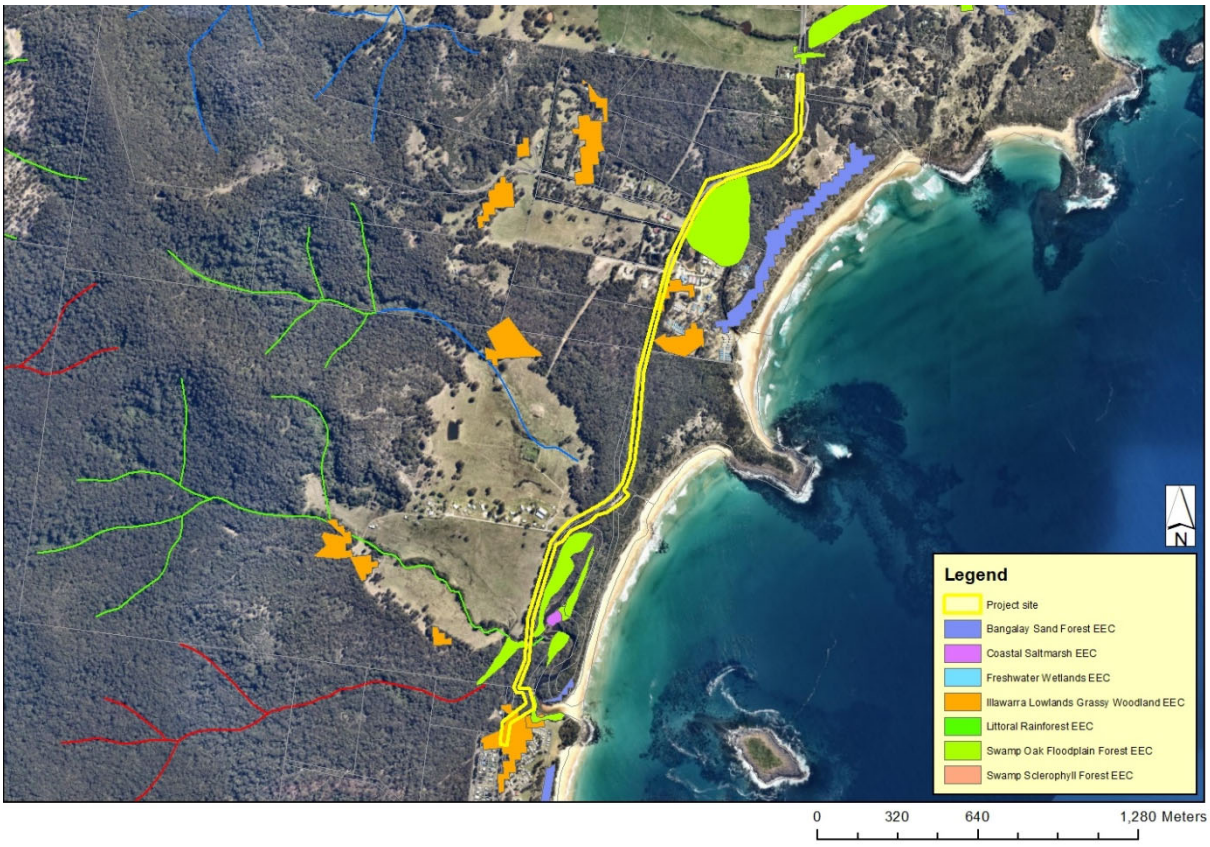
(b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Figure 11 (below) shows the mapped occurrences of endangered ecological communities (EECs) in proximity to the site and the surrounding locality. EECs mapped as occurring within or in close proximity to the site are:

- Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions

Refer to figures 3 to 7 for more detail.

Figure 11. Endangered Ecological Communities (EECs) mapped as occurring in the surrounding locality (refer to figures 3 to 7 for more detail)



Illawarra Lowlands Grassy Woodland EEC

Illawarra Lowlands Grassy Woodland occurs on relatively gently sloping to undulating lands less than about 200 m elevation on Berry Siltstone, Budgong Sandstone and Quaternary alluvium. This community comprises vegetation types that occupy the Illawarra coastal plain and escarpment foothills. Characteristic tree species in the Illawarra Lowlands Grassy Woodland are *Eucalyptus tereticornis, Eucalyptus eugenioides, Eucalyptus longifolia, Eucalyptus bosistoana* and *Melaleuca decora*. The understorey is not necessarily grassy as moist forest vegetation types are also included within this broad community. Common shrub species include *Acacia mearnsii* and *Dodonaea viscosa* subsp. *angustifolia*.

(NSW Scientific Committee 2011a)

Scattered Forest Red Gum (*E.tereticornis*) trees occur through the site. These trees are typically isolated and occurring amongst Swamp She-Oak vegetation. Understorey in each of these locations is neither grass dominated, nor comprised of shrub species characteristic of this EEC.

In two areas, ILGW EEC is mapped as occurring over the site. Area E (refer to Figure 5) is mapped as containing ILGW for a length of approx. 100m, however this area (shown in Photo 26 below) is dominated by Swamp She-oak and contains only scattered Forest Red Gum and an absence of understorey.

Areas J and K are mapped as containing ILGW for a length of approx. 60m in each area. Over both areas, the vegetation is comprised of Spotted Gum (*E.maculata*) with shrubby understorey dominated by Sweet Pittosporum. Opposite Area K, in the vicinity of O'Brien Street, ILGW was observed to occur, but this vegetation will not in any way be affected by the proposal.

The proposal will not involve any direct removal of vegetation which is consistent with Illawarra Lowlands Grassy Woodland EEC and is unlikely to result in any indirect impact to ILGW. Nor will the proposal fragment, remove canopy or understorey species, introduce edges, or introduce invasive flora species to ILGW.

The proposal is therefore unlikely to adversely affect the extent or composition of Illawarra Lowland Grassy Woodland EEC such that a local occurrence of the EEC will be placed at risk of extinction.

Photo 26. Vegetation in Area E mapped as Illawarra Lowland Grassland Woodland EEC

Photo 27. ILGW EEC vegetation occurring at O'Brien St., beyond the site

Swamp Oak Floodplain Forest (SOFF EEC)

Swamp Oak Floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions endangered ecological community is associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Swamp Oak Floodplain Forest generally occurs below 20 m (rarely above 10 m) elevation in the NSW North Coast, Sydney Basin and South East Corner bioregions. The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. The combination of features that distinguish Swamp Oak Floodplain Forest from other endangered ecological communities on the coastal floodplains include: its dominance by a tree canopy of either Casuarina glauca or, more rarely, *Melaleuca ericifolia* with or without subordinate tree species; the relatively low abundance of Eucalyptus species; and the prominent groundcover of forbs and graminoids. It generally occupies low-lying parts of floodplains, alluvial flats, drainage lines, lake margins and fringes of estuaries; habitats where flooding is periodic and soils show some influence of saline ground water. This latter habitat feature sets it apart from other floodplain communities.

Swamp Oak Floodplain Forest may adjoin or intergrade with several other endangered ecological communities, which collectively cover all remaining native vegetation on the coastal floodplains of New South Wales. The boundaries between these communities are

dynamic and may shift in response to changes in hydrological regimes, fire regimes or land management practices.

(NSW Scientific Committee 2011b)

While the canopy of the vegetation present within much of the northern portion of the site (Areas A through to H) is dominated by *Casuarina glauca*, the understorey is not characterised by a prominent groundcover of forbs and graminoids, which distinguishes the EEC. The vegetation present on site is therefore not regarded as Swamp Oak Floodplain Forest, but does however serve as a buffer to this EEC in certain locations, particularly in proximity to Area C, where an approximately 372m stretch is adjacent to vegetation mapped as SOFF ECC.

The EEC is also mapped as occurring over or in close proximity to Areas H and J. The vegetation within Area J is comprised of Spotted Gum with an understorey dominated by Sweet Pittosporum, so cannot be SOFF EEC.

It is therefore considered that Swamp Oak Floodplain Forest will not be directly impacted by the proposal.

Vegetation removal would occur in Areas B (up to approx. 1230m^2), C (up to approx. 150m^2) and F (up to approx. 480m^2), in each case as a narrow, linear strip. Removal of any vegetation serving as a buffer to the EEC will occur along the existing exposed edges of Murramarang Road and will not create new edges or introduce weeds or additional edge effects. A buffer of at least 5m will be retained to the mapped occurrence of SOFF EEC.

The proposal and associated works will not further contribute to adversely modifying the composition of the existing vegetation. Exotic flora species and other threatening processes will not be introduced. The proposal is therefore unlikely to substantially and adversely modify the composition of the ecological community, and will not result in isolation or further fragmentation of the local occurrence of Swamp Oak Floodplain Forest such that its local occurrence is likely to be placed at risk of extinction.

Part 3 - In relation to the habitat of a threatened species or ecological community:

(a) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
(b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
(c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

No important habitat for threatened species would be removed (see Part 1).

The proposal will not result in isolation or further fragmentation of any local occurrence of Illawarra Lowlands Grassy Woodland or Swamp Oak Floodplain Forest. Additional edges and additional edge impacts will not be introduced.

The proposal will therefore not affect the long-term survival of any threatened species or endangered ecological community in the locality.

Part 4 – Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No "*areas of outstanding biodiversity values"* have been declared in the City of Shoalhaven.

Part 5 – Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The only key threatening process listed in the Act considered relevant to the proposed activity is Clearing of Native Vegetation. The impact of the proposal, however, is not considered to be significant as it is unlikely lead to:

- destruction of habitat which causes a loss of biological diversity and extinction of species or loss of local genotypes
- fragmentation of populations resulting in limited gene flow between small isolated populations, reduced potential to adapt to environmental change and loss or severe modification of the interactions between species
- riparian zone degradation such as bank erosion leading to sedimentation that affects aquatic communities

- disturbance to habitat which would promote the establishment and spread of exotic species which may displace native species
- expansion of dryland salinity
- significant reduction of habitat for threatened species
- significant loss of leaf litter, removing habitat for a wide variety of vertebrates and invertebrates.

As a result, the proposed activity is considered unlikely to result in the operation of, or significantly increase the impact of this key threatening process.

2.3.2 NSW *Fisheries Management Act 1994* (Part 7A)

No marine or freshwater species listed as threatened under the Act are likely to occur within or in close proximity to the site.

2.4 Threatened species impact assessment (Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act))

An EPBC Protected Matters Report was generated on 25 February 2020. Of those threatened species and endangered ecological communities reported as likely occurring or having habitat within the area of the report, Greater Glider (V), Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (CE) and Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (E) were considered to require further assessment. Additional, highly mobile species including migratory birds may occur occasionally and transiently within the vicinity of the proposed activity but would not be affected by the proposal.

- Greater Glider (Vulnerable)
- Spotted-tailed Quoll (Endangered)
- Illawarra and south coast lowland forest and woodland ecological community (Critically Endangered)
- Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland endangered ecological community (Endangered)

Critically endangered and endangered species - Significant impact criteria Species to consider: **Spotted-tailed Quoll**	
Criteria	***Assessment***
lead to a long-term decrease in the size of a population	The site contains marginal suitable foraging habitat for Spotted-tailed Quoll. No suitable den habitat occurs within the site. Native vegetation removal as part of the proposal will be to an area up to approximately 1710m^2, primarily consisting of Swamp She-oak trees with minimal understorey. Extensive areas of optimal habitat exist to the west and south-west within Murramarang National Park and adjoining lands, exceeding 9000 ha. Site survey did not detect any signs of the species on the site. The proposed activity will not directly impact any known population of the Spotted-tailed Quoll.
reduce the area of occupancy of the species	No
fragment an existing population into two or more populations	No
adversely affect habitat critical to the survival of a species	Habitat on site is considered marginal suitable habitat for the species and survey did not detect any signs of the species. The proposed activity will not remove or otherwise impact habitat critical to the survival of the species.
disrupt the breeding cycle of a population	No
modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No important habitat will be impacted
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere with the recovery of the species	No
Assessment	It is considered unlikely that the Spotted-tailed Quoll would be impacted by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of any of these species is likely to be place at risk of extinction.

Vulnerable species - Significant impact criteria Species to consider: **Greater Glider**	
Criteria	***Assessment***
lead to a long-term decrease in the size of an important population of a species	The proposal does not involve the removal of any HBTs. The site and adjacent area does not contain any known population of Greater Glider. The proposed activity will not directly impact the Greater Glider, will not affect or disrupt breeding and will not impact on breeding or foraging habitat.
reduce the area of occupancy of an important population	No
fragment an existing important population into two or more populations	No
adversely affect habitat critical to the survival of a species	No important habitat will be impacted
disrupt the breeding cycle of an important population	No
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No important habitat will be impacted.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere substantially with the recovery of the species	No

Critically endangered and endangered ecological communities - Significant impact criteria EECs to consider: • **Illawarra and south coast lowland forest and woodland ecological community (CE)** • **Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland endangered ecological community (E)**	
Criteria	***Assessment***
reduce the extent of an ecological community	DoEE (2017) defines the "Extent of Occurrence" as: the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of an ecological community, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of the ecological community (e.g. large areas of obviously unsuitable habitat). This

Critically endangered and endangered ecological communities - Significant impact criteria EECs to consider: • **Illawarra and south coast lowland forest and woodland ecological community (CE)** • **Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland endangered ecological community (E)**	
Criteria	***Assessment***
	essentially refers to the National occurrence of an ecological community. *Illawarra and south coast lowland forest and woodland ecological community* has a patchy distribution, with the remaining occurrences mostly on lowland sandy loam, loam or clay loam soils around Wollongong to Shellharbour, Milton, Bawley Point and Moruya. *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland* ecological community occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales. No areas of vegetation to be directly impacted are considered to be *Illawarra and south coast lowland forest and woodland ecological community* or *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East*. Tree species which occur in each EEC would be removed. The proposal will not result in isolation or further fragmentation, nor reduction of the local occurrence or extent of Coastal Swamp Oak Forest, or Illawarra and south coast lowland forest and woodland.
fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	No. The proposal will not result in isolation or further fragmentation of the local occurrence of Coastal Swamp Oak Forest, or Illawarra and south coast lowland forest and woodland. Clearing of vegetation associated with (but not comprising) these communities will occur along an existing road edge. Additional edges and additional edge impacts will not be introduced.
adversely affect habitat critical to the survival of an ecological community	No habitat critical to the survival of an ecological community will be adversely affected. Linear buffers to Coastal Swamp Oak Forest will be reduced slightly (up to 2 – 3m) in width, but

Critically endangered and endangered ecological communities - Significant impact criteria EECs to consider: • **Illawarra and south coast lowland forest and woodland ecological community (CE)** • **Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland endangered ecological community (E)**	
Criteria	***Assessment***
	will be retained to at least 5m. No additional impacts will be introduced that would reduce the resilience or otherwise affect the survival of this EEC.
modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The proposal will not modify or destroy abiotic factors necessary for any ecological community's survival. The proposal will not affect existing local hydrological functions.
cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposal and associated works will not further contribute to adversely modifying the composition of the existing vegetation.
cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: — assisting invasive species, that are harmful to the listed ecological community, to become established, or — causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	Exotic flora species and other threatening processes will not be introduced or advantaged as a result of the proposal. No chemicals or pollutants will be mobilised or introduced such that they might kill or inhibit the growth of species in the ecological community.
interfere with the recovery of an ecological community.	The proposal is situated within an existing road corridor. The proposal will not restrict or otherwise interfere with the recovery of an ecological community.

2.5 EP&A Act Clause 228 matters of consideration

Clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act. The following assessment deals with each of the factors in relation to the proposed activity.

Table 1 Clause 228 (EP&A Regulation) matters

DOES THE PROPOSAL:	ASSESSMENT	REASON
a) **Have any environmental impact on a community?**	Positive	The purpose of the proposed activity is to construct a shared-user path (SUP) adjacent to Murramarang Road, between Bawley Point and Kioloa linking existing SUPs at either end. The proposed SUP would provide for pedestrian and cyclist travel between Bawley Point and Kioloa and a safer alternative than using the road or road shoulder. The proposed activity would not have any impact on other community services and infrastructure such as power, waste water, waste management, educational, medical or social services. Traffic control may involve minor and temporary disruption to Murramarang Road.
b) **Cause any transformation of a locality?**	Negligible - Positive	The locality's current use would remain unchanged. A safer pedestrian and cyclist travel option would be created.
c) **Have any environmental impact on the ecosystem of the locality?**	Low adverse	The five-part test of significance provided in Section 2.4 concludes that the proposed activity would not have a significant impact upon endangered ecological communities or threatened fauna or flora. No food resources critical to the survival of a particular species would be removed.

DOES THE PROPOSAL:	ASSESSMENT	REASON
		No threatened species, ecological communities, endangered populations or their habitats will be significantly impacted by the proposal With the implementation of the specified environmental mitigation measures (Section 1.3), environmental impacts will be minimal, aquatic ecosystems are not likely to be adversely affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem.
d) **Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?**	Low adverse	In the context of the locality, the visual impact of the SUP would be minimal. The proposed SUP would provide for (relatively) safe pedestrian and cyclist travel between Bawley Point and Kioloa and opportunity for appreciation of the aesthetic and environmental values of the site. Impact to the environmental values of the site would be minimal and not significant.
e) **Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or**	Negligible	The proposed activity would not negatively affect any aesthetic, architectural, cultural, historical, scientific or social values, but would make the site more accessible increasing the appreciation of aesthetic, social and natural values. No items in the vicinity of the work site which are listed on the State Heritage

DOES THE PROPOSAL:	ASSESSMENT	REASON
other special value for present or future generations?		Register and the Shoalhaven Local environmental Plan would be impacted by the proposal. The site is not within an Aboriginal Place declared under the *National Parks and Wildlife Act 1974.* In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 4.1).
f) **Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?**	Low adverse	The site's value to fauna is considered low. No trees containing suitable hollows for fauna would be removed. A small area of marginal fauna habitat would be removed by the activity and therefore the potential impact is considered to be insignificant or inconsequential. The five-part test of significance, provided in Section 2.3 above, concludes that the proposed activity would not have a significant impact upon threatened fauna. The specified environmental mitigation measures (Section 1.3) would mitigate indirect impacts to fauna and habitat including through control of sediment.
g) **Cause any endangering of any**	Negligible	There are no species likely to rely on the site of the proposed works to the extent

DOES THE PROPOSAL:	ASSESSMENT	REASON
species of animal, plant or other form of life, whether living on land, in water or in the air?		that modification would put them further in danger.
h) **Have any long term effects on the environment?**	Negligible	The works would be relatively short term and the noise generated will occur during normal working hours. In the long-term, the impacted area will stabilise and long term effects are considered unlikely. The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment.
i) **Cause any degradation of the quality of the environment?**	Low adverse	The environmental safeguards (Section 1.3) to be undertaken would minimise impacts and risks to the quality of the environment. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil.
j) **Cause any risk to the safety of the environment?**	Negligible	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. The activity is not going to adversely affect flood or tidal regimes, or exacerbate flooding risks.
k) **Cause any reduction in the range of beneficial**	Negligible - Positive	The local environment will remain unchanged. The environment is currently used as a road and roadside. The proposed

DOES THE PROPOSAL:	ASSESSMENT	REASON
uses of the environment?		activity would be ancillary and improve this use.
l) **Cause any pollution of the environment?**	Low adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However this will not affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals. Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into the creek from the embankments. It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation.
m) **Have any environmental problems associated with the disposal of waste?**	Negligible	The waste that would be disposed off-site can be recycled or re-used in accordance with resource recovery exemptions or taken to a licensed waste facility. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997* requiring off-site disposal.
n) **Cause any increased demands on resources (natural or otherwise) which**	Negligible	The amount of resources that would be used are not considered significant and would not increase demands on current resources such that they would become in short supply.

DOES THE PROPOSAL:	ASSESSMENT	REASON
are, or are likely to become, in short supply?		This is a relatively small scale construction project that is unlikely to increase demands on current resources such that they would become in short supply.
o) **Have any cumulative environmental effect with other existing or likely future activities?**	Negligible	The assessed low adverse or negligible impacts of the proposal are not likely to interact.
p) **Any impact on coastal processes and coastal hazards, including those under projected climate change conditions**	Negligible	The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The proposal site is not located in an identified coastal hazard area.

3 PERMISSIBILITY

3.1 Environmental Planning and Assessment Act 1979

Section 4.1 (Development that does not need consent) of the EP&A Act states that:

> *"If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies."*

In this regard, clause 97(1) of the NSW *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) provides that:

> *Development for any of the following purposes is exempt development if it is carried out by or on behalf of a public authority or the Minister responsible for Crown roads (within the meaning of the Roads Act 1993) in connection with a road or road infrastructure facilities and complies with clause 20—*
>
> *(c) erection, installation, maintenance, reconstruction or replacement of any of the following, and any associated landscaping works—*
> *(iv) pedestrian and cyclist facilities (such as footpaths, street lighting, kerb adjustments and ramps, pedestrian fences, refuges, holding rails, and bollards),*

The proposal meets the definition of "pedestrian and cyclist facilities" and would be carried out in connection with Murramarang Road, for which Shoalhaven City Council is the road authority. The proposal can therefore be regarded as exempt development.

The NSW *Environmental Planning & Assessment Act 1979* provides that exempt development can be carried out without requirement for environmental impact assessment (EP&A Act Clause 1.6).

Considering the presence of mapped endangered ecological communities (EECs), threatened species records and Aboriginal heritage records, due diligence called for a detailed environmental assessment to avoid, minimise and mitigate against potential impacts to these values. This REF provides this assessment.

3.2 Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

No EPBC listed threatened species or endangered ecological communities will be adversely impacted by the proposal (refer to section 2.4 for more detail).

No matters of significance, i.e.:

- listed threatened species and communities

- listed migratory species
- Ramsar wetlands of international importance
- Commonwealth marine environment
- world heritage properties
- national heritage places
- the Great Barrier Reef Marine Park
- nuclear actions
- a water resource, in relation to coal seam gas development and large coal mining development

would be affected as a result of the proposal.

Further assessment and referral to the Commonwealth is not required.

3.4 Other legislation

The proposed activity is permissible under environmental legislation (Table 1).

Table 1 Summary of legislation and permissibility

NSW State Legislation
Environmental Planning and Assessment Act 1979 **(EP&A Act)**
Permissible √ Not permissible ☐
Justification: The Infrastructure SEPP provides for this work to be undertaken without development consent (refer to Section 3.1). In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.
Shoalhaven Local Environmental Plan 2014 (SLEP)
Permissible √ Not permissible ☐
Justification: Under the SLEP the proposed activity may have required development consent. The provisions of SEPP Infrastructure, however, prevail over the SLEP where there is an inconsistency by virtue of Section 3.28 of the EP&A Act. Consequently, development consent is not required.

State Environmental Planning Policy (Coastal Management) 2018
Permissible √ Not permissible ☐
Justification: The proposed activity would be undertaken in areas mapped for the purposes of this SEPP as "Coastal Use Area" and "Coastal Environment Area". The provisions of the SEPP for these areas relate to development consent considerations. As the proposed activity does not require development consent these provisions are not relevant. The proposed activity would not be undertaken in areas mapped as coastal wetland or littoral rainforest. The proposed activity also does not comprise "coastal protection works".
Heritage Act 1977
Permissible √ Not permissible ☐
Justification: • The proposed activity would not disturb an item of state heritage significance. • The Act also provides statutory protection to relics, archaeological deposits, artefacts or deposits. Section 139 to 146 of the Act require that excavation that is likely to contain, or is believed may contain, archaeological relics is undertaken in accordance with an excavation permit issued by the Heritage Council. The Act defines an archaeological relic as "*any deposit, artefact, object or material evidence that:* *a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; or* b) *is of state and local heritage significance"* • See Section 4.2 for more information. • As the site has little to no archaeological potential, a permit is not required.
Wilderness Act 1987
Permissible √ Not permissible ☐
Justification: The proposed activity is not located within a wilderness area declared under this Act.
National Parks and Wildlife Act 1974 **(NP&W Act)**
Permissible √ Not permissible ☐
Justification: • The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowlingly destroy or damage, or cause the destruction or

damage to, an Aboriginal object or place, except in accordance with a permit ot consent under section 87 and 90 of the Act.

- As there are no recorded sites or visible objects and as the site is on 'disturbed land', the Due Diligence Guidelines requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 4.1 for more information.

Protection of the Environment Operations Act 1997

Permissible √ Not permissible ☐

Justification:

The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.

Biodiversity Conservation Act 2016

Permissible √ Not permissible ☐

Justification:

- The proposed development is unlikely to have a significant impact on species and communities listed in the schedules of the Act (refer to Section 2.3 of this REF).
- The proposed development is not within an area declared to be of "outstanding biodiversity value" as defined in the Act.
- The proposed development is unlikely to have a significant impact on threatened species and/or threatened ecological communities listed in the schedules of the Act. Therefore there is no requirement to 'opt in' to the Biodiversity Offset Scheme.
- There are no *serious and irreversible impacts on biodiverstiy values* present at the site of the proposed activity.

The proposed activity therefore is not deemed to be *likely to significantly affect threatened species* and a Biodiversity Development Assessment Report (BDAR) is not required.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the EP&A Act after compliance with that Part. The activity is considered permissable as this REF has been prepared and determined in accordance with the EP&A Act.

Aboriginal Land Rights Act 1993

Permissible √ Not permissible ☐

Justification:

An Aboriginal Land Claim exists over Part Lot 130 DP 40869 which is held by the Crown (Crown Reserve R96797) and licenced to Roche Group Pty Ltd (Kioloa Beach Holiday Park owner).

Council is currently in discussion with the land manager (licence holder), seeking authorisation to construct the footpath over this lot.

The footprint and value of the footpath over this lot is not considered significant and therefore not high risk in the event that the Land Claim is granted.

Local Land Services Act 2013

Permissible √ Not permissible ☐

Justification:

Any clearing of vegetation would be of a kind that is authorised under Section 60O(b)(ii) of the *Local Land Services Act 2013* ("*an activity carried out by a determining authority within the meaning of Part 5 of the Act after compliance with that Part.")*. No separate authorisation under the Act is required.

Roads Act 1993

Permissible √ Not permissible ☐

Justification:

- SCC is the roads authority for Murramarang Road. Section 71 provides that a roads authority (e.g. Council) may carry out road work on any public road for which it is the roads authority and on any other land under its control.
- Section 88 allows a roads authority, "*despite any other Act or law to the contrary, remove or lop any tree or other vegetation that is on or overhanging a public road, in its opinion, it is necessary to do so for the purpose of carrying out road work or removing a traffic hazard.*

Crown Land Management Act 2016

Permissible √ Not permissible ☐

Justification:

Part Lot 130 DP 40869 is held by the Crown (Crown Reserve R96797), licenced to Roche Group Pty Ltd (Kioloa Beach Holiday Park owner).

Council is currently in discussion with the land manager (licence holder), seeking authorisation to construct the footpath over this lot.

Water Management Act 2000

Permissible √ Not permissible ☐

Justification:

- Local councils are exempt from s.91E(1) of the Act in relation to all controlled activites that they carry out in, on or under waterfront land (by virtue of clause 41 of the *Water Management (General) Regulation 2018.*
- The proposal would not interfere with the aquifer and therefore an interference licence is not required (s.91F).

Commonwealth Legislation

Commonwealth *Native Title Act 1994*

Permissible √ Not permissible ☐

Justification:

- Native Title has been extinguished over the Murramarang Road reserve by previous exclusive posession acts such as dedication of the reserve as a public road, construction of the road and continued use as a public road prior to 1994 (comencement of the Act). Consultation or approval from native title claimants is not required.
- Native Title has been extinguished over Council freehold Lot 2 DP 614466 by previous exclusive posession acts.
- Native Title does not exist over privately owned lots Lot 2 DP 579750 and Lot 1 DP 782318.
- Part Lot 130 DP 40869 is held by the Crown (Crown Reserve R96797), licenced to Roche Group Pty Ltd (Kioloa Beach Holiday Park owner) and may be subject to Native Title. Native Title Assessment was undertaken under Subdivision J (D19/9866) involving notification and opportunity to comment to relevant parties (D19/10759, D19/42731). The proposed activity is therefore considered a valid future act.

4 HERITAGE

4.1 Indigenous

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises 'due diligence' in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wale*s (hereafter referred to as the 'Due Diligence Guidelines) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

In accordance with the Due Diligence Guidelines (DECCW 2010), a search on the Aboriginal Heritage Information Management System (AHIMS) on 9 January 2020 indicated that eleven Aboriginal heritage sites are known to exist in proximity to the proposed activity (see Figure 10 below and refer to Figures 3 to 7 for more detail).

Most of the site can be regarded as being on 'disturbed land' as defined by the Due Diligence Guidelines i.e.:

> *"Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks."*

The proposed SUP alignment predominantly follows the road verge which has been subject to disturbance as a result of clearing and the road construction and maintenance. Areas where the SUP alignment deviates from the road verge, it follows existing informal tracks and/or existing cleared and disturbed areas, with only minimal removal of understorey vegetation required.

No recorded Aboriginal heritage sites occur in close proximity to the proposed SUP such that there is a risk of impact to these sites (refer to Table 3).

Visual assessment of the soil surface throughout the project site did not detect any artefacts or other Aboriginal heritage objects.

Table 3. AHIMS records in proximity to project site

Site ID	Easting	Northing	Site features	Site types	Comments
58-4-1124	262536	6062601	Artefact : -, Grinding Groove : - , Shell : -		25m adjacent to unnamed estuary inlet
58-4-0477	262546	6063391	Artefact : -	Open Camp Site	141m to west of project site
58-4-0817	262606	6062591	Shell : -, Artefact : -	Midden	92m from project site, adjacent to unnamed estuary inlet
58-4-0818	262706	6062691	Shell : -, Artefact : -	Midden	192m from project site, on beach
58-4-0820	262906	6063391	Shell : -, Artefact : -	Midden	Two records at same site occurring on hind dune 35m from project site.
58-4-0819	262906	6063391	Shell : -, Artefact : -	Midden	
58-4-0470	262906	6063991	Artefact : -	Open Camp Site	146m to west of site
58-4-0821	263006	6063391	Shell : -, Artefact : -	Midden	On beach 123m from project site
58-4-0823	263106	6063791	Shell : -, Artefact : -	Midden	Three records at same site occurring on hind dunes approx. 158m from project site with low-lying swamp between record location and project site.
58-4-0824	263106	6063791	Shell : -, Artefact : -	Midden	
58-4-0825	263106	6063791	Shell : -, Artefact : -	Midden	

A tree containing a scar at the base (refer to Photo 29) was disregarded as potentially being the result of cultural practices based on the following:

- Location in local environment – on road verge where damage due to vehicle impact or maintenance machinery and activities (e.g. road-side slashing) is likely;
- Age of the tree – estimated at no more than 30 years (likely much younger), considering that the species is *Eucalyptus salgna x botryoides*, a relatively fast growing species, and only 25cm (approx.) DBH;

and considered against the criteria provided in Long 2005.

Within Area J (see Figure 10 below), while there are no visible middens or artefacts, it is considered that there is moderate propensity for Aboriginal heritage items, given the close proximity to the watercourse and beach, in addition to the older tree age class indicating that disturbance in this location may have been limited to clearing of understorey vegetation, with little disturbance to the soil surface. In this area, any excavation associated with the project will be monitored by an Aboriginal Heritage Site Officer engaged from Batemans Bay Local Aboriginal Land Council.

As no recorded sites would potentially be impacted and as the area that would be impacted by the proposal is ‘disturbed land’, Due Diligence Guidelines requires no further

assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area. An Aboriginal Heritage Impact Permit (AHIP) is not required and the work can proceed with caution and with monitoring of works within Area J as noted above.

Figure 10 AHIMS Aboriginal Heritage Site Records

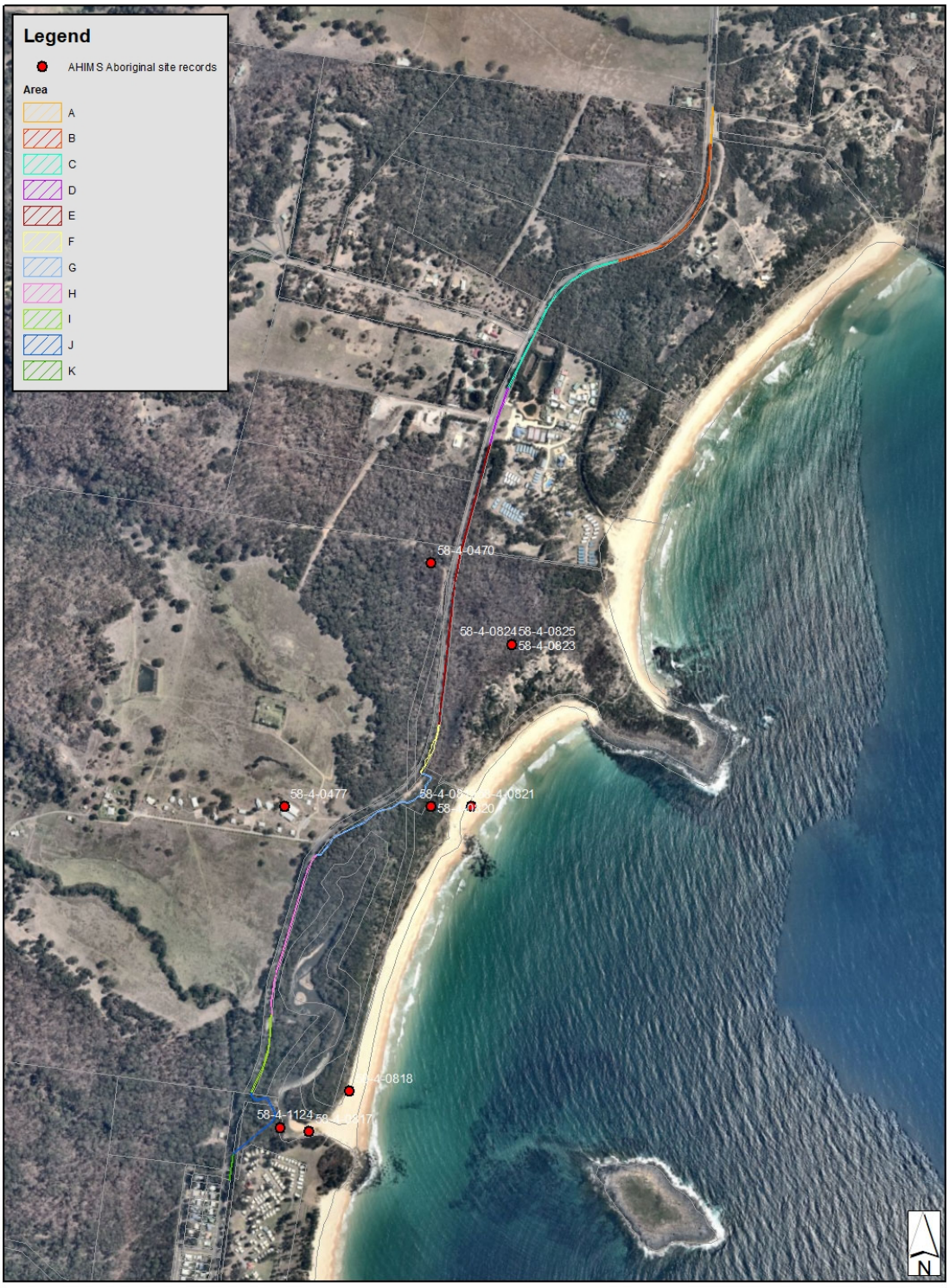


Photo 28. Soil surface within Area J in proximity to AHIMS record

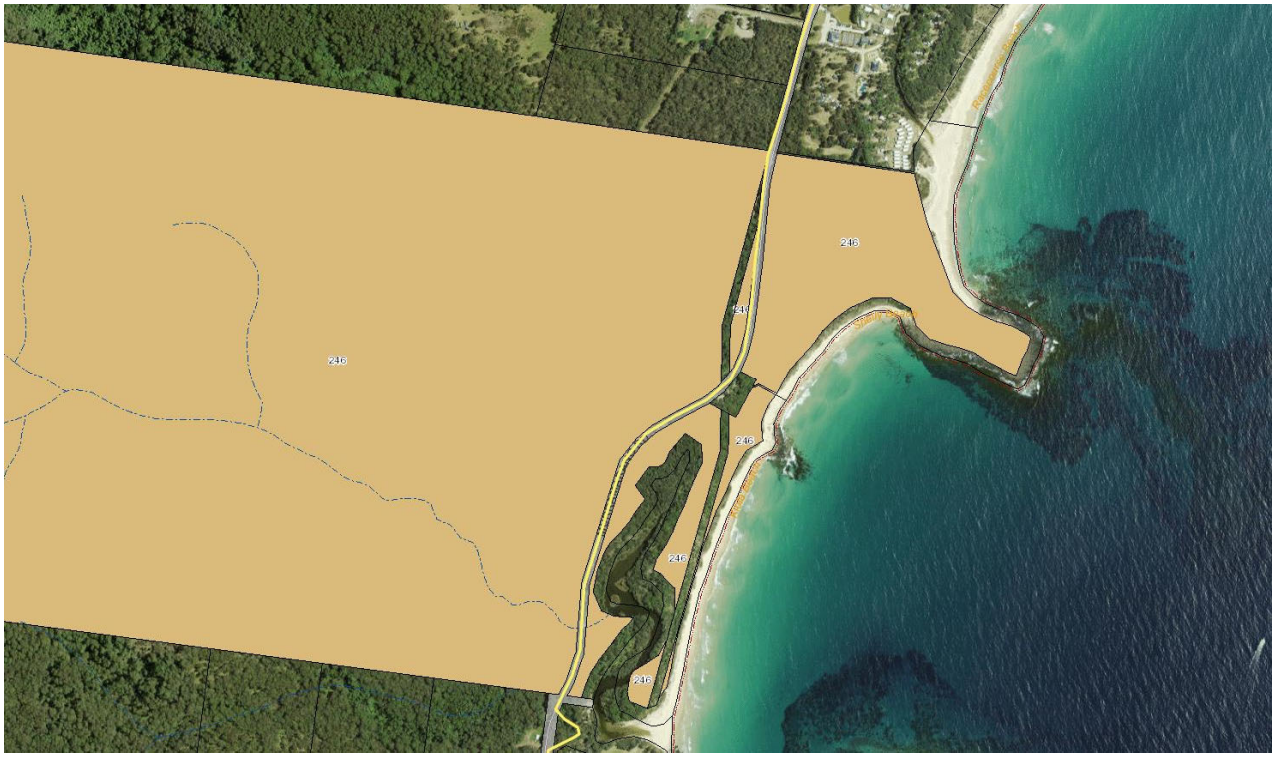
Photo 29. Tree with scarring on lower trunk

4.2 Non-Indigenous

The proposed road works would not come within proximity to items of local heritage significance or any items on the State Heritage Register or listed in the Shoalhaven Local Environmental Plan.

A heritage item exists over Lot 1 DP 782318 (Australian National University land) as shown in Figure 11 below. The heritage listing (NSW Heritage ID 2390439) applies to a Federation weatherboard residence which was the former mill manager's office and former Post Office, in association with nearby workers cottages. The heritage listing applies only to residential buildings. Each of these lie on the west side of Murramarang Rd, away from the road and at no risk of being impacted by the proposed SUP.

Figure 11. Heritage listed items in proximity to the proposal



5 CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Infrastructure SEPP

The proposed activity:

- would not be undertaken within or adjacent to land reserved under the *National Parks & Wildlife Act 1974*
- would not be undertaken within or adjacent to a marine park or aquatic reserve declared under the *Marine Estate Management Act 2014*
- would not be undertaken in the foreshore area within the meaning of the *Sydney Harbour Foreshore Authority Act 1998*
- does not comprise a fixed or floating structure in or over navigable waters
- is not a development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land.
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*, and
- would not be undertaken on flood liable land.

The consultation requirements specified under Part 2 of the Infrastructure SEPP therefore do not apply.

5.2 NSW Department of Primary Industries (Fisheries)

The proposal involves some disturbance and excavation in proximity to Butlers Creek, which occurs within an area mapped as Key Fish Habitat (refer to: https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/634351/ShoalhavenKFHMap.pdf), however will not involve dredging or reclamation within the creek-line or impact to riparian vegetation. An enquiry was sent to DPI Fisheries to determine the need for authorisation. The response received from Jillian Reynolds, Fisheries Manager, NSW Department of Primary Industries, on 11 March 2020 (D20/85216) stated

"As the works will be taking place in within the existing bridge embankment and are out of the creek channel then a permit will not be required for these works. Please ensure that best practice sediment and erosion controls are fully implemented to protect the waterway from any run off."

A Fisheries Permit is therefore not required.

6 COMMUNITY ENAGAGEMENT

The SUP project has had widespread community support by the Bawley Point and Kioloa communities since its inception in 2013 and has been unfolding in stages with continued support and input from Bawley Point & Kioloa Community Association and Community Connect Committee (e.g. D19/390185 and D19/21124).

A licence agreement has been reached with Australian National University (LD7730) for constructing the SUP over areas within Lot 1 DP 782318 – part of Area G, as referred to in this REF.

Discussions are in progress involving pursuit of a licence agreement with J.Nelson (see D19/232685), owner of Lot 2 DP 579750 as an interim measure preceding land acquisition for minor encroachment between CH 3170 and 3380 (approx.) (refer to Sheet 3 of attached Preliminary Plans – D20/92400).

Agreement is yet to be reached with Roche Group Pty Ltd as lessee of Part Lot 130 DP 40869 for construction of the SUP over areas within this lot.

7 SIGNIFICANCE EVALUATION

The proposed activity, which includes the implementation of the environmental safeguards specified in Section 1.3, is unlikely to have a significant impact on the environment for the following reasons:

- An assessment of the statutory matters of consideration reveals no potential medium or high adverse impacts.
- All identified potential negligible or low adverse impacts are considered acceptable considering the need for the activity.
- There are a number of impact mitigation measures that would be in place to reduce any adverse environmental effect.
- The Section 2.3 threatened species impact assessment (NSW) including NSW *BC Act 2016* Test of Significance indicates that the proposed activity is unlikely to have a significance effect on threatened species, populations or ecological communities listed under NSW legislation. The evaluation of 'not significant' determines that an environmental impact statement, Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) is not required.
- The Section 2.4 threatened species impact assessment (Commonwealth) indicates that the proposed activity is unlikely to have a significance effect on threatened species, populations or ecological communities listed under the Commonwealth *EPBC Act 1999.*

8 DETERMINATION

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the *Environmental Planning and Assessment Act 1979*, of a proposal by Shoalhaven City Council for the construction of a Shared User Path (SUP) adjacent to Murramarang Road between Bawley Point and Kioloa.

Shoalhaven City Council has considered the potential environmental effects of the proposal and the effectiveness and feasibility of measures for reducing or preventing detrimental effects. It is determined that:

1. The proposed safeguards identified in the report (Section 1.3) shall be adopted and implemented.

2. It is unlikely that there will be any significant environmental impact as a result of the proposed work and an Environmental Impact Statement is not required for the proposed works.

3. The proposed activity is not likely to significantly affect NSW listed threatened species, populations or ecological communities, or their habitats and a SIS / BDAR is not required.

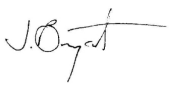
4. The proposed activity is not an EPBC Act 'controlled action' and does not require Commonwealth referral.

Troy Punnett

Unit Manager – District Engineer South

Shoalhaven City Council Date: ……..……

Document Review

	Name	Signature	Date
Author	Jeff Bryant		7/4/2020
Reviewer	Geoff Young		24/9/2021

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APPENDIX A: PRELIMINARY PLANS (see D20/92400) AND DETAILED PLANS FOR STAGE 1 (D21/413589)

APPENDIX B: NSW THREATENED SPECIES LIKELIHOOD OF OCCURRENCE TABLE

Likelihood of occurrence table

The table of likelihood of occurrence evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from Office of Environment and Heritage (OEH) Wildlife Atlas) around the subject site. Ecology information has been obtained from the Threatened Species Profiles on the NSW OEH website (www.threatenedspecies.environment.nsw.gov.au).

Likelihood of occurrence in study area

1. Unlikely – Species, population or ecological community is not likely to occur. Lack of previous recent (<25 years) records and suitable potential habitat limited or not available in the study area.
2. Likely – Species, population or ecological community could occur and study area is likely to provide suitable habitat. Previous records in the locality and/or suitable potential habitat in the study area.
3. Present – Species, population or ecological community was recorded during the field investigations.

Possibility of impact

1. Unlikely – The proposal would be unlikely to impact this species or its habitats. No EP&A Act 7-Part Test or EPBC Act significance assessment is necessary for this species.
2. Likely – The proposal could impact this species, population or ecological community or its habitats. An EP&A Act 7-Part Test and/or EPBC Act significance assessment is required for this species, population or ecological community.

Endangered Ecological Community name	*Status*	*Likelihood of presence within areas impacted by the activity*
Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions	Endangered - *NSW* BC *Act*	Mapped as occurring approximately 40m from the site near the southern end, but site surveys confirmed that this EEC does not occur in close proximity such that it is at risk of being impacted by the proposal. No vegetation removal will occur in proximity to this EEC. No indirect impacts including erosion and sediment movement will affect this EEC.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Endangered - *NSW* BC *Act* Vulnerable - Commonwealth *EPBC Act*	Mapped as occurring approximately 55m from the site at one point in the southern portion of the site, but site surveys confirmed that this EEC does not occur in close proximity such that it is at risk of being impacted by the proposal. No vegetation removal will occur in proximity to this EEC. No indirect impacts including erosion and sediment movement will affect this EEC.
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - *NSW* BC *Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 950m to the north of the site).

Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Endangered - *NSW* BC *Act* Critically Endangered - Commonwealth *EPBC Act*	Mapped as occurring over or in close proximity to the site in three locations.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 1.5km to the south of the site).
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - *NSW* BC *Act* Endangered - Commonwealth *EPBC Act*	Mapped as occurring in close proximity to the site in two locations.
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - NSW BC Act	Occurs in the surrounding area (approx. 430m to the south of the site), but site surveys confirmed that this EEC does not occur in close proximity such that it is at risk of being impacted by the proposal.

Species name	***Status***	***Habitat requirements (www.environment.nsw.gov.au)***	***Likelihood of presence within areas impacted by the activity***
FLORA			

Scrub Turpentine *Rhodamnia rubescens*	Critically Endangered *NSW* BC *Act*	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	No – no habitat present
AMPHIBIANS			
Green and Golden Bell Frog *Litoria aurea*	Vulnerable *EPBC Act* Endangered *NSW* BC *Act*	Heath, woodland and open dry sclerophyll forest on a variety of soil types except clay based. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Breeding frogs will call from open spaces, under vegetation or rocks or from within burrows in the creek bank. Egg masses are laid in burrows or under vegetation in small pools. After rains, tadpoles are washed into larger pools where they complete their development in ponds or ponded areas of the creekline. Tadpole development ranges from Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water.	No suitable habitat occurs on site. However, records occur in the locality including one on Butler Creek approx. 880m upstream of the site.
MICRO-CHIROPTERAN BATS			
Eastern Bentwing-bat *Miniopterus orianae oceanensis*	Vulnerable *EPBC Act*	Specific caves are known maternity sites with other caves being primary roosting habitat outside breeding period. Also uses derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.

Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Vulnerable *NSW* BC *Act*	Prefers moist habitat that contains trees greater than 20 m high with a dense undertstorey. They are fast flyers. Roosts in hollow trunks of eucalyptus trees, in colonies of 3 – 80. Also may roost in caves and old wooden buildings. This species changes roost every night. Roosts on consecutive nights are usually less than 750 m apart. This species has a home range of up to 136 ha (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW). Although they prefer habitat with a dense understorey, they prefer to forage along flyways to avoid the thick understorey. They prefer continuous forest and avoid remnant vegetation. However, they have been recorded in open forests (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW).	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.
Eastern Freetail-Bat *Micronomus norfolkensis*	*Vulnerable NSW* BC *Act* Vulnerable *EPBC Act*	Small tree hollows/fissures in bark for roosting in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.
Golden-tipped Bat *Kerivoula papuensis*	*Vulnerable NSW* BC *Act*	Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, *Casuarina*-dominated riparian forest and coastal *Melaleuca* forests.	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.

		Roost mainly in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests, also in tree hollows, dense foliage and epiphytes; located in rainforest gullies on small first- and second-order streams. Will fly up to two kilometres from roosts to forage in rainforest and sclerophyll forest on mid and upper-slopes. Specialist feeder on small web-building spiders	
Greater Broad-nosed Bat *Scoteanaux ruepelli*	Vulnerable *NSW* BC *Act*	Found mainly in gullies and river systems that drain the Great Dividing Range, it utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, below 500m, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.
Southern Myotis (Large-footed Myotis) *Myotis macropus*	Vulnerable *NSW* BC *Act*	This species is predominantly roosts in caves, however, is known to roost in trees and man- made structures close to water. Roosts are generally located close to water, where the bats forage in small groups of three or four. They have a strong association with streams and permanent waterways in areas that are vegetated rather than cleared (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.

		They feed on small fish, prawns and aquatic macroinvertebrates. They have a preference towards large still pools, rather than flowing streams. They will also forage an aerial insects flying over water. They use their large feet to capture prey items (Churchill 2008).	
BIRDS			
Eastern Ground Parrot *Pezoporus wallicus wallicus*	Vulnerable *NSW* BC Act	The Eastern Ground Parrot occurs in near coastal low heathlands and sedgelands, generally below one metre in height and very dense (up to 90% projected foliage cover). These habitats provide a high abundance and diversity of food, adequate cover and suitable roosting and nesting opportunities for the Ground Parrot, which spends most of its time on or near the ground. When flushed, birds fly strongly and rapidly for up to several hundred metres, at a metre or less above the ground (OEH 2013)	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Eastern Reef Egret *Egretta sacra*	Migratory *EPBC Act*	The Eastern Reef Egret lives on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Gang-gang Cockatoo *Callocephalon fimbriatum*	*Vulnerable NSW* BC *Act*	Tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. preferring more	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.

		open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting	
Glossy Black-cockatoo *Calyptorhynchus lathami*	Vulnerable *NSW* BC *Act*	The GBC inhabits open forest and woodlands of the coast where stands of she-oak occur. In the Jervis Bay region they feed almost exclusively on the seeds of the black she-oak *Allocasuarina littoralis*, shredding the cones with their bill	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected. No feed trees were observed during survey.
Hooded Plover *Thinornis rubricollis*	*NSW* BC *Act:* Critically Endangered *EPBC Act:* Vulnerable	In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh. Hooded Plovers forage in sand at all levels of the zone of wave wash during low and mid-tide or among seaweed at high-tide, and occasionally in dune blowouts after rain. At night they favour the upper zones of beaches for roosting. When on rocks they forage in crevices in the wave-wash or spray zone, avoiding elevated rocky areas and boulder fields. In coastal lagoons they forage in damp or dry substrates and in shallow water, depending on the season and water levels. In eastern Australia, Hooded Plovers usually breed from August to March on sandy ocean	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

		beaches strewn with beachcast seaweed, in a narrow strip between the high-water mark and the base of the fore-dunes. They often nest within 6 m of the fore-dune, mostly within 5 m of the high-water mark, but occasionally among or behind dunes.	
Little Eagle *Hieraaetus morphnoides*	Vulnerable *NSW* BC Act	Occupies open eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected.
Little Lorikeet *Glossopsitta pusilla*	Vulnerable NSW BC ACT	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca 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 Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.

Masked Owl – *Tyto novaehollandiae*	Vulnerable *NSW* BC *Act*	Dry eucalypt forests and woodlands from sea level to 1100 m. Inhabits forest but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Requires old growth elements-hollow bearing tree resources for nesting and prey source.	Possibly occurring transiently over or within the site outside of construction hours. Highly mobile species. No important habitat will be removed or otherwise affected.
Powerful Owl *Ninox strenua*	Vulnerable NSW BC Act	Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda,* Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. requires old growth elements-hollow bearing tree resources for nesting and prey resource. Nests in large tree hollows in large eucalypts that are at least 150yrs old. Often in riparian areas. Large home range	Possibly occurring transiently over or within the site outside of construction hours. Highly mobile species. No important habitat will be removed or otherwise affected.
Ruddy Turnstone *Arenaria interpres*	Migratory EPBC Act	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

		sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In southern Australia the Ruddy Turnstone prefers rockier coastlines and is less numerous on large embayments with extensive mudflats. The Ruddy Turnstone mainly forages between lower supralittoral and lower littoral zones of foreshores, from strand-line to wave-zone. They often forage among banks of stranded seaweed or other tide-wrack. They are also known to forage on exposed rocky platforms, coral reefs and mudflats. In the south-east Gulf of Carpentaria they feed only on mangrove mudflats, especially those near shingle beaches. Sometimes they feed around coastal lagoons and sewage treatment ponds, occasionally among low vegetation in saltmarsh, on exposed beds of seagrass, or among dunes on coral cays. The have sometimes been known to forage in grassy areas above the tideline, in short pasture, or in ploughed paddocks. The Ruddy Turnstone roosts on beaches, above the tideline, among rocks, shells, beachcast seaweed or other debris. They have also been observed roosting on rocky islets among grassy tussocks, and on mudflats and sandflats. They sometimes fly around, or land on, ships at sea	
Short-tailed Shearwater *Ardenna tenuirostris*	Migratory *EPBC Act*	Coastal, oceanic.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

Shy Albatross *Thalassarche cauta*	*NSW* BC *Act* Vulnerable *EPBC Act* Vulnerable	This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea. While at sea, it soars on strong winds and when calm, individuals may rest on the ocean, in groups during the breeding season or as individuals at other times. Occasionally the species occurs in continental shelf waters, in bays and harbours. The species feeds on fish, crustaceans, offal and squid and may forage in mixed-species flocks. Food may be caught by seizing prey from the water's surface while swimming, by landing on top of prey, diving for prey beneath the water and by scavenging behind fishing vessels. Known breeding locations include Albatross Island off Tasmania, Auckland Island, Bounty Island and The Snares, off New Zealand, where nesting colonies of 6-500 nests occur and may contain other species such as the Australian Gannet. Located on sheltered sides of islands, on cliffs and ledges, in crevices and slopes, nests are used annually and consist of a mound of mud, bones, plant matter and rocks.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Sooty Owl *Tyto tenebricosa*	Vulnerable *NSW* BC *Act*	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests	Possibly occurring transiently over or within the site outside of construction hours. Highly mobile species. No important habitat will be removed or otherwise affected.
Sooty Oystercatcher *Haematopus fuliginosus*	Vulnerable *NSW* BC *Act*	Shore bird – breeds in sand or coral scrapes on offshore islands	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

Sooty Tern *Onychoprion fuscata*	Vulnerable *NSW* BC *Act*	The Sooty Tern is found over tropical and sub-tropical seas and on associated islands and cays around Northern Australia. In NSW only known to breed at Lord Howe Island. Occasionally seen along coastal NSW, especially after cyclones. The Sooty Tern is found over tropical and sub-tropical seas and on associated islands and cays around Northern Australia. In NSW only known to breed at Lord Howe Island. Occasionally seen along coastal NSW, especially after cyclones.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Square-Tailed Kite *Lophoictinia isura*	*Vulnerable NSW* BC *Act*	Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses large hunting ranges of more than 100km2 Nest within large hollow bearing trees generally within 200m of riparian areas.	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected.
Swift Parrot *Lathamus discolour*	Endangered *EPBC Act* Endangered *NSW* BC *Act*	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*), and White Box (E. albens). Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected.

		Blackbutt E. pilularis. Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable *NSW* BC *Act*	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.
Wedge-tailed Shearwater *Ardenna pacificus*	Migratory *EPBC Act*	A pelagic, marine bird known from tropical and subtropical waters. The species tolerates a range of surface-temperatures and salinities, but is most abundant where temperatures are greater than 21 °C and salinity is greater than 34.6 %. In tropical zones the species may feed over cool nutrient-rich waters. The species has been recorded in offshore waters of eastern Victoria and southern NSW, mostly over continental slope with sea-surface temperatures of 13.9–24.4 °C and usually off the continental shelf in north-west Australia.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	*NSW* BC *Act* Vulnerable Migratory *EPBC Act*	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterized by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. The species is mostly recorded in coastal lowlands, but can occupy habitats up to	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected.

		1400 m above sea level on the Northern Tablelands of NSW and up to 800 m above sea level in Tasmania and South Australia. Birds have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. They also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding has been recorded on the coast, at inland sites, and on offshore islands. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land. Forages over large expanses of open water; this is particularly true of birds that occur in coastal environments close to the sea-shore, where they forage over in-shore waters. However, the White-bellied Sea-Eagle will also forage over open terrestrial habitats (such as grasslands). Birds may move to and congregate in favorable sites during drought or food shortage.	
MAMMALS			
Eastern Pygmy-possum *Cercatetus nanus*	Vulnerable NSW BC Act	Rainforest, sclerophyll forest & woodland to heath – but heath & woodland preferred. Forages on banksias, eucalypts & bottlebrushes.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

Greater Glider *Petauroides Volans*	Vulnerable EPBC Act	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age. Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent. Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees. Very loyal to their territory.	Possibly occurring within or in close proximity to the site. Records occur immediately adjacent to the road.
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable *EPBC Act* Vulnerable *NSW* BC *Act*	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected.
Koala *Phascolarctos cinereus*	Vulnerable NSW BC Act	Eucalypt woodland and forest Home range sizes vary with quality of habitat ranging from less than two ha to several hundred ha. Preferred tree species on the south coast are *Eucalyptus amplifolia, E.viminalis,* & *E.tereticornis* but numerous other species also known food trees.	Possibly occurring on site. *Eucalyptus tereticornis* is listed as a feed tree under SEPP 44 – Koala Habitat Protection.
Southern Brown Bandicoot (eastern) *Isoodon obesulus obesulus*	Endangered EPBC Act Endangered NSW BC Act	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

		feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees Xanthorrhoea spp., blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest.	
Spotted-tailed Quoll *Dasyurus maculatus*	Endangered *EPBC Act* Vulnerable *NSW* BC *Act*	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	Possibly occurring within or in close proximity to the site. Records occur immediately adjacent to the road.

Squirrel Glider *Petaurus norfolcensis*	*NSW* BC *Act* Vulnerable	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
White-footed Dunnart *Sminthospsis leucopus*	Vulnerable NSW BC Act	Dry sclerophyll forests, sedgeland or heathland-coastal dune vegetation, coastal forest, tussock grassland and woodland and forest post disturbance – open understorey layer. They shelter in bark nests in hollows under standing or fallen timber, burrows in the ground, piles of logging debris, large grass clumps such as provided by Grass Trees *Xanthorrhoea* spp.and Cycads *Macrozamia* spp. and rock crevices	Possibly occurring within or in close proximity to the site. A record occurs approx. 230 west of the road.
Yellow-bellied Glider - *Petaurus Australis*	Vulnerable *NSW* BC *Act*	Forest with old growth elements. Large Eucalypt Hollows for denning- Inhabits mature or old growth Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia mid storey. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar.	Possibly occurring within or in close proximity to the site. Records occur immediately adjacent to the road.

		Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	